DEPARTMENT OF FINANCE (DOF)
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS (DPWH)
DEPARTMENT OF INTERIOR AND LOCAL GOVERNMENT (DILG)
THE REPUBLIC OF THE PHILIPPINES

THE URGENT DEVELOPMENT STUDY ON THE PROJECT ON REHABILITATION AND RECOVERY FROM TYPHOON YOLANDA IN THE PHILIPPINES

FINAL REPORT (II)

MAIN REPORT

VOLUME 2: QUICK IMPACT PROJECTS

FEBRUARY 2017

JAPAN INTERNATIONAL COOPERATION AGENCY

ORIENTAL CONSULTANTS GLOBAL CO., LTD.
CTI ENGINEERING INTERNATIONAL CO., LTD.
PACIFIC CONSULTANTS CO., LTD.
YACHIYO ENGINEERING CO., LTD.
PASCO CORPORATION

E I
J R
17-019

DEPARTMENT OF FINANCE (DOF)
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS (DPWH)
DEPARTMENT OF INTERIOR AND LOCAL GOVERNMENT (DILG)
THE REPUBLIC OF THE PHILIPPINES

THE URGENT DEVELOPMENT STUDY ON THE PROJECT ON REHABILITATION AND RECOVERY FROM TYPHOON YOLANDA IN THE PHILIPPINES

FINAL REPORT (II)

MAIN REPORT

VOLUME 2: QUICK IMPACT PROJECTS

FEBRUARY 2017

JAPAN INTERNATIONAL COOPERATION AGENCY

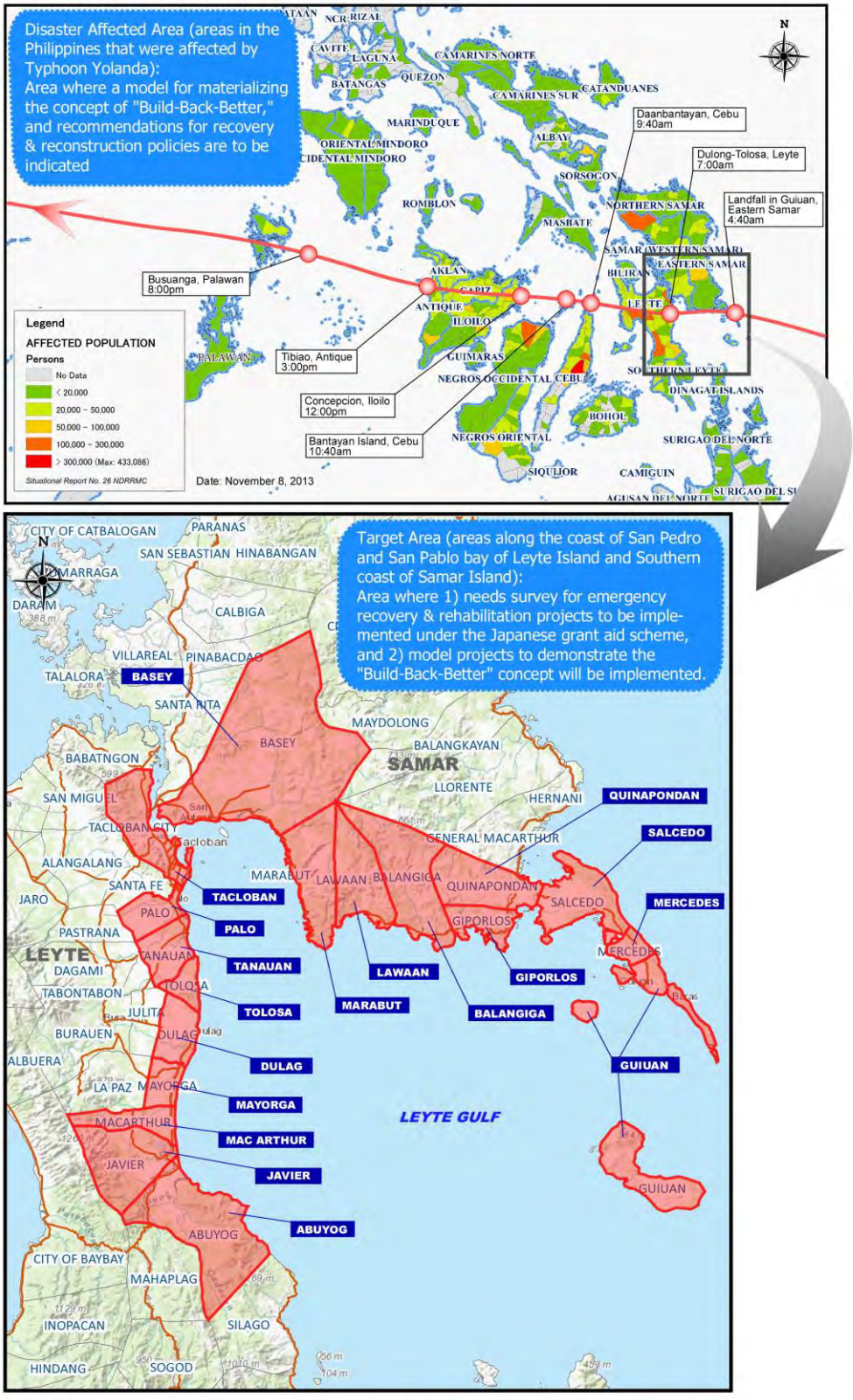
ORIENTAL CONSULTANTS GLOBAL CO., LTD.
CTI ENGINEERING INTERNATIONAL CO., LTD.
PACIFIC CONSULTANTS CO., LTD.
YACHIYO ENGINEERING CO., LTD.
PASCO CORPORATION

Composition of Final Report (II)

Summary		
Main Report	Volume 1	Recovery and Reconstruction Planning
	Volume 2	Quick Impact Projects
Appendix	Technical Supporting Report 1 (Volume 1, Chapter 2)	
	Technical Supporting Report 2 (Volume 1, Chapter 3 and 4)	
	Technical Supporting Report 3 (Volume 2)	

US$ 1.00 = Phillipines Peso (PHP) 49.68 = Japanese Yen ¥ 117.38

(January, 2017)



Map of the Disaster Affected Area and Target Area

Republic of the Philippines

The Urgent Development Study on
The Project on Rehabilitation and Recovery from Typhoon Yolanda

Final report (II)

Main Report
Volume 2: Quick Impact Projects

Table of Contents

List of Tables (Volume 2)

Page

Chapter 1 Formulation of Quick Impact Projects

Chapter 2 Implementation of Quick Impact Projects

Chapter 4 Lessons Learned from Quick Impact Projects

List of Figures (Volume 2)

Page

Chapter 1 Formulation of Quick Impact Projects

Chapter 2 Implementation of Quick Impact Projects

Abbreviations

ADB	:	Asian Development Bank
BFAD	:	Bureau of Food and Drug
BFAR	:	Bureau of Fisheries and Aquatic Resources
BOQ	:	Bill of Quantities
CD	:	Capacity Development
CHB	:	Concrete Hollow Block
DAC	:	Development Assistance Committee
DAR	:	Department of Agrarian Reform
DILG	:	Department of Interior and Local Government
DOH	:	Department of Health
DOLE	:	Department of Labor and Employment
DOST	:	Department of Science and Technology
DPWH	:	Department of Public Works and Highways
DRRM	:	Disaster Risk Reduction and Management
DSWD	:	Department of Social Welfare and Development
DTI	:	Department of Trade and Industry
EVRMC	:	Eastern Visayas Regional Medical Center
FAO	:	Food and Agriculture Organization of the United Nations
FIC	:	Food Innovation Center
FY	:	Fyscal Year
GMFDC	:	Guiuan Marine Fisheries Development Centre
GoP	:	Government of the Philippines
HDPE	:	High Density Polyethylen
IOM	:	International Organization for Migrants
JICA	:	Japan International Cooperation Agency
LGU/PLGU/CLGU/MLGU	:	Local Government Unit/Provinial LGU, City LGU, Municipal LGU
LMBTC	:	Leyte Marine Biotoxin Testing Center
LTO	:	Licence to Operate
NAS	:	National Agriculture School
NHS	:	National High School
NIFTDC	:	National Integrated Fisheries Technology Development Center

OJT	:	On the Job Training
PCA	:	Phillipine Coconut Authority
PCIC	:	Philippine Crop Insurance Corporation
PE	:	Polyethylen
PHO	:	Provincial Health Office
PPE	:	Personal Protection Equipment
PQ	:	Pre-Qualificaiton
PWD	:	Persons with Disorders
QIP	:	Quick Impact Project
RAY	:	Reconstruction Assitance on Yolanda
RHU	:	Rural Health Unit
SCWFA	:	Santa Cruz Women Fisheries Association
SMACHS-EV	:	Strengthening Maternal and Child Health Services in Eastern Visayas
TESDA	:	Technical Education and Skills Development Authority
UNDP	:	United Nations Develpment Programme
VSU	:	Visaya State University

Chapter 1 Formulation of Quick Impact Projects

1.1 Background and Objectives of Quick Impact Projects

1.1.1 Background of Quick Impact Projects

With the strong efforts of the Government of the Republic of the Philippines (GoP) and with support from various International Organizations, donor countries and NGOs in humanitarian assistance including provision of shelter, food, drinking water, sanitation, education and support for the vulnerable, the areas hit by Typhoon Yolanda somewhat managed to avoid the worst-case scenario of humanitarian crisis. However, although many of the humanitarian assistance organizations had been gradually withdrawing, the people still lack appropriate measures for issues such as securing material for construction of shelters, support for resuming livelihood activities, disposal of fallen coconut trees, recovering of community facilities, recovery of equipment for fisheries, support for inter-cropping, securing of coconut seedlings, and have been dependent on external support.

Under such circumstance, the GoP prepared the Reconstruction Assistance of Yolanda (RAY). However, the RAY is yet to be implemented in a comprehensive form, and issues on substantial means for recovery of livelihood and rebuilding of the community are still evident. With more typhoon seasons coming near, every possible measure should be also undertaken in order to reconstruct the functions of the government and community, and to strengthen their capacity for disaster risk reduction and management.

1.1.2 Objectives of Quick Impact Projects

The Quick Impact Projects (QIPs) are implemented with the aim of promoting the process of reconstruction by contributing to the restarting of economic activities, reconstruction of daily lives, and strengthening of government organizations' capacities in implementing supportive measures for disaster management in the Target Area. At the same time, they also need to be completed within the Project Period, maintain appropriate quality, and secure a concrete structure for operation and maintenance.

1.2 Principles for Selection of Quick Impact Projects

Discussions on the directionalities for the selection of QIPs were made between the Japanese side and relevant organizations of the Philippines in order to select QIPs that are both necessary and effective for the disaster hit areas, and that can materialize the above aim to the maximum extent. As a result, the following directionalities were determined.

- Projects having high impact due to their implementation
- Projects having high synergetic effect when combined with the Japanese Grant Aid projects

- Projects contributing to the sharing of Japanese experience and technology
- Projects contributing to the reconstruction of livelihoods and the community
- Projects contributing to the strengthening of capacities of administrative organizations in supporting disaster management activities
- Projects that are not duplicating the activities of other donors

Based on the above, the Study Team developed the following three principles in order to materialize the six directionalities as actual candidate QIPs that respond to actual local needs. Apart from these principles, the two directionalities "projects with high impact" and "Projects that are not duplicating" were considered at the time of actual selection of the QIPs.

1.2.1 Reflecting Lessons Learned and Technologies Accumulated through Past Disasters in Japan to Recovery and Reconstruction

(1) Utilization of lessons learned in Higashi-Matsushima City of Miyagi Prefecture

In Higashi-Matsushima City, which suffered serious damage in the Great East Japan Earthquake, the local people used prefabricated facilities which were donated with the support of Germany as meeting places. It is said that the facilities were effectively used as places where the local people discussed their community rehabilitation plans. Through the experiences of Higashi-Matsushima City, early reconstruction of multi-purpose facilities (daycare centers) that can be utilized as venues for community meetings with prefabricated building units have been found to be very effective for recovery and reconstruction from disaster damage.

The peninsula-like topography of the area somewhat limits the access for construction material and other resources, making it difficult to procure them in sufficient quantity. Prefabricated building units using technologies applied in Japan shall be applied for early reconstruction of the destroyed daycare centers that can be used for multiple functions, as they can be transferred to construction sites easily and can be installed in a relatively short time and at small cost. At the same time, these units can maintain a certain level of rigidness. The reconstructed daycare centers, which will have a standard size of around $50m^2$, will be used for infants as daycare centers in the day time, while in the night time and weekends, they will be used as meeting places of the community to discuss topics such as issues on reconstruction of Barangays and necessary requests to government organizations.

(2) Utilization of Knowledge and Technologies of Japanese Skilled Builders

In both the Great Hanshin-Awaji Earthquake and the Great East Japan Earthquake that Japan has experienced in recent years as large-scale disasters, many skilled builders worked in the fields from all over the country during the recovery period. They used highly developed techniques in the reconstruction of public facilities and the construction of temporary housing so that disaster resilient public facilities were restored. However, in the affected areas of

Typhoon Yolanda, besides the use of construction material with due quality, the quality of local craftsmanship for construction is of concern, and improvement of local craftsmanship for construction is urgently needed to recover and re-construct public facilities in the near future.

In the Philippines, the Technical Education and Skills Development Authority (TESDA) is in charge of providing technical training to nurture skilled builders. In order to train skilled builders with the knowledge and technology applied in Japan, on-site technical training shall be given through the repairing of damaged school facilities. The graduates of TESDA training courses on carpentry, who will be involved in repair and reconstruction works as skilled builders, will be targeted as trainees. Sites for training shall be selected among school plots with buildings constructed through past Japanese Grant Aid Projects. The Buildings to be repaired shall be in the same plot, but constructed by local funds. Moreover, the training shall be recorded on video as training material and handed over to TESDA in order to enable continued training of Japanese technology by TESDA.

(3) Synergetic Effect with Grant Aid projects

Under the framework of this Project, the reconstruction of selected Rural Health Units (RHUs), which are the primary access points for basic medical services, and the Eastern Visayas Regional Medical Center (EVRMC), which is a tertiary medical facility, have been selected as candidate projects to be implemented under the Japanese Grant Aid scheme from the viewpoint of rehabilitating regional medical services.

Currently, the Provincial Health Office (PHO) of Leyte, which oversees the activities of RHUs, is also still damaged and has received no assistance from any donor organization. Rehabilitation of the PHO shall be selected in order reestablish the coordination structure with primary and tertiary medical facilities and to enable the RHUs to fully function after they are reconstructed through the Japanese Grant Aid project.

1.2.2 Supporting the Regeneration of Livelihood Activities and the Community

(1) Regenerating Livelihoods of Coconut Farmers

Agriculture and fisheries, which are the main industries of the area, suffered devastating damages by Typhoon Yolanda. The damage to agriculture is particularly significant in the coconut farms. According to estimates by the Philippine Coconut Authority (PCA), a total of 33 million coconut trees (295,191 ha) has been damaged in the whole of the Eastern Visayas (Region VIII). Accordingly, more than 1 million coconut famers have lost their means of income and are in critical situations. In order to rehabilitate the damaged coconut fields, fallen and standing decayed coconut trees must be removed and coconut seedlings must be newly planted. However, even if this is done, it will take nearly 10 years for local coconut trees or 6 to 7 years for improved varieties to start bearing fruits. In order to endure this period, farmers

will have to practice integrated farming such as intercropping and combination of crop production and livestock.

In response to the situation, the PCA and other international organizations such as the UNDP are supporting the removal of fallen or standing decayed coconut trees by providing chainsaws to the LGU or local residents. However, removal of the trees is not necessarily being done in an efficient manner due to the huge amount of trees and issues such as difficulties in management of the chainsaws. Trunks of fallen coconut trees are processed as timber for construction, and it has become a source of cash income. However, the quality of coco lumber is not suitable for building material, and it is expected that the supply of coco lumber will soon overwhelm the demand for the building material because the number of fallen trees is too large. On the other hand, the removal of damaged coconut trees is of urgent importance because they may induce an upsurge of pests that can also affect the remaining coconut trees.

Under such circumstance, charcoal production from fallen and standing decayed trees shall be introduced as an effective measure to cope with the removal of the damaged trees. Production of charcoal will not only satisfy the needs of farmers, but will also create a temporary source of income.

In the fields where the fallen coconut trees have been processed, horticulture crops will be also implemented to create a new source of income, as well as diversify farm work of the coconut farmers, and the risk from natural disasters will be reduced.

However, the local natural environment is unsuitable for the cultivation of horticultural crops and might give adverse effect on the crops. Therefore, in order to reduce crop cultivation risk, crop types that can endure the local natural environment will be selected and by using equipment that can be procured locally, cultivation technology will be tested, and the results along with information of intercropping such as crop rotation, will be arranged as a “Coco intercropping Manual”. Before the end of the project, the manual will be distributed to farmers and LGU, agricultural extension workers of DA, and sustainability of livelihood by coco intercropping will be aimed.

(2) Regenerating Livelihood of Fisherfolk

Fisheries in the Eastern Visayas (Region VIII), which includes the islands of Leyte and Samar, suffered devastating damages from Typhoon Yolanda. More than 20,000 boats, mainly owned by small independent fisherfolk were damaged, taking away the livelihood of more than 21,000 families. Most of the fish cages in the area were also washed away. Furthermore, damage was observed in all sorts of fishery related infrastructure in the area (i.e. company owned industrial fish cages, freezing facilities, hatcheries). After being hit by Typhoon Yolanda, the Government of the Philippines has promptly established the AHON Fisheries Rehabilitation Project in order to provide support for the affected fisher folks. However,

support for rehabilitation of fish culture activities has not shown significant progress.

The Basey Mariculture Park located in San Juanico Strait, with an annual production of 600 tons, is one of the major production centers for milkfish culture in Region VIII. The site was severely damaged by the storm surge caused by Typhoon Yolanda, with 265 ships and 110 rafts either destroyed or washed away. Under such conditions, fish-culture activities, which have been the main source of income for the facility, still remains shut down.

Depletion of aquatic resources in neighboring waters has been a crucial issue in the whole of the Philippines from the times before Typhoon Yolanda. With the situation becoming more and more difficult for fisherfolk to secure sufficient income through capture fishery by gill nets or fishing, the GoP has shown its direction to satisfy the market demand and secure the livelihoods of fisher folks through mariculture. Under such circumstance, restarting mariculture activities is an urgent issue.

Under such circumstance, Japanese technologies for typhoon resilient high-density polyethylene (HDPE) submersible fish cages shall be introduced in cooperation with BFAR, together with "Gawabari" techniques, which will improve the resiliency of fish cages against strong waves. The increased resilience of these facilities against typhoons will contribute to realizing the Build-Back-Better concept in rehabilitation of mariculture. Furthermore, submersible fish cages were already introduced in Palawan Island and have managed to endure Typhoon Yolanda.

Guiuan Bay which is located at the south eastern end of Samar Island has suitable habitat for the high-priced fish, grouper, and annually produces 100 tons (about 200 million pesos) from fishing and aquaculture using natural fingerlings. The live fishes were shipped to markets such as Manila and Hong Kong. However, the foundation for livelihood has collapsed due to the loss of fishing boats and fish cages due to the storm surge of Typhoon.

In consideration of the above, disaster resilient fish cages (high-density polyethylene submerged fish cage with improved mooring) shall be introduced to fisherfolk villages with relatively high dependency on fish farming in order to not only resume the livelihood of the fisherfolk but also to stabilize production in the medium-to-long term by improving productivity and applying operational measures that have less burden on natural resources.

On the other hand, support for oyster culture, which is practiced in a small scale in the Target Area, should be done with considerations on natural production capacity of the waters by utilizing Japanese knowledge and technology.

Working together with BFAR and MLGU in introducing the above disaster resilient mariculture technology is expected to enable the said technology to further expand to other areas in the islands of Samar and Leyte, and furthermore to the whole of the Philippines.

(3) Regeneration of Local Small-Scale Industries

There were cases in the Target Area where MLGUs were promoting processing activities for primary food products. Some local residents' groups were actually processing agricultural and fishery products under the support of DOLE and DSWD, which provided them with the necessary training and equipment. However, these groups could not resume their activities because Typhoon Yolanda brought serious damage to the buildings and manufacturing equipment for the processed food production site of these groups.

The main products produced by the residents' groups were fried noodles made with vegetables and fish meat, boneless fish products, meat products (sausage, seasoned meat, salami, etc.), and banana chips. There are significant needs for the resuming of these activities since these products were important sources of additional income for the local residents, particularly for women.

In consideration of the above, diversification of local income sources shall be promoted by supporting the residents' groups by the repairing of multi-purpose buildings, which will be used as the venues for processing of agro-fishery products, and provision of necessary equipment. Furthermore, gathering of individual processing activities to a single location near the Municipal Hall which has good accessibility is expected to contribute to further promotion of processing activities to nearby areas since they will have demonstration effects.

Diversification of income sources in areas that are largely dependent on coconut farming and fisheries is expected to contribute to the formulation of a more disaster resilient community in the area.

1.2.3 Strengthening Public / Community Facilities and their Disaster Resiliency

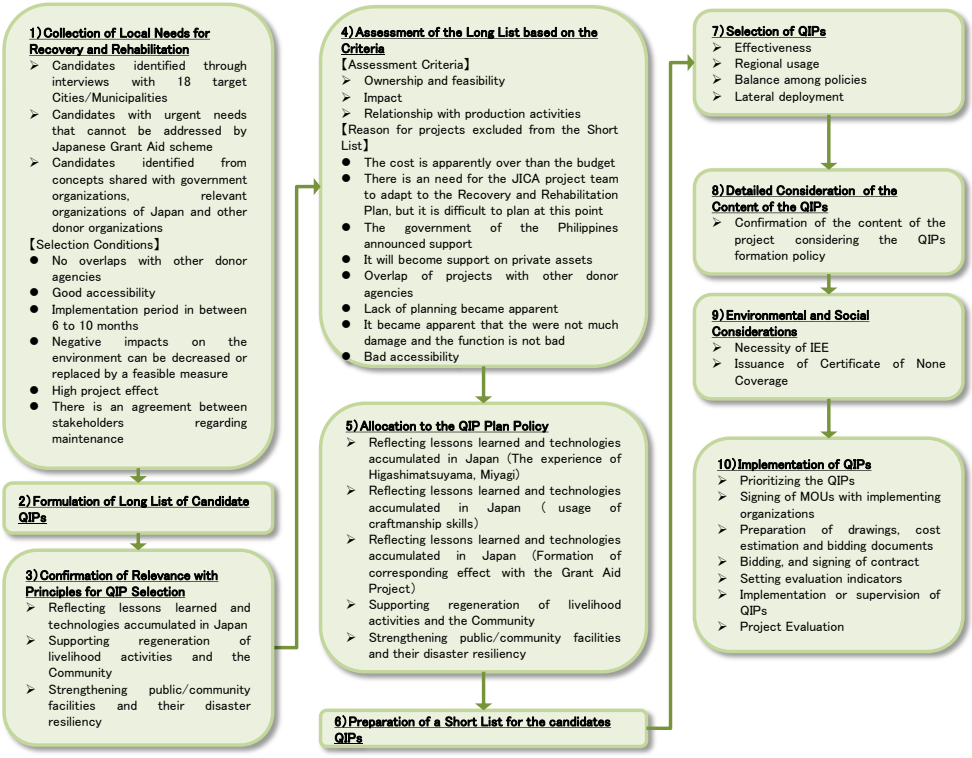
Huge numbers of houses and public facilities have suffered devastating damages from Typhoon Yolanda, of which the majority are yet to be reconstructed. The National Structural Code of the Philippines basically follows the design criteria applied in the USA. However, in reality, there are many difficulties in actually applying the code due to reasons such as; insufficiency in human resources that can prepare technical drawings based on the code, tendency of non-compliance due to financial issues, insufficient manpower in government offices to review the drawings, inappropriate construction supervision, and contractors not precisely following the technical designs. There are also cases observed where the institutional structures of some MLGUs were not necessarily sufficient for managing the technical quality of drawings and construction works. While Yolanda was indeed a typhoon with extraordinary power, a part of the reason for the extensive damage can also be found in the above. Although the MLGUs are in a position to reconstruct their public facilities and to resume their services to their constituents, realization of the concept of "Build-Back-Better" may not be easy under their current limitations.

In consideration of the above, the capacity of MLGU staff for management of technical drawings, cost estimation, bidding, contract and construction supervision in relation to repairing and reconstruction of public facilities shall be aimed at through co-working with the engineers and relevant offices during the whole process. Knowledge and technology on points to be focused on in repairing and strengthening of damaged points, as well as those for construction supervision will also be transferred to the relevant officers.

Increasing the capacity of MLGU officers through the above is expected to contribute to further recovery and reconstruction of other public facilities in a "Build-Back-Better" manner.

1.3 Flow of Quick Impact Project Formulation

Based on the above principles, the QIPs were selected through the process indicated in the Figure Below.



Source: JICA Study Team

Figure 1.3-1 Flow of Formulating Quick Impact Projects

1.3.1 Collection of Information Regarding Local Needs for Emergency Recovery and Rehabilitation

Candidate projects were selected from projects identified based on: 1) needs for rehabilitation and recovery of the 18 target City/Municipalities that were collected through interviews with their representatives, 2) urgent requirements that cannot be materialized through the Japanese Grant Aid scheme and 3) concepts that were shared from government agencies and other donor organizations.

Moreover, taking into consideration that the 18 target City/Municipalities have already prepared, or are currently preparing their City/Municipal Rehabilitation and Recovery Plans based on the instruction of the central government, the Study Team requested all target City/Municipalities to select projects with urgent need from their Rehabilitation and Recovery Plans in the light of the criteria listed below, and to present their information in Project Card formats prepared by the Study Team.

In addition to the above, Project Cards were also prepared for concepts that were shared from other organizations and urgent requirements that cannot be materialized through the Japanese Grant Aid scheme, after reviewing their conformity with the same criteria. The format for the Project Card is shown in Figure 1.3-2.

- No duplication with activities implemented by other donor organizations
- Physical access to the project site is easy
- Period required for implementation is within around 6 to 10 months
- Adverse impact to the natural and social environment can be avoided, mitigated or handled with feasible countermeasures
- Impact of the QIPs are very high
- Agreements on operation and maintenance are made with local stakeholders

The Long List of candidate QIPs has been formulated by gathering the Project Cards prepared through the above.

Date: / /2014	Leyte	Samar	East Samar
City / Municipalty	Tacloban / Palo / Tanauan / Tolosa / Dulag / Mayorga / Macarthur / Javier / Abuyong	Basey / Marabut	Law aan / Balangiga / Giporlos / Quinapondan / Salcedo / Mercedes / Quiuan
Name of Program / Project / Activity			Priority
Contact Parson			
Type of Program / Project / Activity	Infrastructure	Economy	Social
	Road / Bridge /Sport Facility / LGU's Facility / Street Light / Dranage / Others	Public marcket / Fishery / Agriculture / Others	Food control / Health Facility / School / Nurthly / Day Care Center
Barangay			
Damage	Damage of Facility	Cause	
	Totally / Partially	Heavy Rain / Big Wind / Tidal Wave (H = m)	
Out Put	Rehabilitation	Reconstruction	Capacity Building
	Facility / Equipment / Others	Facility / Equipment / Others	Training / Disaster Reduction / Others
Scale / Volume / Accessibility			
Estimated Cost			
Objective / Impact			
Beneficiaries			

Source: JICA Study Team

Figure 1.3-2 Project Card Format

1.3.2 Evaluation of Candidate Quick Impact Projects Based on the Criteria

The contents of the Project Cards were further scored in terms of four items (Table 1.3-1), in order to narrow down the candidate projects in the Long List into those with high impact and a

possibility for implementation. The criteria for scoring the four items are indicated in Table 1.3-2. Each of the items was evaluated with a maximum score of 5 points, whereas for item (1), a maximum score of 5 was applied as a total of its three sub-items.

Average Project Cost is expected to be around 20 million yen (approximately 8 to 9 million pesos) per project. However, particular importance was not attached to this item for scoring, since the costs indicated in the Project Cards were very course estimates.

Based on the results of scoring done through the above process, a Short List of candidate projects was prepared by selecting the three top-score projects from each City/Municipality. Initially, some projects for new construction of sea-walls and installation of landfills were indicated in the Short List. However, these projects were later excluded from the short list because the outputs from Component 1 of this Urgent Development Study (basic policies for rehabilitation and reconstruction), which can only be produced at later stages of the Study, needed to be considered for designing their scale and capacity.

In the process of reviewing the shortlist, some other projects were also excluded, such as; projects concerning repairing / reconstruction of buildings that are expected to be done with the support of DILG, projects with contents that are likely to duplicate the work of other donors and relevant organizations, and projects that are expected to receive budgeting from other sources.

Table 1.3-1 Items Evaluated

Items	Reason	Corresponding Content of the Project Card
(1) Ownership and possibility	Short implementation periods and high possibilities for actual implementation are to be selected as Quick Impact Projects among those identified in the City / Municipal Rehabilitation and Recovery Plans. The item was set so as to evaluate these points, Three sub-items will be included in this item. The "Priority" refers to the priority determined by the City / Municipality among the projects indicated in the Rehabilitation and Recovery Plans. The "Scale / Volume / Accessibility" as well as the "Estimated Cost" are set to evaluate whether or not the City / Municipality has a concrete plan for the project in terms of project scale and necessary cost, and to confirm that there are no problems in physical access to the project sites.	Priority Scale/Volume/ Accessibility Estimated Cost
(2) Impact	The item was set to evaluate the magnitude of impact that may be derived from the project.	Beneficiaries
(3) Productivity	The item was set to evaluate whether the implementation of the project will contribute to recovering economic activities and means of livelihood.	Type of Program / Project /Activity、Objective / Impact
(4) Expandability	The item was selected to evaluate the probabilities of project effects to further expand in the area through collaboration with other activities / organizations. This will further provide indication of the sustainability of the project activities. The item particularly focuses on aspects of economic, regional, and institutional expansibility, as well as that in terms of human resource	Type of Program / Project / Activity / Objective / Impact

Source: JICA Study Team

Table 1.3-2 Evaluation Points

Evaluation Items		Evaluation Points		
(1) Ownership and possibility	Priority	Priority 1,2, 3,4	Priority 5,6,7,8	Priority 9,10
		3	2	1
	Estimated Cost	Not more than 9 million pesos		More than 9 million pesos
		1		0
	Scale / Volume / Accessibility	Clearly described		Not clearly described or not described
		1		0
(2) Impact		Not less than 1,000	Less than 1,000	Not described
		5	2	0
(3) Productivity		Income/Working Supports	Consumer/Vocational Supports	No relations to Livelihood
		5	2	0
(4) Expandability		Over Local Economy/ Organizational Development	Local Economy/Independent Development	No Relations to Economy or Capacity Development
		5	2	0

Source: JICA Study Team

1.3.3 Selection of Emergency Recovery and Reconstruction Projects to be Implemented as Quick Impact Projects

Site surveys and interviews with City / Municipal engineers and other relevant officers were conducted for the candidate QIPs listed in the Short List. Information was collected on items such as; whether there are concrete implementation plans prepared, whether the C/MLGU is prepared to be proactively involved in the bidding process and construction supervision, and whether there are plans for operation and maintenance after the completion of the QIPs.

Subsequently, the selection of QIPs was done based on the policies discussed above, by confirming which policy the candidate QIP falls in. Furthermore, candidate QIPs were further narrowed down taking into consideration their effectiveness under the respective policies which they fall in, areal distribution projects, balance among the respective policies, and possibilities and means for further expansion of project activities in the future. The selected QIPs were then prioritized in consideration of implementation period, effectiveness, balance among individual policies and different sectors. The list of prioritized QIPs and reasons for prioritization of individual QIPs are indicated in Table 1.3-3 and Table 1.3-4, respectively.

The QIPs were basically planned to be able to deliver their outcomes independently. However, considerations were also made so that further synergy could be obtained when implemented together with the planned Japanese Grant Aid projects and other QIPs. For example, the milkfish produced in Basey (QIP-1), milkfish and oyster produced n Tanauan (QIP-15) and lapu-lapu produced in Guiuan (QIP-8) could be linked to the Guiuan Marine Fisheries Development Center (GMFDC), where equipment will be rehabilitated through a Japanese Grant Aid project. The GMFDC can contribute to these QIPs as one of the providers for fingerlings. Furthermore, a part of the lapu-lapu harvested from QIP-8 can be sold through the public market in Guiuan, which is reconstructed through QIP-9. The project for sales promotion (QIP-14) aims at formulating a

value chain from production of raw material to processing and sales, which is expected to significantly contribute to improving the livelihoods of the affected population. The two Rural Health Units (RHUs) in Leyte, which are also planned to be reconstructed in disaster resilient forms through Japanese Grant Aid projects, will contribute as a center for emergency medical activities during disasters. These facilities are expected to provide more functional and disaster resilient services to the users through collaboration with the Provincial Health Office, which will be reconstructed through QIP-2. Besides, the technical training to TESDA graduates and provision of training material (video and manual) are expected to largely contribute to the reconstruction of disaster resilient structures through collaboration with LGUs. The location and inter-relations of various activities from the view of the above synergies are indicated in Figure 1.3-4.

Table 1.3-3 List of Selected QIPs in Phase 1

QIP No.	Priority Group	Municipality	Project Name	Main Counterpart Agency	Supporting Agency	Remarks
QIP-1	I	Basey	Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish Culture)	Municipal Govt. of Basey	BFAR	
QIP-2	I	Palo	Recovery of Rural Public Health Service Support System through Reconstruction of Provincial Health Office	DOH	Leyte Province	
QIP-3	II	Tolosa	Regenerating Local Livelihoods through Processing of Agriculture and Fishery Products by Small-Scale Community Groups	Municipal Govt. of Tolosa	VSU	
QIP-4	II	Balangiga	Training on Disaster Resilient Construction Technologies through Reconstruction of National Agriculture School	TESDA		Trainers' and Graduates' training for TESDA and evaluation
QIP-5	II	Dulag	Training on Disaster Resilient Construction Technologies through Reconstruction of National High School	TESDA	DepED	Trainers' and Graduates' training for TESDA and evaluation
QIP-6	II	Salcedo	Reconstruction of Daycare Center for Community Rehabilitation (Vitalizing Peoples' Dialogue)	Municipal Govt. of Salcedo		
QIP-7	II	Guiuan	Reconstruction of Daycare Center for Community Rehabilitation (Vitalizing Peoples' Dialogue)	Municipal Govt. of Guiuan		
QIP-8	II	Guiuan	Regenerating Livelihood through Introduction of Disaster Resilient Submerged Fish Cage (Lapu-lapu Culture)	Municipal Govt. of Guiuan	BFAR	
QIP-9	III	Guiuan	Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market	Municipal Govt. of Guiuan		Capacity Development on LGU officers
QIP-10	IV	Dulag	Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Slaughter House	Municipal Govt. of Dulag		Capacity Development on LGU officers
QIP-11	IV	Mercedes	Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market	Municipal Govt. of Mercedes		Capacity Development on LGU officers
QIP-12	IV	Mayorga	Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market	Municipal Govt. of Mayorga		Capacity Development on LGU officers
QIP-13	V	Basey, Mercedes, Tacloban ,Tanauan and Tolosa*	Promotion of Local Products to Improve Livelihoods for the Survivors of Typhoon Yolanda	DTI	BFAR, Chamber of Commerce, DA, DOST, Relevant LGUs	
QIP-14	II	Mercedes	Regenerating Livelihood through Production of Coco Charcoal Briquette	Municipal Govt. of Mercedes	DA, PCA	
QIP-15	I	Tanauan	Integrated Culture of Oyster and Milkfish Improvement for Sustainable Aquaculture and Livelihood	Municipal Govt. of Tanauan	BFAR	

Source: JICA Study Team

* Other possible areas to be identified through the QIP.

Note:

BFAR: Bureau of Fisheries and Aquatic Resources, DA: Department of Agriculture, DepED: Department of Education, DOH: Department of Health, DOST: Department of Science and Technology, NFTDC: National Integrated Fisheries and Technology Development Center, PCA: Philippines Coconut Authority, TESDA: Technical Education and Skills Development Authority, VSU: Visaya State University

Table 1.3-4 Establishment of Priority Groups for QIPs and their Reasons (Phase 1)

Priority Group	Project Title	Project Site	Points Considered for the Categorization of Priority Groups
I	QIP-1 Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish Culture)	Basey	The QIP aims to re-establish milkfish farming, which was a conventional economic activity practiced in the area, in a form that is more resilient to typhoons by introducing Japanese technologies for submersible fish cages. The Municipality will co-manage the fish cages with BFAR and will lease them to the local fisherfolk. The fisherfolk will be responsible for the operation and daily maintenance, while the Municipality / BFAR shall take charge of large-scale repair and renewal of the structures. In order to do this, the Municipality/BFAR shall charge minimum service fees for the use of the equipment. Through this process, the Municipality/ BFAR will be able to obtain the know-how for the operation and management of the fish cages, and will be able to further expand the activities within the Municipality, as well as in the other areas in the region. Ultimately, the disaster resistant technology can be expected to be utilized in all areas affected by typhoons in the country, with Basey Mariculture Park being its model. At the same time, the QIP is also expected to contribute to the formulation of a value chain for fish through its future linkage with Guiuan Marine Fisheries Development Center, which is planned to be supported through the Japanese Grant Aid scheme. As indicated above, the QIP will contribute to reconstructing the local industry in a form that is more resilient to disasters and will directly contribute to the regeneration of local livelihoods. Furthermore, its effect is expected to expand beyond the borders of the Municipality. In consideration of such benefits, the QIP is categorized in Priority Group I.
I	QIP-15 Integrated Culture of Oyster and Milkfish Improvement for Sustainable Aquaculture and Livelihood	Tanauan	The QIP aims to re-establish oyster farming, which was a conventional economic activity practiced in the area. Local material will be used for the construction of fish-pens and oyster racks, so that the facilities can be easily re-established by the fisherfolk once it is damaged by possible future typhoons. Techniques for sustainable integrated culture of oyster and milkfish will be introduced in consideration of the natural production capacity of the site. The water quality of the site will be regularly monitored by the Leyte Marine Biotoxins Testing Center in order to avoid overcrowding of milkfish and oyster, which may result in eutrophication of the waters. Necessary technologies for the production system will be accumulated in the Municipality of Tanauan and BFAR (Leyte Province and Region 8 Office). A part of the products will be processed in order to add value. At the same time, the QIP is also expected to contribute to the formulation of a value chain for fish through its future linkages with the Guiuan Marine Fisheries Development Center, which is planned to be supported through the Japanese Grant Aid Scheme. Furthermore, the milkfish produced is also expected to be sold to the participants of another QIP (Regenerating Local Livelihoods through Processing of Agriculture and Fishery Products by Small-Scale Community Groups) which is also working on value adding to local agro-fishery products. As indicated above, the QIP will contribute to reconstructing the local industry in a form that is more sustainable, and will directly contribute to the regeneration of local livelihoods. Furthermore, the areas suitable for fish-pen culture of milkfish

Priority Group	Project Title	Project Site	Points Considered for the Categorization of Priority Groups
			widely exists in the area, the effect of the QIP is expected to expand beyond the borders of the Municipality. In consideration of such benefits, the QIP is categorized in Priority Group I.
I	QIP-2 Recovery of Rural Public Health Service Support System through Reconstruction of Provincial Health Office	Palo	The QIP aims to recover the functions of the Provincial Health Office (PHO) in supporting the Rural Health Units (RHUs), which are the terminal public health service providers in the region. The functions of the PHO include; 1) support for the 44 RHUs in the Province for the implementation of central policies and programs, and monitoring of services provided, 2) Coordination between the central administration and RHUs, 3) Collection of Provincial and Municipal level data related to public health services and health indices. Reconstruction of the PHO office as well as support for necessary equipment will enable the resumption of stagnated services (issuance of birth certificates and health certificates, provision of administrative training for RHUs, distribution of vaccines, etc.) and contribute to enhancing basic health services in the Province. Furthermore, appropriate designing and construction for the repair works will contribute to increasing the disaster resiliency of the supporting structure for basic health services. As indicated above, the QIP contributes to the reconstruction of the basic public health services of the entire Province by early recovery of the supporting structure for public health services. The QIP is also expected to have synergetic effects with the RHUs which are planned to be rehabilitated under the Japanese Grant Aid scheme. Moreover, urgent recovery is required by the PHO for the stagnated services, such as provision of vaccines to RHUs and issuance of documents necessary for visa applications by migrant workers (birth certificates and health certificates). In consideration of these aspects, the QIP is categorize into Priority Group I.
II	QIP-8 Regenerating Livelihood through Introduction of Disaster Resilient Submerged Fish Cage (Lapu-lapu Culture)	Guiuan	The QIP aims to re-establish grouper (Lapu-lapu) farming, which was a conventional economic activity practiced in the area, by introducing disaster resilient fish cages (submerged fish cages made of high-density polyethylene and improved mooring) and a fish culture system with less load on natural resources (regulation of capturing natural fingerlings and gradual transition to artificial assorted feed), in order to regenerate the economic foundation of fish farmers and to stabilize its production in the mid to long term. The Municipality will co-manage the fish cages with BFAR and will lease them to the local fisherfolk. The fisherfolk will be responsible for the operation and daily maintenance, while the Municipality/ BFAR shall take charge of large-scale repair and renewal of the structures. In order to do this, the Municipality/BFAR shall charge minimum service fees for the use of the equipment. Through this process, the Municipality/BFAR will be able to obtain the know-how for the operation and management of the fish cages, and will be able to further expand the activities within the Municipality. In the future, seedlings used for grouper farming will shift to artificially raised fingerlings that will be produced in the Guiuan Marine Fisheries Development Center, which is planned to be supported through a Japanese Grant Aid scheme, so as to reduce the dependency on natural fingerlings. Furthermore, the QIP is expected contribute to the establishment of the entire value chain through its linkage with

Priority Group	Project Title	Project Site	Points Considered for the Categorization of Priority Groups
			the later mentioned QIP titled "Improving Municipal Capacity for Disaster Resilient Construction Project Management (Reconstruction of Guiuan Public Market)." As indicated above, the QIP will contribute to reconstructing the local industry in a form that is more resilient to disasters and will directly contribute to the regeneration of local livelihoods. Furthermore, its effects are expected to expand beyond the borders of the Municipality. However, since the sites suitable for grouper farming is rather limited, the magnitude of expansion is expected to be lower than the QIPs in Priority Group I. Therefore, the QIP is categorized into Priority Group II.
II	QIP-3 Regenerating Local Livelihoods through Processing of Agriculture and Fishery Products by Small-Scale Community Groups	Tolosa	The QIP will contribute to promoting the diversification of income sources for the local residents by supporting residents' organizations for food processing activities through repairing a multi-purpose building that can be used as processing centers, and by providing necessary equipment for processing activities. Processing activities of agro-fishery products (deboning of milkfish, producing noodles from fish meat and vegetables, production of sausages, etc.) were already practiced by small-scale residents' groups before Typhoon Yolanda. Therefore, it is expected that it will be relatively easy to resume these activities by installing a processing center with a kitchen and necessary equipment (small equipment such as refrigerator, tables and common kitchenware, hand operated pasta machine, etc. Necessary equipment will be decided through discussions with the residents' groups). In addition, gathering of the individual processing activities, which were practiced in dispersed locations, to a site with good access near the Municipal Hall is expected to bear demonstration effects to neighboring areas. Through such effect, it is expected that processing activities will also expand to areas outside of the borders of Tolosa. With local means of livelihoods largely biased on coconut farming and fisheries, diversification of livelihood activities is expected to contribute to formulating a community that is more resilient to disasters. As indicated above, the QIP is expected to contribute to increasing disaster resiliency of the area by promoting diversification of economic activities. Furthermore, the effect of the QIP is expected to expand beyond the borders of the Municipality. However, considering that the scale of activities and area of expansion is expected to be lower than those of the QIPs in Priority Group I, the QIP is categorized into Priority Group II.
II	QIP-14 Regenerating Livelihood through Production of Coco Charcoal Briquette	Mercedes	The QIP aims to accelerate the removal of fallen trees and standing dead stocks from the coconut fields damaged by Typhoon Yolanda, in order to resume the production of coconut production and to promote inter cropping, which will be an important income source for the coconut farmers until the replanted coconut trees start baring fruits. Promotion of inter cropping after the coconut fields are cleared is also expected to increase the resiliency of coconut farmers because their sources of income will be diversified, meaning that they will be able to obtain a certain amount of income even when coconut trees are damaged again by possible future typhoons. The fallen trees and standing dead stocks will be processed into charcoal by applying "*Fuse Yaki*" method, which is a simple method for charcoal production that has been practiced

Priority Group	Project Title	Project Site	Points Considered for the Categorization of Priority Groups
			in Japan. The produced charcoal will be sold to markets in order to generate cash income, which will be an incentive for the coconut farmers for clearing their coconut fields. Since charcoal produced from coconut trunks are products that have not been used in the area, and because the quality of this charcoal is not as high as those produced from coconut shells, possibilities for processing them into charcoal briquettes will also be examined. Briquetting equipment and techniques will also be introduced to the area if briquetting is proved to add value to the products. As indicated above, the QIP is expected to contribute to the re-establishment of coconut farming through the clearing of coconut fields. The QIP will also directly contribute to the local livelihood through providing means for supplemental cash income. The activities are simple and can be expanded beyond the borders of the Municipality. However, taking into consideration that there are also other means for clearing the damaged coconut fields such as cash for work activities, the QIP is categorized into Priority Group II.
II	QIP-4 Training on Disaster Resilient Construction Technologies through Reconstruction of National Agriculture School	Balangiga	The QIP aims to enhance the technical skills of skilled workers by utilizing the reconstruction of Balangiga National Agriculture School (mainly providing vocational training) as a training material for teaching disaster resilient design and construction techniques. Training will be provided in collaboration with the Technical Education and Skills Development Authority TESDA, an organization providing a series of vocational training including construction techniques, and graduates of TESDA training courses, who will be involved in the construction / repair works as skilled workers will be targeted as the trainees. The QIP will start by reviewing the technical drawing that is already being prepared by TESDA and training will be conducted by utilizing an existing OJT scheme (as a part of its curriculum, TESDA is sending its trainees to contractors for OJT). In the QIP, TESDA trainers and training course graduates shall be employed by a contractor in order to perform OJT under the supervision of the Study Team during the whole process of reconstruction. A skilled worker from Japan will be invited to the site, particularly at the stage of preparation to fixing of trusses and tiling of the roof, which is a critical stage as it largely influences the susceptibility to typhoons, so that the trainees can obtain the knowledge and techniques applied in Japan. Training activities with the Japanese skilled worker will be recorded on video and handed over to TESDA as training material, so that the technique can be further taught to future trainees. By widely sharing knowledge and technology for disaster resilient designing and construction among the trainees, the QIP is expected to contribute to the reconstruction of the disaster hit areas based on appropriate skills, and contribute to the reconstruction of disaster resilient public facilities. At the same time, the knowledge and technologies transferred to the TESDA trainers are also expected to be further inherited by future trainees after the QIP is completed. As for indirect effects, with skills improved through the training, the access of trainees to income opportunities is also expected to improve. The reconstruction of the Balangiga National Agriculture School (vocational school) will benefit the disaster hit

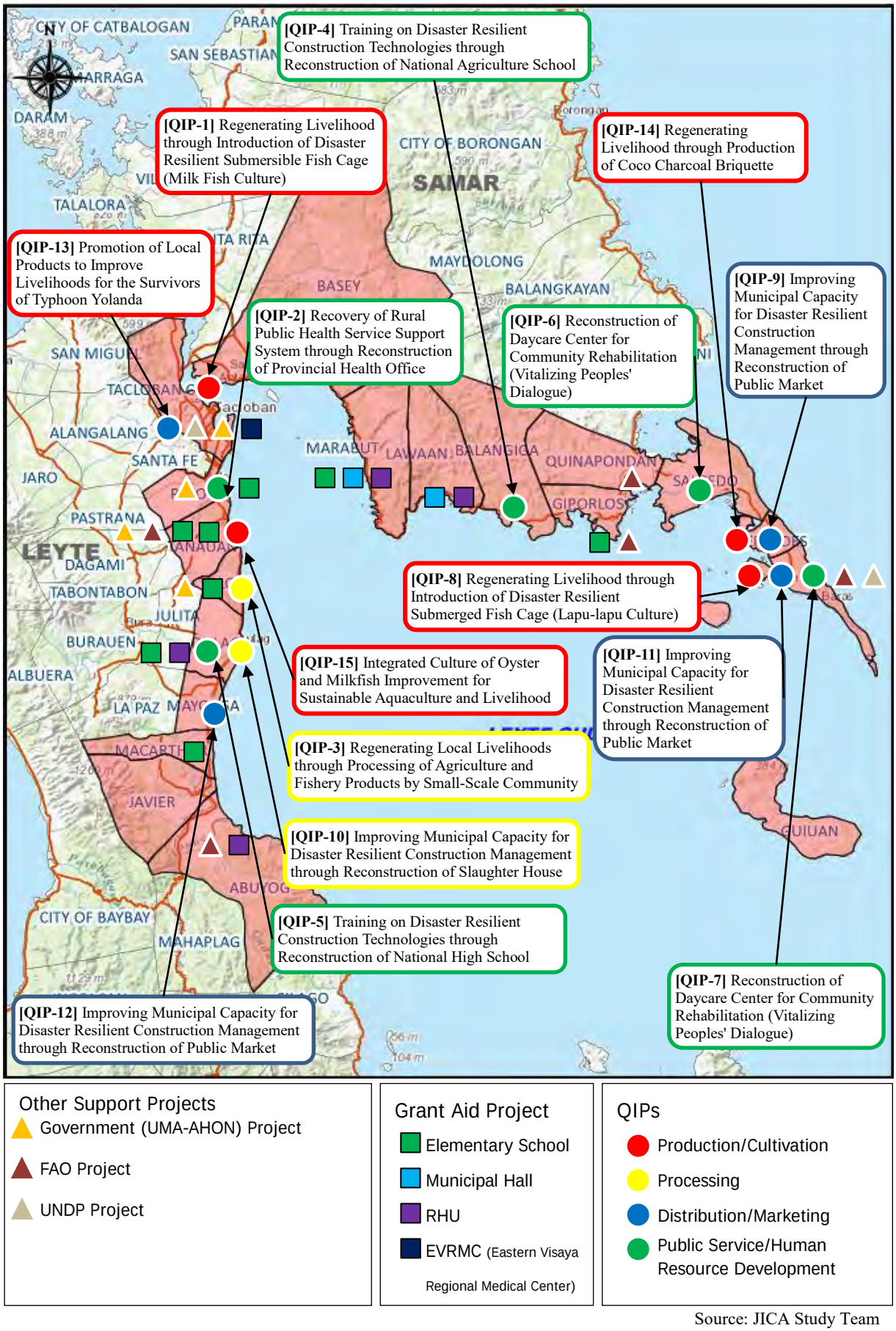
Priority Group	Project Title	Project Site	Points Considered for the Categorization of Priority Groups
			population as a place for acquiring skills and knowledge for livelihood activities. It is also expected to contribute to the local economy through dissemination of knowledge regarding agriculture, which is one of the main industries in the area. As indicated above, the QIP is expected to contribute to strengthening the disaster resiliency of the area through improving the capacities of skilled workers involved in reconstruction of the facilities. The effect of the QIP is expected to expand beyond the borders of the Municipality. However, considering that the area of expansion and the number of direct beneficiaries is expected to be lower than those of the QIPs in Priority Group I, and that the economic impact to the area is not large, the QIP is categorized into Priority Group II.
II	QIP-5 Training on Disaster Resilient Construction Technologies through Reconstruction of National High School	Dulag	The QIP aims to enhance the technical skills of skilled workers by utilizing the reconstruction of Dulag National High School as training material for teaching disaster resilient design and construction techniques. Training will be provided in collaboration with the Technical Education and Skills Development Authority TESDA, an organization providing a series of vocational training including construction techniques, and graduates of TESDA training courses, who will be involved in the construction / repair works as skilled workers will be targeted as the trainees. The QIP will start by reviewing the technical drawings that are already being prepared by DepED and training will be conducted by utilizing an existing OJT scheme (as a part of its curriculum, TESDA is sending its trainees to contractors for OJT). In the QIP, TESDA trainers and training course graduates shall be employed by a contractor in order to get OJT under the supervision of the Study Team during the whole process of reconstruction. A skilled worker from Japan will be invited to the site, particularly at the stage of preparation to fixing of trusses and tiling of the roof, which is a critical stage as it largely influences the susceptibility to typhoons, so that the trainees can obtain the knowledge and techniques applied in Japan. Training activities with the Japanese skilled worker will be recorded on video and handed over to TESDA as training material, so that the technique can be further taught to future trainees. By widely sharing knowledge and technology for disaster resilient designing and construction among the trainees, the QIP is expected to contribute to the reconstruction of the disaster hit areas based on appropriate skills, and contribute to the reconstruction of disaster resilient public facilities. At the same time, the knowledge and technologies transferred to the TESDA trainers is also expected to be further inherited by future trainees after the QIP is completed. As for indirect effects, with skills improved through the training, the access of trainees to income opportunities is also expected to improve. As indicated above, the QIP is expected to contribute to strengthening the disaster resiliency of the area through improving the capacities of skilled workers involved in the reconstruction of the facilities. The effect of the QIP is expected to expand beyond the borders of the Municipality. However, in consideration of the fact that the area of expansion and the number of direct beneficiaries is expected to be lower than those of the QIPs in Priority Group I, and that

Priority Group	Project Title	Project Site	Points Considered for the Categorization of Priority Groups
			the economic impact to the area is not large, the QIP is categorized into Priority Group II.
II	QIP-6 Reconstruction of Daycare Center for Community Rehabilitation (Vitalizing Peoples' Dialogue)	Salcedo	At the time of the Great East Japan Earthquake, Higashi-Matsushima City, one of the areas strongly hit by the quake received prefabricated building units that can be used as venues for community meetings under the support of Germany. The building units are said to have been very useful for the local population to discuss issues on recovery and reconstruction. In order to utilize this experience in the areas hit by Typhoon Yolanda, this QIP aims at introducing Japanese pre- fabricated building technology, which can be easily transported and installed, and at the same time, can secure a certain level of rigidness, as a model for emergency recovery of facilities at times of disasters. The 7 daycare centers (5 in Salcedo and 2 in Guiuan) that are to be reconstructed through the QIP will primarily function to foster the healthy growth of children both physically and mentally, support working mothers in raising their children, protect children from abuse, and support expected mothers. On the other hand, the facilities should also be opened to the public during times when they are not used as daycare centers (night time, weekends, etc.) as a venue for community gathering. Its use as a venue for discussion by communities on issues on reconstruction and for enlightenment activities for disaster risk reduction and management (DRRM) should be promoted so as to strengthen the ties of the community and increase their capacity in DRRM. Since the requirements for installing prefabricated building units are relatively simple, preparation of bidding documents for the QIP is expected to be rather easy. In addition, introduction of simple but high quality prefabricated building unit technology is expected to function as a model for early recovery for neighboring Municipalities. As indicated above, the QIP is expected to be a model for early recovery from disaster damage, and at the same time, provide a venue for community meetings in order to strengthen their resilience to future calamities. The effect of the QIP is expected to expand beyond the borders of the Municipality. However, in consideration of the fact that the impact of the project is smaller than those of the QIPs in Priority Group I, and that there is small direct impact to the local economy, the QIP is categorized into Priority Group II.
II	QIP-7 Reconstruction of Daycare Center for Community Rehabilitation (Vitalizing Peoples' Dialogue)	Guiuan	
III	QIP-9 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market	Guiuan	The QIP aims at improving the project management capacity of Guiuan Municipality in terms of planning, procurement, construction supervision, operation and monitoring, through the reconstruction of public facilities. The improved capacity of the Municipality is expected to contribute to further reconstruction of public facilities with due quality, which will result in improved disaster resiliency. The public market to be reconstructed will also become more resilient to disasters and will contribute to securing access to safe foods during times of disasters. Furthermore, the reconstruction of the public market will contribute to resuming the revenue of the Municipality, which indirectly contributes to securing necessary budget for recovery and reconstruction of the Municipality. Moreover, the QIP is expected to contribute to the establishment of a value chain through its linkage with the

Priority Group	Project Title	Project Site	Points Considered for the Categorization of Priority Groups
			former mentioned QIP titled "Regenerating Livelihood through Introduction of Disaster Resilient Submerged Fish Cage (Lapu-lapu Culture)." As indicated above, the QIP will improve the project management capacity of the Municipality. The QIP will also contribute to further reconstruction of the Municipality through resuming the revenue of the Municipality. On the other hand, the accumulation of know-how for management of projects for disaster resilient public structures will be limited within the Municipality and is not expected to extend beyond its borders. However, in consideration of the fact that the QIP is interlinked with another QIP to bear synergy (which is different from the later mentioned projects related to reconstruction of public facilities), the QIP is categorized in Priority Group III.
IV	QIP-10 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Slaughter House	Dulag	The QIP aims at improving the project management capacity of Dulag Municipality in terms of planning, procurement, construction supervision, operation and monitoring, through the reconstruction of public facilities. The improved capacity of the Municipality is expected to contribute to further reconstruction of public facilities with due quality, which will result in improved disaster resiliency. The meat center to be reconstructed will also become more resilient to disasters and will contribute to securing access to safe foods during times of disasters. Furthermore, the reconstruction of the meat center will contribute to resuming the revenue of the Municipality, which indirectly contributes to securing necessary budget for recovery and reconstruction of the Municipality. As indicated above, the QIP will improve the project management capacity of the Municipality. The QIP will also contribute to further reconstruction of the Municipality through resuming the revenue of the Municipality. On the other hand, the accumulation of know-how for management of projects for disaster resilient public structures will be limited within the Municipality and is not expected to extend beyond its borders. Also, in consideration of the fact that there are no linkages with other QIPs for synergetic effects, the QIP is categorized into Priority Group IV.
IV	QIP-11 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market	Mercedes	The QIP aims at improving the project management capacity of Mercedes Municipality in terms of planning, procurement, construction supervision, operation and monitoring, through the reconstruction of public facilities. The improved capacity of the Municipality is expected to contribute to further reconstruction of public facilities with due quality, which will result in improved disaster resiliency. The public market to be reconstructed will also become more resilient to disasters and will contribute to securing access to safe foods during times of disasters. Furthermore, the reconstruction of the public market will contribute to resuming the revenue of the Municipality, which indirectly contributes to securing necessary budget for recovery and reconstruction of the Municipality. As indicated above, the QIP will improve the project management capacity of the Municipality. The QIP will also contribute to further reconstruction of the Municipality through resuming the revenue of the Municipality. On the other hand, the accumulation of know-how for management of

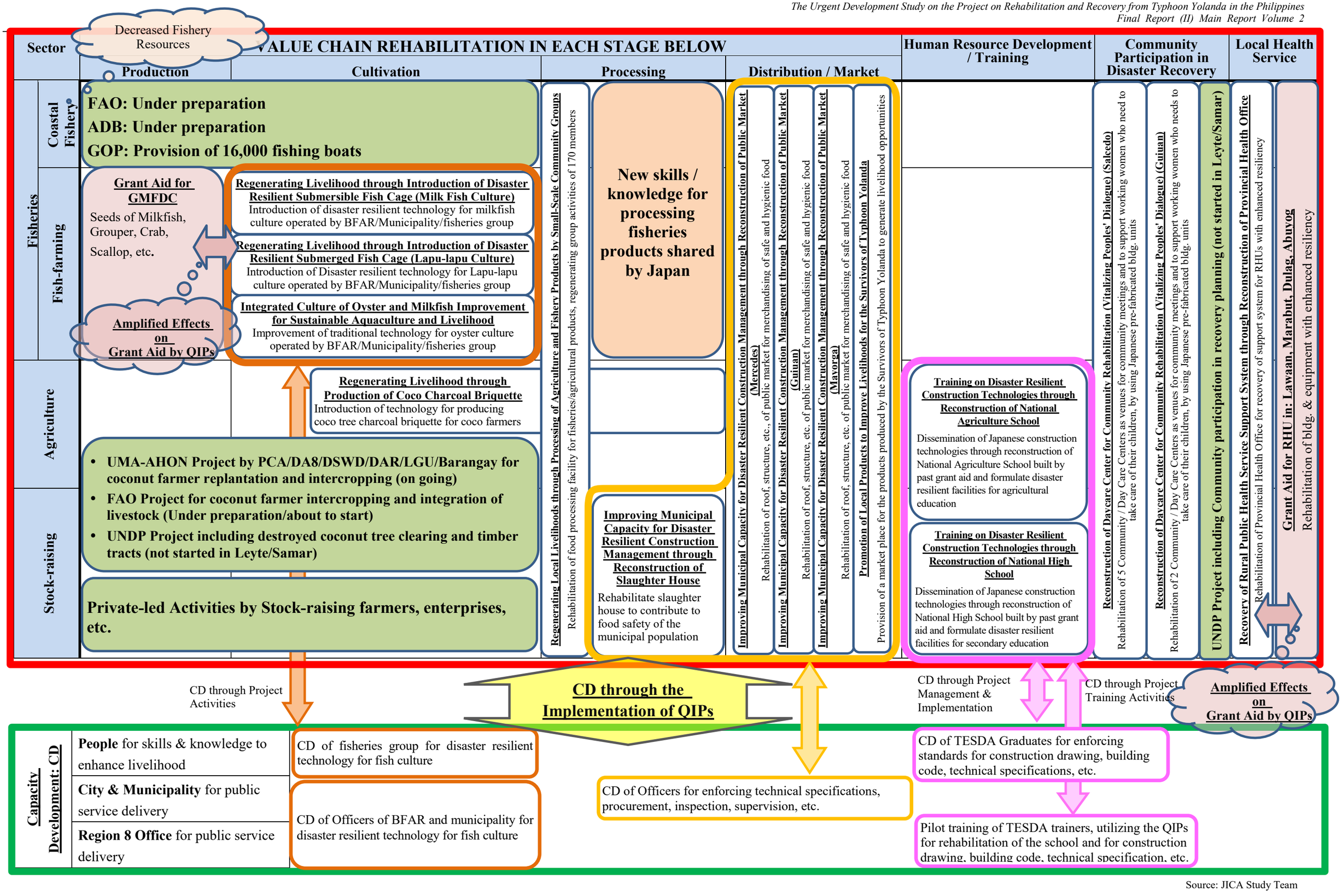
Priority Group	Project Title	Project Site	Points Considered for the Categorization of Priority Groups
			projects for disaster resilient public structures will be limited within the Municipality and is not expected to extend beyond its borders. Also, in consideration of the fact that there are no linkages with other QIPs for synergetic effects, the QIP is categorized into Priority Group IV.
IV	QIP-12 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market	Mayorga	The QIP aims at improving the project management capacity of Mayorga Municipality in terms of planning, procurement, construction supervision, operation and monitoring, through the reconstruction of public facilities. The improved capacity of the Municipality is expected to contribute to further reconstruction of public facilities with due quality, which will result in improved disaster resiliency. The public market to be reconstructed will also become more resilient to disasters and will contribute to securing access to safe foods during times of disasters. Furthermore, the reconstruction of the public market will contribute to resuming the revenue of the Municipality, which indirectly contributes to securing necessary budget for recovery and reconstruction of the Municipality. As indicated above, the QIP will improve the project management capacity of the Municipality. The QIP will also contribute to further reconstruction of the Municipality through resuming the revenue of the Municipality. On the other hand, the accumulation of know-how for management of projects for disaster resilient public structures will be limited within the Municipality and is not expected to extend beyond its borders. Also, considering that there are no linkages with other QIPs for synergetic effects, the QIP is categorized into Priority Group IV.
V	QIP-13 Promotion of Local Products to Improve Livelihoods for the Survivors of Typhoon Yolanda	Basey, Mercedes, Tacloban, Tanauan and Tolosa. Other areas to be identified through the QIP.	The QIP aims to examine effective means to promote sales of value added products that are produced through other QIPs under the Study (Basey: processed milkfish, Tanauan: processed milkfish and oyster, Tolosa: processed milkfish and meat products, and Mercedes: charcoal products). A task force will be formulated to study the overall framework for promoting the sales of the processed products examining their target markets, requirements for sales (quality, production volume, certificates, etc.), and means for approaching the market. Furthermore, the formulated frameworks will be partially implemented to further look into possible improvements. The necessity of establishing a sales promotion center for local products will also be examined through the QIP. As indicated above, the QIP will identify and approaches that will further contribute to the recovery and reconstruction of the regional economy. The activities also cover a number of LGUs. However, in consideration that the QIP is dependent on the activities of the other QIPs and stable production of processed products will be a pre- condition for success, the QIP is categorized into Priority Group V.

Source: JICA Study Team



Source: JICA Study Team

Figure 1.3-3 Location of QIPs in Phase 1



Source: JICA Study Team

Figure 1.3-4 Image of Quick Impact Projects for Livelihood & Community Rehabilitation

1.3.4 The Selection of Quick Impact Projects as the Second Phase

At the stage of the ending of the implementation of the QIPs which were selected in 1.3.3, seven more QIPs were selected for implementation for the second phase for various reasons. Among the projects which were conducted from the beginning, especially those which were related to livelihood were also judged that they needed further support and were decided to be continued.
The QIPs that will be implemented in the second phase are as shown in Table 1.3-5. The reasons for the selection for both new and extended projects are shown in Table 1.3-6.

Table 1.3-5 Reasons for the Selection / Continuation of Activities for QIPs Phase 2

State	Name of Project	Site	Selection and continuing reason
Extended	QIP-1 Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish Culture)	Basey	Infrastructure was improved but it may take time for technology to become sustainable, therefore there is a need for guidance of technology on operation and management from Japanese experts. Transferring of new processing technology has started mainly targeting women's groups which were affected by the disaster, but production is still not stable. Guidance for technology and management for the sustainability and stability of the processing technology, and the cooperation between DTI and LGU to ensure sustainability and the reinforcement of the support system for sales development by Japanese experts is necessary.
Extended	QIP-3 Regenerating Local Livelihoods through Processing of Agriculture and Fishery Products by Small-Scale Community Groups	Tolosa	Transferring of new processing technology has been started mainly targeting women's groups which were affected by the disaster, but production is still not stable. Guidance for technology and management for the sustainability and stability of the processing technology, and the cooperation between DTI and LGU to ensure sustainability and the reinforcement of the support system for sales development by Japanese experts is necessary.
Extended	QIP-8 Regenerating Livelihood through Introduction of Disaster Resilient Submerged Fish Cage (Lapu-lapu Culture)	Guiuan	Infrastructure was improved but it may take time for technology to become sustainable, therefore there is a need for guidance of technology on operation and management from Japanese experts. In perspective to lessen the burden on natural resources, it is necessary to divert to compound feed. Currently, granular feed is made by hand from moist pellet, which is made by mixing raw fish and powdered compound feed. However, they have such problems as uneven mixture and difficulty in storing. Therefore, provision of granulators and refrigerators, and a backup solar system for them is necessary.
Extended	QIP-14 Regenerating Livelihood through Production of Coco Charcoal Briquette	Mercedes	To reconstruct the livelihood of the coconut farmers which are the targets, early recovery is necessary for the coconut fields that are already cleared of fallen trees by production of Charcoal.. Therefore, it is necessary to consider a crop rotation system which is suitable for natural environment such as soil condition and weather, and the market environment that surrounds the crops, and promote diversification of crops.
Extended	QIP-15 Integrated Culture of Oyster and Milkfish Improvement for Sustainable Aquaculture and	Tanauan	Infrastructure was improved but it may take time for technology to become sustainable, therefore there is a need for guidance of technology on operation and management from Japanese experts. Transferring of new processing technology has started mainly targeting women's groups which were affected by the

State	Name of Project	Site	Selection and continuing reason
	Livelihood		disaster, but production is still not stable. Guidance for technology and management for the sustainability and stability of the processing technology, and the cooperation between DTI and LGU to ensure sustainability and the reinforcement of the support system for sales development by Japanese experts is necessary.
New	QIP-16 Training on Disaster Resilient Construction Technologies Through Reconstruction of Elemental School	Tanauan	While the restorations of schools constructed through past yen loan projects have proceeded, one school building which was supposed to be restored by some donors was left untouched due to some disagreement among donors. For the restoration of the school function, it is necessary to restore the school which was constructed by the yen loan and was left untouched.
New	QIP-17 Training on Disaster Resilient Construction Technologies Through Reconstruction of National Agriculture School (Phase 2)	Balangiga	So far, through the QIPs for the rehabilitation of the Balaginga National Agricultural School, technic transfer to welders and roofing workers has been conducted to TESDA. At the end of the project, there was a request from TESDA for a technical guidance in other fields through the reconstruction of another school building of Balaginga National Agricultural School. Also, in the initial plan of the QIP, a part of the food processing machinery was to be procured for TESDA. However, it has become clear that TESDA did not have any provisions for securing budget for the procurement of equipment for training on welding, piping, electricity etc. for the time being. After the reconstruction of the building, for timely conduction of trainings on welding, piping and electricity, these machinery must be procured by the QIPs.
New	QIPs-18 Recovery of Rural Health Service Through Reconstruction of Rural Health Unit (Abuyog)	Abuyog	At first, in the Grant Aid Program, reconstruction of four rural health units (RHU) was planned. However, due to the budget limitation of the Grant Aid Program, the reconstruction of those in Abuyog and Dulag could not be covered. The reconstruction of Abuyog and Dulag RHU has been committed to Philippines, and the recovery of the health service in the region is needed immediately.
New	QIPs-19 Recovery of Rural Health Service Through Reconstruction of Rural Health Unit (Abuyog)	Dulag	At first, in the Grant Aid Program, reconstruction of four rural health units (RHU) was planned. However, due to the budget limitation of the Grant Aid Program, the reconstruction of those in Abuyog and Dulag could not be covered. The reconstruction of Abuyog and Dulag RHU has been committed to Philippines, and the recovery of the health service in the region is needed immediately.
New	QIPs-20 Construction of Processing Plant for integrated Culture of Oyster and Milk Fish Improvement for Sustainable Aquaculture and Livelihood	Tanauan	In Tanauan and Basey, support in the production and marketing of processed milkfish has been one activity, and it has got good reputation from consumers. However, in the community level which the milkfish are processed, they have not been able to get approval for the fishery products processing facility from BFAR, and therefore they are not able to get business registration and product registration which is needed in order to consider the large market. For the sustainability of the future activities, it is necessary to prepare a processing facility which can get the approval from BFAR.
New	QIPs-21 Construction of Processing Plant for	Basey	In Tanauan and Basey, support in the production and marketing of processed milkfish has been one activity, and it has got good reputation from consumers. However, in the

State	Name of Project	Site	Selection and continuing reason
	Regenerating Livelihood Through Introduction of Disaster Resilient Submersible Fish Cage (Milkfish)		community level which the milkfish are processed, they have not been able to get approval for the fishery products processing facility from BFAR, and therefore they are not able to get business registration and product registration which is needed in order to consider the large market. For the sustainability of the future activities, it is necessary to prepare a processing facility which can get the approval from BFAR.
New	QIPs-22 Improving Municipal Capacity for Disaster Resilient Construction Management Through Reconstruction of Slaughter House (Recover of Access road and pavement in the compound)	Dulag	The road between the slaughter house, which has been reconstructed by the QIPs, and the main road is currently an earthen road. The road condition therefore becomes bad in times of rain, which becomes an obstruction to the access to the slaughter house. For the improvement of the accessibility to the meat processing plant and the sanitary control during carrying in/out for the surrounding community, paving of the road is necessary.

Source: JICA Study Team

Table 1.3-6 QIPs Selected in Phase Two

SN	State	Region	Name of Project	Main CP	Supporting Organization	Remarks
QIP-1	Extended	Basey	Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish Culture)	Basey Government	BFAR	
QIP-3	Extended	Tolosa	Regenerating Local Livelihoods through Processing of Agriculture and Fishery Products by Small-Scale Community Groups	Tolosa Government	VSU	
QIP-8	Extended	Guiuan	Regenerating Livelihood through Introduction of Disaster Resilient Submerged Fish Cage (Lapu-lapu Culture)	Guiuan Government	BFAR	
QIP-14	Extended	Mercedes	Regenerating Livelihood through Production of Coco Charcoal Briquette	Merecedes Government	DA, PCA	
QIP-15	Extended	Tanauan	Integrated Culture of Oyster and Milkfish Improvement for Sustainable Aquaculture and Livelihood	Tanauan Government	BFAR	
QIP-16	New	Tanauan	Training on Disaster Resilient Construction Technologies Through Reconstruction of Elemental School	TESDA	DepED	Training of TESDA trainer and trainee
QIP-17	New	Balangiga	Training on Disaster Resilient Construction Technologies Through Reconstruction of National Agriculture School (Phase 2)	TESDA		Training of TESDA trainer and trainee
QIP-18	New	Abuyog	Recovery of Rural Health Service Through Reconstruction of Rural Health Unit (Abuyog)	Abuyog Government	DOH	
QIP-19	New	Dulag	Recovery of Rural Health Service Through Reconstruction of Rural Health Unit (Abuyog)	Dulag Government	DOH	
QIP-20	New	Tanauan	Construction of Processing Plant for integrated Culture of Oyster and Milk Fish Improvement for Sustainable Aquaculture and Livelihood	Tanauan Government	BFAR, DOST	
QIP-21	New	Basey	Construction of Processing Plant for Regenerating Livelihood Through Introduction of Disaster Resilient Submersible Fish Cage (Milkfish)	Basey Government	BFAR	
QIP-22	New	Dulag	Improving Municipal Capacity for Disaster Resilient Construction Management Through Reconstruction of Slaughter House (Recover of Access road and pavement in the compound)	Dulag Government	BFAR	

Source: JICA Study Team

Note: BFAR: Bureau of Fisheries and Aquatic Resources, DA: Department of Agriculture, DepED: Department of Education, DOH: Department of Health, DOST: Department of Science and Technology, PCA: Philippine Coconut Authority, TESDA: Technical Education and Skills Development Authority, VSU: Visayas State University

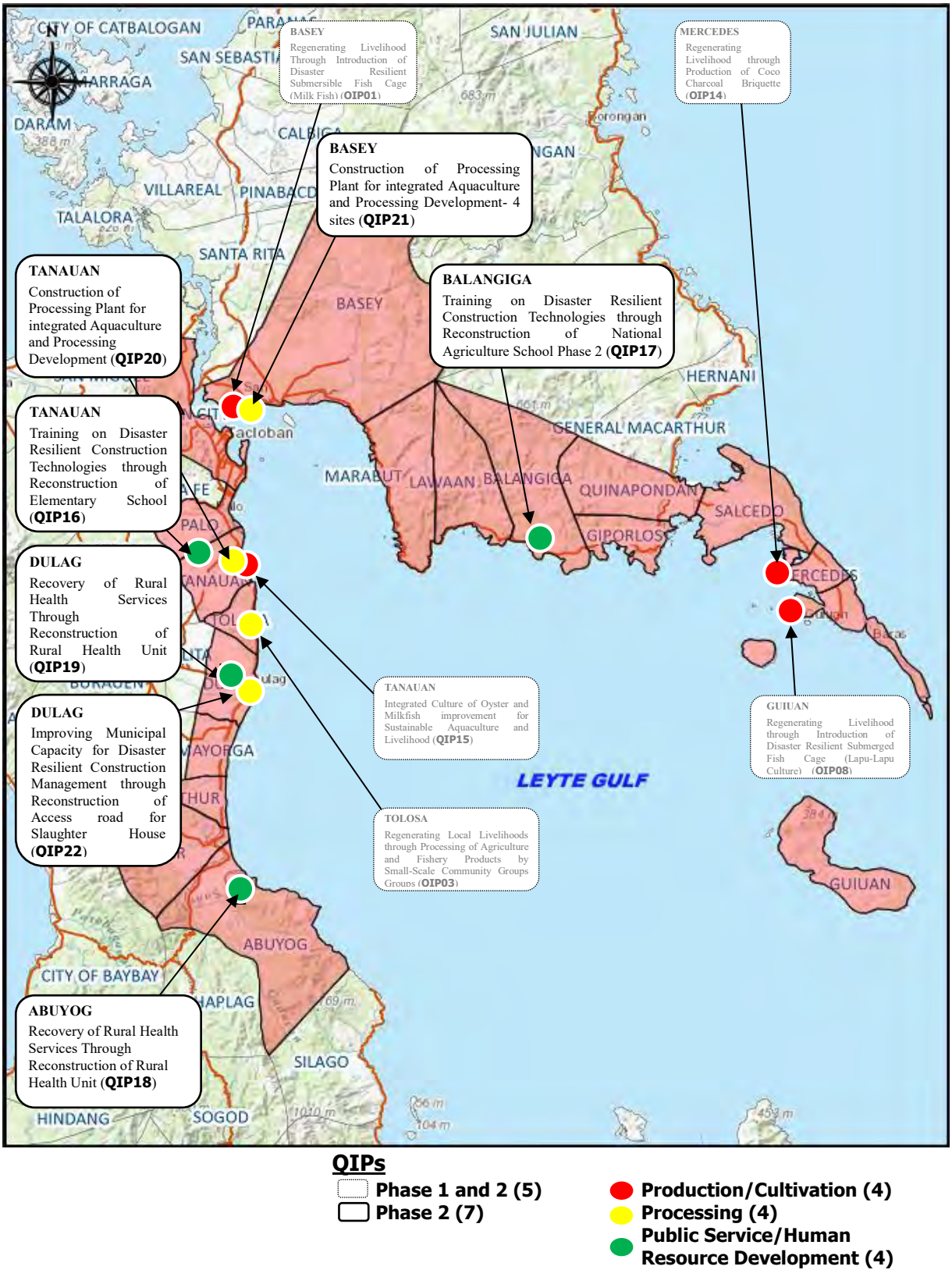


Figure 1.3-5 Location of QIPs Implemented in Phase 2

Chapter 2 Implementation of Quick Impact Projects

2.1 Contents of Quick Impact Projects

2.1.1 Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish) (QIP-1)

In this project, milkfish farming will be regenerated in a disaster resilient form by introducing submersible fish cages and the "Gawabari" mooring system, which are unique Japanese technology. Municipality and BFAR will co-manage the equipment to be introduced, and will lent to the fish farmers. The fish farmers will do the farming activities and routine maintenance of equipment. A part of the produced fish will be processed with soft bone technique by the women's group for adding values and diversifying supply options for the products. This QIP will also support the promotion of the local products by emphasizing its odorless characteristics, which is due to its "off-bottom" production style, by adding value through processing, and by conducting sales promotion events based on existing distribution routes.

(1) Location

Barangay Tinaogan, Barangay Cambayan, Barangay Amandayehan and Barangay San Antonio at Municipality Basey in Samar Province

(2) Beneficiaries

Direct beneficiaries: 885 fish farmers, BFAR
Indirect beneficiaries: 5,278 people living in 4 fishery villages (Barangay Tinaogan: 1,270, Barangay Cambayan: 429, Barangay Amandayehan: 995, Barangay San Antonio: 2,584)

(3) Background

After being hit by Typhoon Yolanda, the GoP has promptly established the AHON Fisheries Rehabilitation Project in order to provide support for the affected fisher folks. However, support for rehabilitation of fish culture activities has not shown significant progress. The Basey Mariculture Park located in San Juanico Strait, with an annual production of 600 tons, is one of the major production centers for milk fish culture in Region VIII. The site was severely damaged by the storm surge caused by Typhoon Yolanda, with 265 ships and 110 rafts were either destroyed or washed away. Under such conditions, fish culture activities, which has been the main source of income for the area, still remains shut down.

On the other hand, submersible fish cage developed in Japan, which were introduced in Palawan, escaped physical damages of Typhoon Yolanda. The Japanese style submersible fish cage is made of high-density polyethylene (HDPE), and has durability and resistance to high waves. Further in Japan, there is a farming technique using "Gawabari (grid mooring)" which

is strong to waves. Therefore, the introduction of these farming technologies in the site is highly effective in helping to foster local aquaculture industry strong to the disaster and to achieve livelihood more stable, not only to improving livelihood of individual farming fisherman. In addition, the restoration of equipment to Guiuan Marine Fisheries Development Center by Japanese grant aid can expand choice of fingerling supply sources, and it can be expected that the disaster resilient aquaculture technology can also be deployed in other farming suitable sites through cooperation with Municipality and BFAR.

(4) Purpose of the Project

The purpose of the Project is to restore and improve the livelihood of fishing families by introducing disaster resilient submersible fish cage for milk fish farming.

(5) Expected Output of the Project

- Disaster resilient farming cages are installed and BFAR obtains techniques for their procurement, management and operation.
- Disaster resilient farming cages are installed and the fish farmers obtain techniques for their management and operation.
- The fish farmers resume the milk fish farming.
- (Extension period) The fish farmers' technical capacity in maintenance of the introduced disaster resilient cages is improved.
- (Extension period) The function of disaster resilient cage gets better by improvement of cage parts through adjustments from feedback of fish farmers experience.
- (Extension period) The institutional capacity for managing the cage culture operations will improve.
- Local Women's Associations start production and sales of processed milk fish products

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-1.

1) Introduction of the disaster resilient submersible fish cages and the "Gawabari" fish cages.
2) Training for fishing families on the operation techniques of the disaster resilient submersible type fish cages.
3) Introduction of fish processing techniques for women's groups.
4) Promotion of milk fish products.
5) (Extension period) Training on repair and maintenance of the introduced cages.
6) (Extension period) Improvements of the introduced cage functions.

(7) (Extension period) Improvement of institutional management capacity of cage culture Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-2.

Table 2.1-2 Implementation Schedule for QIP-1

	Activities	2014									2015											
		Original plan period									Extension period											
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Review of the damages																					
2	Bathymetrical survey																					
3	Designing typhoon-resistant fish cages																					
4	Procurement of equipment, feeds and fingerlings																					
5	Manufacturing and Installation of cages																					
6	Training on the new technologies																					
7	Stocking/culture/ management of the fish stocks																					
8	Harvesting of fish																					
9	Marketing, process-sing & value-adding of fish																					
10	(Extension period) Maintenance of introduced cages																					
12	(Extension period) Improvement of cage components																					
13	(Extension period) Improvement on harvesting technique																					
14	(Extension period) Improvement on institutional manage-ment capacity																					
15	Evaluation																					

Source: JICA Study Team

2.1.2 Recovery of Rural Health Service Support System through Reconstruction of Provincial Health Office (QIP-2)

The Project aims at enhancing basic medical services across the Province by repairing the Provincial Health Office (PHO) main building that have lost most of the roof, ceilings and windows, and by procuring necessary equipment for its operations. The Project also aims at the formulation of a disaster resilient health services system through application of appropriate design and repair works for the PHO facilities.

(1) Location

Barangay Candahug at Municipality Palo in Leyte Province

(2) Beneficiaries

Direct beneficiaries: A total of 58 PHO staff and employee

Indirect beneficiaries: Users of PHO, 9 District Hospitals in Leyte Province, 3 Community Hospitals, 44 Rural Health Unit (RHU)

(3) Background

Leyte Provincial Health Office (PHO) is the only administrative office to manage health service by Rural Health Unit (RHU) of each LGU and takes the following rolls.

- Operation support and monitoring of 44 RHUs in Leyte Province for implementing central policies and programs, as well as monitoring of their service quality.
- Mediator between central administration and each RHU.
- Data collection of health index and health service at provincial and municipal levels.

PHO is the core coordinating organization for the services provided by the DoH, Municipal Hospitals and RHUs. However, the damage caused by Typhoon Yolanda has totally destroyed its office roof. With its office building still not repaired, the PHO is facing significant difficulties in their routine works, namely the distribution of medicines and vaccines to the RHU and technical training and guidance to RHU staff.

On the other hand, the reconstruction of 4 RHUs is planned as Japanese grant aid projects. Taking into consideration the role of PHO in regularly monitoring and controlling the RHUs, recovering the functions of the PHO is considered essential to resume basic medical services in Leyte Province and to maintain its service quality. Reconstruction of RHUs through Japanese grant-aid projects will also contribute to improving disaster resiliency of the facilities through its firm structures. Through collaboration of the PHO and RHUs, it is expected that a more functional and disaster resilient structure for providing medical services will be established for the whole Province.

(4) Purpose of the Project

The purpose of the Project is that the health administrative service of Leyte is restored with the functional recovery of Leyte PHO by the disaster resilient system.

(5) Expected Output of the Project

- Office building of PHO is reconstructed in a disaster resistant form.
- Supporting services to RHU by the PHO are restored.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-3.

1) Rehabilitation of PHO building (mainly repair of roof, ceiling, walls, windows)
2) Procurement of equipment (air-conditioners, refrigerators and freezers for vaccines).

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-4.

Table 2.1-4 Implementation Schedule for QIP-2

Activities		2014							2015					
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	Prepare Tender Documents													
2	Selection of Contractor													
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)													
4	Coordination with related agencies for Building permission and / or others													
5	Technical Seminar													
6	Construction work by the Contractor													
7	Construction Supervision													
8	Supply of Equipment													
9	Operation of PHO													
10	Inspection for Defective liability Period													2015/ Jun

Source: JICA Study Team

2.1.3 Regenerating Local Livelihood through Processing of Agriculture and Fishery Products by Small-Scale Community Groups (QIP-3)

Tolosa Municipality intends to consolidate the venue of individual processing activities into a processing facility constructed in the compound of the Municipal Office. The Municipality expects that such measures will contribute to the enhancement of food processing because the women's groups will able to demonstrate the production of processed vegetable, fish and meat products to a wide range of residents that are currently not engaged. The Project will support the Municipality in promoting livelihood improvement activities by reconstructing as the Tolosa Multi-purpose Livelihood Building and by promoting the use of the facility by local residents. Furthermore, the food processing activities can be expanded to other municipalities. The QIP will also support promotion of processed products by participating in sales promotion such as those using tents.

In restarting the activities by the women's groups engaged in food processing, supporting activities by the Municipality as well as the group activities will be reviewed and possible

measures for improvement will be examined in order to further enhance their sustainability and possibilities for further development. It is expected that technical support will be provided from Visaya State University (VSU) of Tolosa School which supported the women's groups to start their activities. The VSU has curriculums focusing on fisheries industry, and is also studying seafood processing. Tolosa Municipality is going to find other groups involved in the processing activities through meetings with Women's Associations of all 15 barangays.

(1) Location

Barangay Poblacion at Municipality Tolosa in Leyte Province

(2) Beneficiaries

Direct beneficiaries:	Residents' groups engaged in food processing (5 groups) and its members (170 members)
Indirect beneficiaries:	Clients of the residents' groups engaged in food processing, consumers, groups of the 15 barangays which have interest in starting processing activities

(3) Background

Tolosa Municipality, with its population of 17,921 heads and 3,922 households (2010 Census), is considered as a middle-sized Municipality in the Target Area. Under the initiative of the Municipality in promoting activities for food processing from local primary products with the aim of improving local livelihoods, there were five women's groups that started food processing activities with the support of DOLE and DSWD in terms of necessary training and equipment. However, those groups cannot resume the activities because the Typhoon Yolanda caused serious damage to the buildings and manufacturing equipment for the processed food production site of these groups.

The main products produced by the resident's groups were fried noodles made with vegetables and fish meat, boneless fish products, meat products (sausage, seasoned meat, salami, etc.), and banana chips. Production was basically done upon order from clients, and the scale was relatively small, only aiming at local consumptions. However, one group that succeeded in the production of fried noodles used to earn an average of 3,000 pesos/member/month. The group also has a sustainable structure; apart from the support by the Municipality, the group allocates 30% of their benefit for running their business (mainly for purchase of raw material), while 70% was distributed among the group members. Through the women's groups as well as the Tolosa Municipality strongly intend to continue the activities for food processing, there are currently no perspectives for restarting the works.

(4) Purpose of the Project

The purpose of the Project is to contribute sustainable livelihood activities for food processing

of agriculture and fishery by women's group through integrated reconstruction of multi-purpose public facility for livelihood activities.

(5) Expected Output of the Project

- Place of the processed food production is rebuilt as a Multi-purpose Livelihood Building for the groups.
- Group members involved in processed food production resume the food processing activities.
- Food processing activities are continued in a stable manner, with group members obtaining knowledge and skills to plan and implement their own activities
- Group activities and supporting measures of Tolosa Municipality are reviewed and production activities are improved from before Typhoon Yolanda.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-5.

1) Reconstruction of Tolosa Multi-purpose Livelihood Building (including facility and equipment).
2) Guidance for the women's groups (processing techniques and management).
3) Promotion of processed products.

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-6.

Table 2.1-6 Implementation Schedule for QIP-3

	Activities	2014							2015											
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Prepare Tender Documents																			
2	Selection of Contractor																			
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)																			
4	Coordination with related agencies for Building permission and/or others																			
5	Technical Seminar																			
6	Construction work by the Contractor																			
7	Construction Supervision																			
8	Supply of Equipment																			

	Activities	2014							2015											
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
9	Temporary Start of Food Production				▬	▬	▬	▬	▬	▬	▬	▬	▬							
10	Start of Food Production at new Building												▬	▬	▬	▬	▬	▬	▬	▬
11	Inspection for Defective liability Period													▼						
12	Identification of Target Sales, Market and Sales Strategies													▼						
13	Continued Promotion Activities based on identified Strategies														▬	▬	▬	▬	▬	▬
14	Preparation of Business Plans based on experiences obtained durng QIP Period																			▼
15	Support for Package Improvement and acquisition of LTO for Future Market Development														▬	▬	▬	▬	▬	▬
16	Participation in Value Chain Analysis Workshop and Follow-up Workshops													▬	▬	▬	▬	▬	▬	▬

Source: JICA Study Team

2.1.4 Training on Disaster Resilient Construction Technologies through Reconstruction of National Agriculture School (QIP-4)

The school buildings which were constructed with the past Japanese Grant Aid projects, as well as those built with local finance in the same compound will be repaired and reconstructed. The Technical Education and Skills Development Authority (TESDA) will learn the disaster resilient design through improvement of the drawing designed by a local architecture who was asked by TESDA. The TESDA trainers related to construction, as well as those of schools associated with TESDA, and graduates of TESDA training courses will have the opportunity to learn and obtain skills for repairing and construction through the training for repair and reconstruction of the school buildings.

A contractor will employ the TESDA graduates, TESDA will dispatch the TESDA trainers and the project will provide them opportunity to learn Japanese construction techniques under the supervision of JICA Study Team by inviting Japanese skilled specialists especially for the works from truss building and installation up to roofing works, which was a major cause of typhoon damage.

(1) Location

Barangay Poblacion 01 at Municipality Balangiga in Eastern Samar Province

(2) Beneficiaries

Direct beneficiaries: Graduates of TESDA training courses related to construction, TESDA, Relevant trainers of schools associated with TESDA

Indirect beneficiaries: Teachers and students of the agriculture school to be repaired

(3) Background

The buildings of the Balangiga National Agriculture School operated under TESDA have been significantly damaged by the enormous winds of Typhoon Yolanda. Two of the school buildings which were constructed through a Japanese Grant Aid project have received damages mainly on its roofs and ceilings, while other buildings constructed with local finance were more severely damaged with damaged/lost roofs and collapsed pillars. The situation is affecting the school curriculum as classes cannot be appropriately held.

On the other hand, in the great Hanshin-Awaji Earthquake and the Great East Japan Earthquake that Japan has experienced in recent years as the large-scale disaster, many skilled builders worked in the fields from all over the country during recovery period. They showed highly developed techniques in the reconstruction of public facilities and the construction of temporary housing so that disaster resilient public facilities were restored. However, in the affected areas of Typhoon Yolanda, quality of local craftsmanship for construction is of concern, and improvement of local craftsmanship for construction is of urgent needs to recover and reconstruct public facilities in near future.

Meanwhile, TESDA is responsible to develop the middle-level manpower in the Philippines, and is also associated with 130 schools including 9 TESDA training centers/training schools in Region VIII. The main training courses related to construction are Carpentry, Welding, Masonry, Plumbing, and Electrical Work in 7, 28, 6, 14 and 23 schools for each course.

As TESDA conducts vocational trainings in the region, it is expected that technologies for constructing more disaster resilient structures can be transferred to TESDA by involving them in the repair works of the damaged Agriculture School buildings. This will further contribute to the future development of a disaster resilient society in the region. In addition, as the diversification of trainings on agricultural technology including livestock raising, processing technology of agricultural products are also planned in the school, it is expected to contribute to disseminating technologies for intercropping and alternative crops of coconut farmers, which can increase in near future, and for the processed agricultural products.

(4) Purpose of the Project

The purpose of the Project is to disseminate the disaster resilient construction technologies through reconstruction of National Agriculture School in Balangiga, Eastern Samar Province.

(5) Expected Output of the Project

- The points of improvements for the construction are understood through the design/ reconstruction of TESDA Agriculture School, and disaster resilient construction techniques are learned.

- TESDA Agriculture School is rebuilt with disaster resilient structure.
- Training curriculums of TESDA Agriculture School are resumed.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-7.

1) Preparation of training programs.
2) Construction technique training through the repair and reconstruction of TESDA Agriculture School buildings.
3) Preparation of training video and text.

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-8.

Table 2.1-8 Implementation Schedule for QIP-4

	Activities	2014							2015					
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	Prepare Tender Documents													
2	Selection of Contractor													
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)													
4	Coordination with related agencies for Building Permission and/or others													
5	Technical Seminar													
6	Construction work by the Contractor													
7	Construction Supervision													
8	Provide the Trainee List by TESDA													
9	Dispatch of Skilled Workers from Japan for Trainers													
10	Technical Training													
11	Preparation of Training Video and Text													
12	Implementation of new and / or revised Curriculum using prepared Video and Text in TESDA													
13	Inspection for Defect Liability Period													2015/ Jun

Source: JICA Study Team

2.1.5 Training on Disaster Resilient Construction Technologies through Reconstruction of National High School (QIP-5)

The school buildings which were constructed with the past Japanese Grant Aid projects, as well as those built with local finance in the same compound will be repaired and reconstructed. The Technical Education and Skills Development Authority (TESDA) and the Department of Education (DepED) will learn the disaster resilient design through improvement of the drawing designed by DepED. The TESDA trainers related to construction, as well as those of schools associated with TESDA, and graduates of TESDA training courses will have the opportunity to learn and obtain skills for repairing and construction through the training for repair and reconstruction of the school buildings.

A contractor will employ the TESDA graduates, TESDA will dispatch the TESDA trainers and the project will provide them opportunity to learn Japanese construction techniques under the supervision of JICA Study Team by inviting Japanese skilled specialists especially for the works from truss building and installation up to roofing works, which was a major cause of typhoon damage.

(1) Location

Barangay Cabacungan at Municipality Dulag in Leyte Province

(2) Beneficiaries

Direct beneficiaries: Graduates of TESDA training courses related to construction, TESDA, Relevant trainers of schools associated with TESDA

Indirect beneficiaries: Teachers and students of the national high school to be repaired

(3) Background

The buildings of the Cabacungan National High School have been significantly damaged by the enormous winds of Typhoon Yolanda. One of the school buildings which was constructed through a Japanese Grant Aid project has received damages mainly on its roofs and ceilings, while other buildings constructed with local finance were more severely damaged with their roofs completely lost. The situation is affecting the school curriculum as classes cannot be appropriately held.

On the other hand, in the great Hanshin-Awaji Earthquake and the Great East Japan Earthquake that Japan has experienced in recent years as the large-scale disaster, many skilled builders worked in the fields from all over the country during recovery period. They showed the highly developed techniques in the reconstruction of public facilities and the construction of temporary housing so that disaster resilient public facilities were restored. However, in the affected areas of Typhoon Yolanda, quality of local craftsmanship for construction is of

concern, and improvement of local craftsmanship for construction is of urgent need to recover and reconstruct public facilities in near future.

Meanwhile, TESDA is responsible to develop the middle-level manpower in the Philippines, and is also associated with 130 schools including 9 TESDA training centers/ training schools in Region VIII. The main training courses related to construction are Carpentry, Welding, Masonry, Plumbing, and Electrical Work in 7, 28, 6, 14 and 23 schools for each course.

As TESDA conducts vocational trainings in the region, it is expected that technologies for constructing more disaster resilient structures can be transferred to TESDA by involving them in the repair works of the damaged School buildings. This will further contribute to the future development of a disaster resilient society in the region.

(4) Purpose of the Project

The purpose of the Project is to disseminate disaster resilient construction technologies through reconstruction of National High School in Dulag, Leyte Province.

(5) Expected Output of the Project

- The points of improvements for the construction are understood through the design/ reconstruction of High School, and the disaster resilient construction techniques are learned.
- High School is rebuilt with disaster resilient structure.
- Curriculums of High School are normalized.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-9.

1) Preparation of training programs.
2) Construction technique training through the repair and reconstruction of High School buildings.
3) Preparation of training video and text.

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-10.

Table 2.1-10 Implementation Schedule for QIP-5

Activities		2014							2015					
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	Prepare Tender Documents													
2	Selection of Contractor													

3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)													
4	Coordination with related agencies for Building Permission and/or others													
5	Technical Seminar													
6	Construction work by the Contractor													
7	Construction Supervision													
8	Provide the Trainee List by TESDA													
9	Dispatch of Skilled Workers from Japan for Trainers													
10	Technical Training													
11	Preparation of Training Video and Text													
12	Implementation of new and / or revised Curriculum using prepared Video and Text in TESDA													
13	Inspection for Defect Liability Period													2015/ Jun

Source: JICA Study Team

2.1.6 Reconstruction of Daycare Center for Community Rehabilitation (Vitalization of Peoples' Dialogue) (Salcedo) (QIP-6)

In nighttime or weekend when the buildings are not used as daycare center, they will be used for places for communication in the communities, to encourage discussion among residents on community rehabilitation, for places of disaster prevention education, in order to regenerate peoples' relations and improve the capacities of disaster prevention.

(1) Location

Barangay Sitio Guba (Bagtong), Sta Cruz, San Roque, Matarinao, Sitio Layag (Burak) at Municipality Salcedo in Eastern Samar Province

(2) Beneficiaries

Direct beneficiaries: Children attending the daycare centers in the 5 barangays, their mothers and families

Indirect beneficiaries: Residents of the 5 barangays (children of the next generation)

(3) Background

In Higashi-Matsushima City which received serious damage in the Great East Japan Earthquake, the local people used prefabricated facilities which were donated with the support of Germany as meeting places. It is said that the facilities were effectively used as places

where the local people discussed the community rehabilitation plans.

Each barangay is obligated under the legislation of the Philippines to establish one daycare center in order to provide services of child healthcare, pre- and postpartum support for mothers, and to function as shelters from child abuse. The daycare centers in the 5 barangays of Salcedo Municipality have been almost totally destroyed by Typhoon Yolanda and have not been reconstructed up to now. There is increasing importance of support for children, working mothers and their families in this critical stage for starting reconstruction, as well as for recovering livelihood. In this regard, reconstruction of daycare centers is an issue that must urgently be solved.

On the other hand, the peninsula-like topography of the area somewhat limits the access of construction material and other resources, making it difficult to procure them in sufficient quality. Prefabricated building units using technologies applied in Japan can be a solution for early reconstruction of the destroyed daycare centers, as they can be transferred to construction sites easily and can be installed with relatively short time and small cost. At the same time, these units can maintain a certain level of rigidness. The sizes of single units also fit with the average size of the daycare centers, which is around 50 m^2. Since prefabricated building units can be built by assembling parts brought from other locations, it will be an efficient means for constructing many daycare centers in limited time.

(4) Purpose of the Project

The purpose of the Project is to recover the function of the daycare center and to promote the vitalization of community dialogues including disaster enlightenment through reconstruction of the daycare center by Japanese style prefabricated building.

(5) Expected Output of the Project

- Function of daycare center is restored and the users (children and mothers) are supported.
- Daycare center is used as a place for communication of local people; the residents learn knowledge of disaster prevention.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-11.

1) Production and transport of prefabricated building units.
2) Reconstruction of daycare centers (5 sites for 5 barangays).
3) Site visits to observe construction process of daycare center.

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-12.

Table 2.1-12 Implementation Schedule for QIP-6

Activities		2014							2015					
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	Prepare Tender Documents													
2	Selection of Contractor													
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)													
4	Coordination with related agencies for Building permission and/or others													
5	Technical Seminar		▼											
6	Construction work by the Contractor													
7	Construction Supervision													
8	Site Visits to observe construction of Prefab-system			▼	▼	▼								
9	Activity of Day Care Center													
10	Inspection for Defective liability Period													2015/ Jun ▼

Source: JICA Study Team

2.1.7 Reconstruction of Daycare Center for Community Rehabilitation (Vitalization of Peoples' Dialogue) (Guiuan) (QIP-7)

In nighttime or weekend when the buildings are not used as daycare center, they will be used for places for communication in the communities, to encourage discussion among residents on community rehabilitation, for places of disaster prevention education, in order to regenerate peoples' relations and improve the capacities of disaster prevention.

(1) Location

Barangay 9-A Poblacion, Gahoy at Municipality Guiuan in Eastern Samar Province

(2) Beneficiaries

Direct beneficiaries: Children attending the daycare centers in the 2 barangays, their mothers and families

Indirect beneficiaries: Residents of the 2 barangays (children of the next generation)

(3) Background

In Higashi-Matsushima City which received serious damage in the Great East Japan Earthquake, the local people used prefabricated facilities which were donated with the support of Germany as meeting places. It is said that the facilities were effectively used as places where the local people discussed the community rehabilitation plans.

Each barangay is obligated under the legislation of the Philippines to establish one daycare center in order to provide services of child healthcare, pre- and postpartum support for mothers, and to function as shelters from child abuse. The daycare centers in the 2 barangays of Guiuan Municipality have been almost totally destroyed by Typhoon Yolanda and have not been reconstructed up to now. There is increasing importance of support for children, working mothers and their families in this critical stage for starting reconstruction, as well as for recovering livelihood. In this regard, reconstruction of daycare centers is an issue that must urgently be solved.

On the other hand, the peninsula-like topography of the area somewhat limits the access of construction material and other resources, making it difficult to procure them in sufficient quality. Prefabricated building units using technologies applied in Japan can be a solution for early reconstruction of the destroyed daycare centers, as they can be transferred to construction sites easily and can be installed with relatively short time and small cost. At the same time, these units can maintain a certain level of rigidness. The sizes of single units also fit with the average size of the daycare centers, which is around 50 $m^{2.}$ Since prefabricated building units can be built by assembling parts brought from other locations, it will be an efficient means for constructing many daycare centers in limited time.

(4) Purpose of the Project

The purpose of the Project is to recover the function of the daycare center and to promote the vitalization of community dialogues including disaster enlightenment through reconstruction of the daycare center by Japanese style prefabricated building.

(5) Expected Output of the Project

- Function of daycare center is restored and the users (children and mothers) are supported.
- Daycare center is used as a place for communication of local people; the residents learn knowledge of disaster prevention.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-13.

1) Production and transport of prefabricated building units.
2) Reconstruction of daycare centers (2 sites for 2 barangays).
3) Site visits to observe construction process of daycare center.

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1.14.

Table 2.1-14 Implementation Schedule for QIP-7

Activities		2014							2015			
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
1	Prepare Tender Documents											
2	Selection of Contractor											
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)											
4	Coordination with related agencies for Building permission and/or others											
5	Technical Seminar		▼									
6	Construction work by the Contractor											
7	Construction Supervision											
8	Demonstration of Prefab-system			▼	▼	▼						
9	Activity of Day Care Center											
10	Inspection for Defective liability Period											2015/ Apr ▼

Source: JICA Study Team

2.1.8 Regenerating Livelihood through Introduction of Disaster Resilient Submerged Fish Cage (Lapu-Lapu Culture) (QIP-8)

The QIP introduces the disaster resilient submerged fish cages, and sustainable environment-friendly grouper (lapu-lapu) aquaculture system. Municipality and BFAR co-manage the cages and lent the fish farmers the cages. The fish farmers cultivate groupers and maintain the cages. BFAR trains the fish farmers in environment-friendly grouper aquaculture system and monitors cultivation activities. Furthermore, a facility to prepare artificial feed (moist pellets) will be constructed as a part of the activities for introducing environment-friendly aquaculture system.

(1) Location

Barangay Victory Island and Camparang at Municipality Guiuan in Eastern Samar Province

(2) Beneficiaries

Direct beneficiaries: 1,183 people (Victory Is. 742 people, Camparang 441 people)

Indirect beneficiaries: Fishing villages in Guiuan Bay, people related to fishery distribution (a population of around 10,000, taking into consideration the Municipal population of 50,000)

(3) Background

Guiuan Bay which is located at southeastern end of Samar Island has suitable habitat of the

high-priced fish, grouper, and produces annually 100 tons (about 200 million pesos) from fishing and aquaculture using natural fingerlings. The live fishes were shipped to Manila, Hong Kong, and etc. However, the living foundations collapsed losing fishing boats and aquaculture cages due to the storm surge of Typhoon Yolanda. In particular, the area around Guiuan was severely damaged as 1,723 fish cages were collapsed and washed out in Eastern Samar, in contrast to 323 in Leyte and 458 in Samar. However, supports to restore aquaculture have not been promoted.

In this QIP, fishing villages of Barangay Camparang and Victory Island, which have a higher percentage of fish farmers (over 80%) in Guiuan Bay are targeted, and the disaster resilient fish cages will be introduced (high-density polyethylene submerged fish cage and improved mooring) to increase the productivity. A sustainable form of operation will be also introduced (gradual shifting to restriction of natural fingerling capture and use of artificially formulated feed) will be introduced. Based on this, the QIP aims at recovery of livelihoods for fish farmers as well as its stabilization in the medium-to-long-term.

For the introduction of fish cages (the hardware), the existing technologies in the Philippines will be improved. The experiences of Japan and Southeast Asia, where Japan has been providing technical support, will be introduced for the environment-friendly aquaculture. In the future, artificial fingerlings of groupers produced by Guiuan Marine Fisheries Development Center supported by Japanese Grant Aid will be used to reduce the dependence on the natural fingerlings.

(4) Purpose of the Project

The purpose of the Project is to improve livelihoods of Typhoon affected fisherfolk families though restoration of lapu-lapu fish farming with environment-friendly and disaster resilient fish cage culture system.

(5) Expected Output of the Project

- Grouper aquaculture is resumed with the disaster resilient submerged fish cage.
- Sustainable environment-friendly grouper aquaculture system is introduced.
- (Extension period) The clause on air compressor ban of the Guiuan fisheries ordinance is amended for facilitation of sustainable aquaculture development

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-15 and Table 2.1-16.

1) Introduction of the disaster resilient and environment-friendly submerged fish cages.
2) Training for fishing families on the operation techniques of the submerged fish cages.
3) Training of environment-friendly culture technology.

4) (Extension period) Training on environment-friendly fish farming technology (use of hatchery bred fingerlings and artificial feeds)
5) (Extension period) Amendment of Guiuan fisheries ordinance

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-17 and Table 2.1-18.

Table 2.1-17 Implementation Schedule for Lapu-lapu Culture (QIP-8)

Activities	2014								2015										
	Original plan period											Extension period							
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1. Designing and testing prototype cages and developing operational guideline for environment-friendly farming																			
① Bathymetrical survey	▼	▼																	
② Design of typhoon-resistant cage	■	■																	
③ Prototype production and field test		■	■																
④ Developing operational guideline				■	■														
2. Construction and installation of cages																			
① Construction of cages by the manufacturer				■	■														
② Delivery of cages to the sites					▼														
③ Installation of cages					■	■	■	■											
3. Training on environment-friendly cage fish culture																			
① Training on cage culture operation								▼	▼	▼									
② Monthly monitoring by BFAR & LGU							■	■	■	■	■	■	■	■	■	■	■	■	■
③ (Extension period) Training on SASUBA													▼		■	■			
4. Supply of supplemental pellet feeds																			
① Procurement of feeds										▼					▼		▼		
② (Extension period) Supply of moist feeds																■	■	■	■
5. Cage culture operation by fishermen																			
① Stocking of fingerlings						■	■	■	■	■	■	■	■	■	■	■	■	■	■
② Feeding and manage-ment of fish cages							■	■	■	■	■	■	■	■	■	■	■	■	■
6. Harvesting															▼				▼
7. (Extension period) Amendment of Fisheries Ordinance									■	■	■						■	■	■
8. Evaluation										■									■

Source: JICA Study Team

Table 2.1-18 Implementation Schedule for Feed Production Center（QIP-8）

Activity		2015			2016						
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
1	Prepare Tender Documents	■									
2	Selection of Contractor	■	■								
3	Coordination with related agencies for Building Permission and/or others			■	■						
4	Construction work by the Contractor			■	■	■	■				
5	Construction Supervision			■	■	■	■				
6	Defect Liability Period inspection									▼	

Source: JICA Study Team

2.1.9 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market (Guiuan) (QIP-9)

Design, quantity surveying, tender, contract and construction supervision are implemented with the engineers of Guiuan Municipality and technical transfer of technical points to strengthen structure and construction management is promoted through the repair of public market building for the wet section of fish and meat sales.

(1) Location

Barangay 06 at Municipality Guiuan in Eastern Samar Province

(2) Beneficiaries

Direct beneficiaries: Market stall, farmer and fisherfolk producing the merchandise sold in the market, Guiuan Municipality which manages the facility and its engineers

Indirect beneficiaries: Consumers of Guiuan Municipality

(3) Background

Guiuan Municipality is located at the end of the south-eastern peninsula in Samar Island and has a population of 47,037 and households of 10,002 (2010 Census), and the Municipality is larger scale compared with other municipalities in the area. In the Municipality, fishery industry is so active that fish is shipped to other areas. Even wet section for fish and meat in the public market is 440 m^2. Including other sector, this public market is operated by financial affairs division of the Municipality and the Municipality gave operating license to the fish stalls at 1,350 peso and the meat stalls at 1,650 peso per year in the wet section and collected respectively 5 peso and 20 peso from fish stalls and meat stalls per day as a rent. In addition the Municipality collected a fee according to the products from the supplier of fish and meat to the market. Although this market supported daily consumption by local people and became the source of income for stalls and the Municipality, the whole roof received serious damage and

was destroyed during Typhoon Yolanda and there is no prospect to repair the market.

On the other hand, the reason that the roof was destroyed is not only technical problems of design and construction but also the undeveloped system to manage the quality of construction by the Municipality. Therefore, the reconstruction of the public market will contribute not only to restore the public market function but also to improve disaster recovery capacity of the Municipality with the improvement of techniques from design to construction supervision of the Municipal engineers through the reconstruction works. This is highly effective in promoting disaster resistant urban development. In addition, the disaster resilient public market can ensure access to safe food for the residents if an emergency arises, and lead to ensure revenue of the Municipality. The public market also can contribute to restore a value chain in collaboration to the QIP of Lapu-Lapu Culture (see section 2.1.8).

(4) Purpose of the Project

The purpose of the Project is to improve the capacity of disaster resilient project management of the Municipality and its engineers through reconstruction of Public Market in Guiuan, Eastern Samar Province.

(5) Expected Output of the Project

- Through the collaborative works of design, quantity surveying, tender, contract and construction supervision for the repair and reconstruction works of public facilities, engineers of Guiuan Municipality learn knowledge and skills necessary for construction project management.
- The public market (wet section of fish and meat sales) is rehabilitated with disaster resilient structure.
- Function of the public market (wet section of fish and meat sales) is recovered.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-19.

1) Collaborative implementation of design, quantity surveying, tender and contract.
2) Repair of the public market building (wet section for fish and meat sales).
3) Collaborative implementation of construction supervision.

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-20.

Table 2.1-20 Implementation Schedule for QIP-9

	Activities	2014							2015					
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	Prepare Tender Documents													
2	Selection of Contractor													
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)													
4	Coordination with related agencies for Building permission and/or others													
5	Technical Seminar													
6	Construction work by the Contractor													
7	Construction Supervision													
8	Inspection for Defective liability Period													2015/ Jun

Source: JICA Study Team

2.1.10 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Slaughter House (QIP-10)

Design, quantity surveying, tender, contract and construction supervision are implemented with the engineers of Dulag Municipality and technical transfer of technical points to strengthen structure and construction management is promoted through the repair of slaughter house building.

(1) Location

Barangay Salvacion at Municipality Dulag in Leyte Province

(2) Beneficiaries

Direct beneficiaries: workers, meat suppliers, livestock farmers, Dulag Municipality to manage facility and the architecture engineers

Indirect beneficiaries: Consumers of Dulag Municipality

(3) Background

Dulag Municipality has a population of 41,757 and households of 9,101 (2010 Census), and the Municipality is the larger scale compared with other municipalities in the area. For the residents, meat such as beef and pork is a basic food material as well as local seafood. The slaughter house worked in order to process the meat in a sanitary manner. The slaughter house operated by the Municipality was a relatively large processing facility which had about 250 m^2 floor area with storage field, and processed the meat of 7 – 8 animals per day. Pig farmers or

meat suppliers from neighboring municipalities as well as in the Municipality brought livestock, and the Municipality collected fees to provide them a place in order to store the livestock for the inspection of diseases, and to slaughter the livestock. However, the slaughter house received serious damages and especially buildings and equipment were destroyed by Typhoon Yolanda, and there is no prospect to repair the facility. Therefore, sanitary meat processing has not been done since the Typhoon Yolanda.

On the other hand, the reason that the roof was destroyed is not only technical problems of design and construction but also the undeveloped system to manage the quality of construction by the Municipality. Therefore, the reconstruction of the slaughter house will contribute not only to restore the slaughter house function but also to improve disaster recovery capacity of the Municipality with the improvement of techniques from design to construction supervision of the Municipality engineers through the reconstruction works. This is highly effective in promoting the disaster resistant urban development. In addition, the disaster resilient slaughter house can ensure access to safe food for the residents if an emergency arises, and lead to ensure revenue of the Municipality.

(4) Purpose of the Project

The purpose of the Project is to improve the capacity of disaster resilient project management of the Municipality and its engineers through reconstruction of Slaughter House in Dulag, Leyte Province.

(5) Expected Output of the Project

- Through the collaborative works of design, quantity surveying, tender, contract and construction supervision for the repair and reconstruction works of public facilities, engineers of Dulag Municipality learn knowledge and skills necessary for construction project management.
- The slaughter house is rehabilitated with disaster resilient structure.
- Function of the slaughter house is recovered.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project indicated in Table 2.1-21.

1) Collaborative implementation of design, quantity surveying, tender and contract.
2) Repair of the slaughter house building.
3) Collaborative implementation of construction supervision.

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-22.

Table 2.1-22 Implementation Schedule for QIP-10

	Activities	2014							2015					
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	Prepare Tender Documents													
2	Selection of Contractor													
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)													
4	Coordination with related agencies for Building permission and/or others													
5	Technical Seminar													
6	Construction work by the Contractor													
7	Construction Supervision													
8	Inspection for Defective liability Period													2015/ Jun

Source: JICA Study Team

2.1.11 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market (Mercedes) (QIP-11)

Design, quantity surveying, tender, contract and construction supervision are implemented with the engineers of Mercedes Municipality and technical transfer of technical points to strengthen structure and construction management is promoted through the repair of public market building.

(1) Location

Barangay I, Poblacion at Municipality Mercedes in Eastern Samar Province.

(2) Beneficiaries

Direct beneficiaries: Market stalls, farmers and fisherfolk producing the merchandise sold in the market, Mercedes Municipality which manages the facility and its engineers

Indirect beneficiaries: Consumers of Mercedes Municipality

(3) Background

Mercedes Municipality has a population of 5,369 and households of 1,133 (2010 Census), and the Municipality is the smallest in the area. The public market of the Municipality has about 350 m^2 where fish, meat, vegetable, dry food and general merchandise are sold. The Municipality gave operating license to the stalls at 1,500 peso per year and collected 150 peso per month as a rent. The feature of this market is that it has a refrigerator and the Municipality used to buy 50 kg of fish and meat from local farmer and supported them by temporarily keeping a part of them in this refrigerator for later sale. Although this market supported daily

consumption by local people and became the source of income for stalls and the Municipality, the facility was almost totally damaged with the roof lost and posts collapsed during Typhoon Yolanda and there is no prospect to repair the market.

On the other hand, the reason of fully-destroyed damage to public market is not only technical problems of design and construction but also the undeveloped system to manage the quality of construction by the Municipality. Therefore, the reconstruction of the public market will contribute not only to restore the public market function but also to improve disaster recovery capacity of the Municipality with the improvement of techniques from design to construction supervision of the Municipal engineers through the reconstruction works. This is highly effective in promoting disaster resistant urban development. In addition, the disaster resilient public market can ensure access to safe food for the residents if an emergency arises, and lead to ensure revenue of the Municipality.

(4) Purpose of the Project

The purpose of the Project is to improve the capacity of disaster resilient project management of the Municipality and its engineers through reconstruction of Public Market in Mercedes, Eastern Samar Province.

(5) Expected Output of the Project

- Through the collaborative works of design, quantity surveying, tender, contract and construction supervision of the repair and reconstruction works of public facilities, engineers of Mercedes Municipality learn knowledge and skills necessary for construction project management.
- The public market is rehabilitated with disaster resilient structure.
- Function of the public market is recovered.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-23.

1) Collaborative implementation of design, quantity surveying, tender and contract.
2) Repair of the public market building.
3) Collaborative implementation of construction supervision.

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-24.

Table 2.1-24 Implementation Schedule for QIP-11

Activities		2014							2015					
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	Prepare Tender Documents													
2	Selection of Contractor													
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)													
4	Coordination with related agencies for Building permission and/or others													
5	Technical Seminar													
6	Construction work by the Contractor													
7	Construction Supervision													
8	Inspection for Defective liability Period													2015/ Jun

Source: JICA Study Team

2.1.12 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market (Mayorga) (QIP-12)

Design, quantity surveying, tender, contract and construction supervision are implemented with the engineers of Mayorga Municipality and technical transfer of technical points to strengthen structure and construction management is promoted through the repair of public market building for fish, meat, vegetable and general merchandise.

(1) Location

Barangay Poblacion Zone 1 at Municipality Mayorga in Leyte Province

(2) Beneficiaries

Direct beneficiaries: Market stalls, farmers and fisherfolk producing the merchandise sold in the market, Mayorga Municipality which manages the facility and its engineers

Indirect beneficiaries: Consumers of Mayorga Municipality

(3) Background

Mayorga Municipality has a population of 14,694 and households of 3,197 (2010 Census), and the Municipality is a middle scale compared with other municipalities in the area. The public market of the Municipality is a small scale compared with population and about 20 stalls were operated for fish, meat, vegetable and general merchandise. Suppliers are not only local. They are also from larger nearby municipalities such as Abuyog, Dulag, Tacloban city and Davao

city. Mayorga Municipality gave operating license to each stall at 3,000 peso per year and collected 500 peso per month as a rent. In addition the Municipality collected a fee per steer, granter or a truck of fish from the supplier of fish and meat to the market. But especially whole roof received serious damage and was destroyed during Typhoon Yolanda and there is no prospect to repair and reopen the market.

On the other hand, the reason that the roof was destroyed is not only technical problems of design and construction but also the undeveloped system to manage the quality of construction by the Municipality. Therefore, the reconstruction of the public market will contribute not only to restore the public market function but also to improve disaster recovery capacity of the Municipality with the improvement of techniques from design to construction supervision of the Municipal engineers through the reconstruction works. This is highly effective in promoting disaster resistant urban development. In addition, the disaster resilient public market can ensure access to safe food for the residents if an emergency arises, and lead to ensure revenue of the Municipality.

(4) Purpose of the Project

The purpose of the Project is to improve the capacity of disaster resilient project management of the Municipality and its engineers through reconstruction of Public Market in Mayorga, Leyte Province.

(5) Expected Output of the Project

- Through the collaborative works of design, quantity surveying, tender, contract and construction supervision of the repair and reconstruction works of public facilities, engineers of Mayorga Municipality learn knowledge and skills necessary for construction project management.
- The public market is rehabilitated with disaster resilient structure.
- Function of the public market is recovered.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-25.

1) Collaborative implementation of design, quantity surveying, tender and contract.
2) Repair of the public market building.
3) Collaborative implementation of construction supervision.

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-26.

Table 2.1-26 Implementation Schedule for QIP-12

Activities		2014							2015					
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	Prepare Tender Documents													
2	Selection of Contractor													
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)													
4	Coordination with related agencies for Building permission and/or others													
5	Technical Seminar													
6	Construction work by the Contractor													
7	Construction Supervision													
8	Inspection for Defective liability Period													2015/ Jun

Source: JICA Study Team

2.1.13 Promotion of Local Products to Improve Livelihoods for the Survivors of Typhoon Yolanda (QIP-13)

The task force will study the framework of promotion activities for the processed products produced by the disaster victims and implement the promotion activities. In the framework, the possibilities for promotion center will be studied, which may become a center to offer information about the QIPs and local products to internal / external people including buyers, and which may work as a billboard of the local products.

(1) Location

Basically the LGUs of, Basey, Mercedes, Tacloban, Tanauan and Tolosa. Other possible target areas to be identified through the activities of the QIP

(2) Beneficiaries

Direct beneficiaries: 3,238 people (Basey 885, Tanauan 1000, Tolosa 170, Mercedes 1,000)
Indirect beneficiaries: 221,174 people (population of Tacloban City), aid workers, tourists

(3) Background

There are four QIPs in Basey (Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish)), Tanauan (Integrated Culture of Oyster and Milk Fish Improvement for Sustainable Aquaculture and Livelihood), Tolosa (Regenerating Local Livelihoods through Processing of Agriculture and Fishery Products by Small-Scale Community Groups) and Mercedes (Regenerating Livelihood through Production of Coco Charcoal Briquette), which have been planned to support the livelihoods of victims of the

Typhoon Yolanda through adding value to agricultural / marine products through processing. Expected products are milk fish processed products (Basey, Tanauan), boneless milk fish and processed meat products (Tolosa), charcoal briquettes made from fallen coco trees (Mercedes). However, these products produced by the disaster victims are not well known and the products have to be promoted widely in order to sustainably sell these local products.

Meanwhile, before the Typhoon Yolanda, some local products who participated in a trade fair in Manila had contracts with buyers. However, the contracts were not completed because they were not able to transport their products. Besides, some buyers advised them that access point in Tacloban could work for the trade of local products. Moreover, the local producers used to be individually supported for the promotion of products and there were no overall promotion activities for the local specialties.

Therefore, the QIP will formulate a task force with organizations related to promotion activities in cooperation with Department of Trade and Industry (DTI) which supports promotion for the local products. The task force will study the contents of promotion activities for the processed products produced by the disaster victims.

(4) Purpose of the Project

The purpose of the Project is to establish the framework of promotion activities for the local processed products by the disaster victims and to promote the sales of the local processed products.

(5) Expected Output of the Project

- The framework of promotion activities for the products produced established through the promotion activities.
- The local products become recognized by consumers through the promotion activities.

(6) Activities and Task Allocation

The activites under QIP-13 are as shown below. Actual activities for sales promotion were carried out through individual QIPs (QIP-01, QIP-03 and 15). Accordingly, the Task allocation for the Project is also indicated in the descriptions of these QIPs.

1) Study of the framework of promotion activities for the processed products with the task force.
2) Implementation of the framework of promotion activities for the processed products.
3) Examine possibilities of a promotion center.

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-27.

Table 2.1-27 Implementation Schedule for QIP-13

	Activities	2014							2015											
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Coordination meeting	▼																		
2	Setting up Task Force		▬	▬																
3	Conduct Task Force Meeting			▼																
4	Examine Promotion Activities											▬	▬	▬						
5	Conduct Promotion Activities*			▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
6	Examine possibilities of promotion centers																			

Source: JICA Study Team

*: Promotion activities were conducted through individual QIPs (QIP-03, QIP-14 and QIP-15)

2.1.14 Regenerating Livelihood through Production of Coco Charcoal Briquette (QIP-14)

2.1.14.1 Charcoal Production

Farmers' groups are established, and be provided necessary tools. They are also trained for building charcoal kiln and production. The member farmers individually produce the charcoal after they are trained in management and use of the tool. They will sell the quality charcoal, and low quality charcoal can be used for home consumption to reduce the expenditure. Further, possibilities for production of briquette using charcoal by sharing the low quality charcoal to add value will be examined. The QIP will also support promotion of charcoal by participating in events such as sales in tents.

(1) Location

Barangay Buyayawon and Busay at Municipality Mercedes in Eastern Samar Province

(2) Beneficiaries

Direct beneficiaries: Coconut farmers (2 groups with approximately 20 persons / group)

Indirect beneficiaries: Other coconut farmers who are interested in charcoal production

(3) Background

Region VIII was third rank in coconut-producing areas in the Philippines with 46 million coconut trees planted on 420 thousand ha, and 1.7 million people involved in the industry of coconut production according to Philippines Coconut Authority (PCA) before the disaster of Typhoon Yolanda. Mixed cropping under the coconut trees were also important for the local economy, the production scale of abaca was the second highest, banana was the seventh

highest, and sweet potato was the first highest in the country. However, 15 million coconut trees have been non-producible, and 20 million coconut trees have further been severely damaged by Typhoon Yolanda. The inter cropping of banana, sweet potatoes and abaca were also seriously devastated. Therefore, the reproduction of coconut cultivation is urgent and indispensable to the local economy. Trunks of fallen coconut trees are processed as timbers for construction, and it has become a source of cash income. However, the quality of coco timber is not suitable for building material, and it is expected that the supply of coco timber will soon overwhelm the needs for building materials because the number of fallen trees is too large.

In this context, the removal of fallen trees and standing dead stocks in the agricultural land, which are the obstacle for replanting of coconut and intercropping, is an urgent issue in order to ensure the livelihood of coconut farmers and recovery of coconut industry in the region. The disposal is also a major issue as same as the removal of the stems. The stems can also be processed to charcoal or organic fertilizer besides from the building materials. It will be precious income resources until the farmers can start harvesting the coconut. The fallen coconut trees that do not require the process of logging, which is prohibited by law, will become suitable charcoal material.

However, the charcoal made from the trunk of coconut has not been present in the market up to now. Therefore, trainings are necessary for preparing charcoal kiln and producing better quality charcoal. Generally, as the charcoal made from coconut tree burns fast, it is expected to be sold at high price by molding charcoal briquette with mixing a binder of crushed cassava. The quality of charcoal made from coconut shell is better, but it is realistic to use the roots and trunks of coco trees, because coconut cannot be harvested for a considerable time due to the disaster, meaning that coconut shells are not produced. In addition, even landless farmers can easily produce the charcoal in gardens.

(4) Purpose of the Project

The purpose of the Project is to contribute to livelihood of the coconut farmers by introducing charcoal production technique.

(5) Expected Output of the Project

- The coconut farmers produce the charcoal made from fallen coco trees.
- Cleaning of the fallen trees and standing dead stocks which are left in the farmlands proceeds.
- The damage caused by coconut pest breeding in the fallen trees is relieved.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-28.

1) Invitation of participant farmers and group formulation.
2) Provision of necessary tools.
3) Examine possibilities for charcoal briquetting.
4) Provision of training.

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-29.

Table 2.1-29 Implementation Schedule for Charcoal Production (QIP-14)

Activities		2014							2015		
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	Invitation of Participant Farmers and Group Formulation										
2	Provision of Necessary Tools										
3	Examine Possibilities for Charcoal Briquetting										
4	Provision of Training										
5	Production and Sales of Charcoal										

Source: JICA Study Team

2.1.14.2 Introduction of intercropping

This project of QIP-14 on coconut intercropping with horticultural crops (vegetables) was conducted in the field after clearance of the fallen and damaged coco trees with farmers selected from participants of the charcoal making. The participating farmers were provided fertilizers and materials least necessary to practice intercropping and trained for particular horticultural techniques. Adaptability of the techniques and cost efficiency of the intercropping were evaluated after finishing the project. In accordance with the evaluation, a coconut intercropping manual has been prepared and distributed to the participant farmers and related parties which are in charge of local development.

(1) Location

Eastern Samar, Mercedes, Barangay, Buyayawon and Busay

(2) Beneficiaries

Direct beneficiary： Coconut farmers (2 groups with approximately 10 persons/group)
Indirect beneficiary： Other coconut farmers who are interested in the intercropping

(3) Background

The typhoon Yolanda catastrophically struck coconut trees in region 8, which took away the income source of the farmers who were making a living with coconut monoculture. Coconut

farming should be urgently rehabilitated. However, even if transplanting of new coconut seedling is done, it will take nearly 10 years for the local variety, or 6 to 7 years even for improved varieties to start bearing fruits. In order to survive this period, it is necessary to introduce coconut intercropping with horticultural crops as an alternative income source for coconut farmers in the target area. Intercropping will improve diversification of farming to reduce the risk of livelihood from natural disasters.

It is said that the target area Mercedes is not suitable for the horticultural production due to its environmental condition. Thus, intercropping practiced in the coconut field is mainly done with root crops such as a sweet potatoes and cassava which are more adaptable in such condition. Horticultural crops have been produced only for home consumption in backyard gardens scale. Nevertheless, there are farmers who are producing horticultural crops for cash in Salcedo where the environmental condition is similar to Mercedes. This fact indicates the possibility of horticulture in Mercedes. Therefore, the project aims to establish intercropping with appropriate crop rotation by selecting crops that are adaptable to the local environment, and by using locally available materials to improve sustainable livelihood for the local coconut farmers.

(4) Project Objective

The purpose of the project is to introduce intercropping with horticultural crops as a new income source, and to pave the way for recovering and improving livelihood of the coconut farmers.

(5) Expected output

- Horticultural crop production techniques for coconut intercropping suitable for the local environment is introduced and examined.
- Cost efficiency of horticultural production as a coconut intercropping is examined
- Appropriate crop rotation for coconut intercropping is suggested in accordance with the local environmental and local demand conditions based on the above mentioned results.
- The way to sustainable livelihood is paved by distributing coconut intercropping manual which compiled with basic information and the above-mentioned results.

(6) Activities

Activities for the Project are as follows and Task allocation for the Project indicated in Table 2.1-30.

1) Selection of participant farmers
2) Designing of intercropping with horticultural crops and techniques to be introduced
3) Procurement of agricultural inputs and materials
4) Implementation of horticultural crop production and sales (with technical training)

5) Evaluation of economic efficiency of pilot production
6) Preparation of coconut intercropping manual from experience of the pilot production

(7) Implementation Schedule

The implementation schedule for the sub-project is indicated in Table 2.1-31.

Table 2.1-31 Implementation schedule for sub project of the QIP-14

Activities		2015						
		Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Selection of participant farmers							
2	Designing of intercropping with horticultural crops and techniques to be introduced							
3	Procurement of agricultural inputs and materials							
4	Implementation of horticultural crop production and sales							
5	Evaluation of economic efficiency of pilot production							
6	Preparation of cultivation manual from experience of the pilot production							

Source: JICA Study Team

2.1.15 Integrated Culture of Oyster and Milk Fish Improvement for Sustainable Aquaculture and Livelihood (QIP-15)

In this QIP, Japanese side will provide the necessary equipment and materials, the fish farmers will conduct balanced culture of oysters and milk fish with the cooperation of bathymetrical survey by BFAR Region VIII Office and Leyte Province. Tanauan Municipality will be responsible for the project implementation at the site in conjunction. Debris from Typhoon Yolanda such as the remaining material of destroyed fish pens and fallen coconut trees, which are obstructing transportation of local residents by canoes, will be removed during the initial stage of the QIP through Cash-for-Work activities. The QIP will also support promotion of processed milkfish by organizing sales campaigns.

(1) Location

Barangay Santa Cruz at Municipality Tanauan in Leyte Province

(2) Beneficiaries

Direct beneficiaries: 1,000 people (Barangay Santa Cruz, 836 population, processing workers, buyers)
Indirect beneficiaries: Assumed 5,000 people: oyster farmers, processing workers, buyers

(3) Background

A Sta. Cruz island in the mouth of the river, which was a preferred place of oyster cultivation due to the nutrition from the river and clean ocean currents of Leyte Gulf facing the open

ocean, was known for a production area of cultured oyster with traditional oyster farming. However, the oyster farming sites have been filled by fish pen farming of milkfish which was more profitable in recent years. Mass mortality of milkfish eventually occurred from deterioration of water quality by eutrophication due to overcrowding of milkfish farming in 2012. It had suspected ties to the cause of red tide in recent years. It can be said the situation represents a typical "The Tragedy of the Commons" occurred in few productive brackish water sites in Leyte Gulf. In this island, there were 10 households engaged in oyster farming, and 55 households in fish pen farming of milk fish before Typhoon Yolanda, which were all lost due to the typhoon.

This QIP aims to establish a sustainable fishing village economy by recovery of the oyster farming through sustainable use of village farming resources to maintain the ecological balance between the farming of milk fish and oyster. BFAR Region VIII Office and Marine Biotoxins Testing Center of Leyte Province are in charge of environmental monitoring, and Tanauan Municipality oversees the farmers' groups in the field. In addition to selling as fresh oyster, a part of produced oyster is planned to be smoked to add values and increase the shelf life so as to increase the volume of sales by diversifying the market destinations. The recovery of the former oyster farming with the balanced milk fish farming operation can improve the economic base of fishing village by diversification of income sources.

(4) Purpose of the Project

The purpose of the Project is to manage community aquaculture resources and to secure the livelihood of Typhoon affected fishermen's families by establishment of integrated culture of oyster and milk fish or 'Talabangusan' as a strategy for sustainable aquaculture.

(5) Expected Output of the Project

- The oyster farmers learn the oyster culture technology.
- Farming facilities of milkfish and oyster are installed.
- Milkfish farming and oyster farming are resumed.
- (Extension period) The efficiency and profitability of milkfish and oyster farming will be improved.
- (Extension period) Milkfish and oyster processing products will be developed and sold
- (Extension period) The management capacity of fish farming and processing associations will be improved.
- Processed milk fish products are produced and sold by the local women fisherfolk association

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project indicated in Table 2.1-32.

1) Removal of debris from cultivation sites through cash-for-work.
2) Installations of oysters and milk fish farming facilities.
3) Improvement of oyster farming technology.
4) Training on milkfish and oyster processing technologies with supply of tools.
5) Environmental monitoring (water quality and toxic plankton)
6) (Extension period) Development of packages for milkfish and oyster for commercial sales
7) (Extension period) Improvement of management capacity of fish farming and processing associations

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-33.

Table 2.1-33 Implementation Schedule for QIP-15

Activities	2014								2015											
	Original plan period										Extension period									
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	May
1. Site preparation																				
1-1 Clearing of site from debris			▼																	
1-2 Application & approval for sites by fishermen			▬	▬																
1-3 Site survey and delineation				▼																
1-4 Design of facilities and field tests			▬	▬																
2. Installation of milkfish and oyster farming facilities																				
2-1 Procurement of materials				▼	▬															
2-2 Construction of fish pens					▬	▬	▬	▬	▬	▬	▬	▬	▬							
2-3 Construction of oyster racks					▬	▬	▬	▬												
2-4 Installation of oyster seed facilities (Leyte-Leyte)							▬	▬												
2-5(Extension period) Provision of Aeration equipment												▬	▬				▬	▬	▬	▬
3. Rehabilitation of Leyte Marine Biotoxins Testing Center (Red Tide Laboratory)																				
3-1 Replacement/procurement of equipment and tools					▬	▬	▬	▬	▬	▬	▬	▬	▬							
3-2 Re-assignment of personnel to work and manage							▼													
4. Training and technology transfer																				
4-1 Visiting Higashi-Matsushima city for fisheries industry observation								▼												
4-2 Training on fish and oyster processing		▼		▼		▼	▼		▼	▼				▼			▼			
4-3 Oyster seed collection technology transfer								▼												
4-4 (Extension period) Packaging of milkfish and oyster processed products																	▬		▼	
5. Operation and monitoring of milkfish and oyster farming																				
5-1 Procurement of oyster seeds								▼	▼	▼										

Activities	2014								2015											
	Original plan period										Extension period									
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	May
5-2 Procurement of milkfish fingerlings and feeds																				
5-3 Feeding and farm management																				
5-4 Environmental monitoring (water quality and plankton)																				
6. Harvesting and sales																				
6-1 Milkfish																				
6-2 Oyster																				
6-3 Package development and shelf-life analysis																				
7. Management and institutional capacity improvement																				
7-1 DOLE DILEEP application and approval																				
7-2 Formation of women's processing association																				
7-3 Production and sales of processed milk fish products by the local women fisherfolk association																				
8. Evaluation																				

Source: JICA Study Team

2.1.16 Training on Disaster Resilient Construction Technologies through Reconstruction of Elementary School (QIP-16)

The school building which was damaged during Typhoon Yolanda which is going to be reconstructed was constructed in one of the Japanese Grant Aid Projects. Since the area where the school is located is low lying and is prone to floods, the floor level will be elevated so that the school can also be used as evacuation sites.

In line with the activities of QIP-4, training activities will be conducted through the QIP. Participants are to obtain skills on technical designs through revising and improving the existing drawings prepared by DepED. Furthermore, trainings for TESDA graduates will be conducted through actual reconstruction works. The contactor engaged in the project will employ skilled workers with TESDA certificates who will be trained through actual works under supervision of the Study Team. Through this process, the trainees will be learning skills for constructing rigid structures that will be required for typhoon resilient buildings. Japanese skilled workers will be deployed during QIP implementation to directly share Japanese technologies to the local workers. Furthermore, the contents of the trainings will be recorded on video and handed over to TESDA so that it could be utilized for further trainings.

(1) Location

Barangay Camire at Municipality of Tanauan in Leyte Province

(2) Beneficiaries

Direct beneficiaries: Graduates of TESDA training courses related to construction, TESDA, Relevant trainers of schools associated with TESDA

Indirect beneficiaries: Teachers and pupils of Camire Elementary School
Residents of Brgy. Camire

(3) Background

The selected three-Classroom building at Camire Elementary School was originally constructed through a JBIC funded project. When Typhoon Yolanda occurred, the roofing of the said school building was totally blown-off and its ceiling including dry-wall partitions were totally damaged. DepEd funded the emergency repair for the building, however, during assessment of the building structural cracks were found in the columns of the building and the roofing system, especially the trusses, were already worn out and anchorage was poor. Hence, through the QIP the building will be reconstructed into a disaster resilient structure with the integration of Japanese construction technology.

Dissemination of construction technologies for disaster resilient structures which will be trained through the reconstruction works of the building is expected to further contribute to the formulation of a disaster resilient society. In addition, the building will be constructed so that it can serve as an evacuation site in the flood prone Barangay.

(4) Purpose of the Project

The purpose of the Project is to disseminate disaster resilient construction technologies through reconstruction of the Elementary School in Tanauan, Leyte Province.

(5) Expected Output of the Project

- Points of improvement will be integrated and techniques for disaster resilient construction will be acquired through the designing and reconstruction of the elementary school;
- The elementary school is rebuilt with a disaster resilient structure.
- Classes of the elementary school will be resumed
- The reconstructed school building will also be utilized as evacuation center

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-34..

1) Preparation of training programs.
2) Construction technique training through the repair and reconstruction of Elementary School buildings.
3) Preparation of training video and text.

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-35.

Table 2.1-35 Implementation Schedule for QIP-16

Activities		2015									2016			
		Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	Prepare Tender Documents													
2	Selection of Contractor													
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)													
4	Coordination with related agencies for Building Permission and/or others													
5	Technical Seminar													
6	Construction work by the Contractor													
7	Construction Supervision													
8	Provide the Trainee List by TESDA													
9	Dispatch of Skilled Workers from Japan for Trainers													
10	Technical Training													
11	Preparation of Training Video and Text													
12	Inspection for Defect Liability Period													

Source: JICA Study Team

2.1.17 Training on Disaster Resilient Construction Technologies through Balangiga Reconstruction of National Agriculture School – Phase 2 (QIP-17)

This QIP is an extension of the Reconstruction of NAS, with the reconstruction of the remaining two (2) buildings; Food Technology and Construction workshops, in the school that was also damaged during Typhoon Yolanda. In line with the activities of QIP-4, training activities will be conducted through the QIP. Participants are to obtain skills on technical designs through revising and improving the existing drawings. Furthermore, trainings for TESDA trainers (including those of associated schools) and graduates will be conducted through actual reconstruction works. The contactor engaged in the project will employ skilled workers with TESDA certificates who will be trained through actual works under supervision of the Study Team. TESDA trainers will also be dispatched to the site. In QIP-4, training activities were conducted on trusses and roofs, which were the main causes of damage to the building. For this QIP, trainings will be done for the construction of substructures, mainly the building framework, which support the superstructures of the building. Japanese skilled workers will be deployed during QIP implementation to directly share Japanese techniques to

the local workers. Furthermore, the contents of the trainings will be recorded on video and handed over to TESDA so that it could be utilized for further trainings.

(1) Location

Barangay Poblacion 01 at Municipality Balangiga in Eastern Samar Province.

(2) Beneficiaries

Direct beneficiaries: Graduates of TESDA training courses related to construction, TESDA, Relevant trainers of schools associated with TESDA

Indirect beneficiaries: Trainers and students of the agriculture school to be repaired

(3) Background

The buildings of the Balangiga National Agriculture School operated under TESDA have been significantly damaged by the gales of Typhoon Yolanda. Two of the school buildings which were constructed through a Japanese Grant Aid project have received damages mainly on its roofs and ceilings, while other buildings constructed with local finance were more severely damaged with damaged/lost roofs and collapsed pillars. The situation is affecting the school curriculum as classes cannot be appropriately held.

On the other hand, in the great Hanshin-Awaji Earthquake and the Great East Japan Earthquake that Japan has experienced in recent years as large-scale disasters, many skilled builders worked in the fields from all over the country during the recovery period. They showed highly developed techniques in the reconstruction of public facilities and the construction of temporary housing so that disaster resilient public facilities were restored. However, in the affected areas of Typhoon Yolanda, the quality of local craftsmanship for construction is of concern, and improvement of the local craftsmanship for construction is of urgent needs to recover and reconstruct public facilities in near future.

Meanwhile, TESDA is responsible to develop the middle-level manpower in the Philippines, and is also associated with 130 schools including 9 TESDA training centers/training schools in Region VIII. The main training courses related to construction are Carpentry, Welding, Masonry, Plumbing, and Electrical Work in 7, 28, 6, 14 and 23 schools for each course.

As TESDA conducts vocational trainings in the region, it is expected that techniques for constructing more disaster resilient structures can be transferred to TESDA by involving them in the repair works of the damaged Agriculture School buildings. This will further contribute to the future development of a disaster resilient society in the region. In addition, as the diversification of trainings on agricultural technology including livestock raising, processing technology of agricultural products are also planned in the school, it is expected to contribute to disseminating technologies for intercropping and alternative crops of coconut farmers, which can increase in near future, and for the processed agricultural products.

(4) Purpose of the Project

The purpose of the Project is to disseminate the disaster resilient construction technologies through reconstruction of National Agriculture School in Balangiga, Eastern Samar Province.

(5) Expected Output of the Project

- TESDA Agriculture School is rebuilt with a disaster resilient structure.
- Training curriculums of TESDA Agriculture School are resumed.
- Points of improvement will be integrated and techniques for disaster resilient construction will be acquired through the designing and reconstruction of TESDA Agriculture School.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-36.

1) Preparation of training programs.
2) Construction technique training through the repair and reconstruction of TESDA Food Technical workshop and Construction workshop buildings.
3) Preparation of training video and text.

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-37.

Table 2.1-37 Implementation Schedule for QIP-17

	Activity	2015									2016			
		Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	Prepare Tender Documents													
2	Selection of Contractor													
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)													
4	Coordination with related agencies for Building Permission and/or others													
5	Technical Seminar													
6	Construction work by the Contractor													
7	Construction Supervision													
8	Provide the Trainee List by TESDA													
9	Dispatch of Skilled Workers from Japan for Trainers													
10	Technical Training													

Activity		2015									2016			
		Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
11	Preparation of Training Video and Text		■	■	■	■	■	■	■	■	■			
12	Inspection for Defect Liability Period													▼

Source: JICA Study Team

2.1.18 Recovery of Rural Health Service Support System through Reconstruction of Rural Health Unit (Abuyog RHU) (QIP-18)

The Project aims at enhancing basic medical services in the Municipality of Abuyog by reconstruction of the Rural Health Unit (RHU) that was damaged by Typhoon Yolanda. The Project also aims at the formulation of a disaster resilient health service system through application of appropriate design and repair works for the RHU facilities.

(1) Location

Barangay Loyonsawang at Municipality Abuyog in Leyte Province

(2) Beneficiaries

Direct beneficiaries: A total of 27 RHU staff and employee
Indirect beneficiaries: Users of RHU

(3) Background

The Municipality of Abuyog, with 12,431 households and a population of 57,146 (2010 Census), is considered to be a rather large Municipality in the Study Area. The operation and management of the facility and equipment of the Abuyog Rural Health Unit (RHU) is done by the Municipality, under the policies of the Regional and Provincial Health Offices Operated by the Department of Health.

The RHU provides various important health services including; Basic medical services such as; out-patients consultation, laboratory examinations, TB Directly Observed Treatment Short-Course (DOTS) Services, Nutrition management, Public Hygiene, Health services at the Baragay level, Maternal Health Care (Pre-Natal & Post-Natal Services), Child Health Services (Newborn Care, Newborn Screening, Nutrition Activities), Water & Sanitation Inspection, Control of contagious diseases, Immunization, Vaccination, and Maintenance and issuance of birth, medical and death records. However, the facility was greatly damaged by typhoon Yolanda to a level of which it could not sustain its activities with its own facility, and up to date, the facility has not been repaired. Currently, the Abuyog RHU is functioning with a reduced scope, by renting space of other public offices.

One of the functions of the Provincial Health Office (PHO) of Leyte that has been repaired

under QIP-2 is to conduct regular monitoring of the services provided by RHUs in the Province. On the other hand, the RHUs are the actual providers of basic health services under the PHO, and in order to maintain the qualities of health services and to resume the basic health service system in Leyte Province, recovering the functions of RHUs is crucial. Furthermore, the RHU will be reconstructed as a disaster resilient regional health facility. This, in collaboration with the PHO, is expected to further contribute to the formulation of a more functional and disaster resilient health service support system for the whole province of Leyte.

(4) Purpose of the Project

The purpose of the Project is to restore rural health service through the reconstruction of RHU facility into a disaster resilient structure.

(5) Expected Output of the Project

- The office building of RHU is reconstructed in a disaster resilient structure.
- Rural health services provided by RHU to the municipality will be restored.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-38.

1) Rehabilitation of RHU Building
2) Concrete pavement of the RHU compound and installation of outdoor lighting system

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-39.

Table 2.1-39 Implementation Schedule for QIP-18

Activities		2015							2016					
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	Prepare Tender Documents													
2	Selection of Contractor													
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)													
4	Coordination with related agencies for Building permission and / or others													
6	Construction work by the Contractor													
7	Construction Supervision													
9	Operation of RHU													

Activities		2015							2016					
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
10	Defective Liability Period inspection													▼

Source: JICA Study Team

2.1.19 Recovery of Rural Health Service Support System through Reconstruction of Rural Health Unit (Dulag RHU) (QIP-19)

The Project aims at enhancing basic medical services in the Municipality of Dulag by reconstruction of the Rural Health Unit (RHU) that was damaged during Typhoon Yolanda. The Project also aims at the formulation of a disaster resilient health service system through application of appropriate design and repair works for the RHU facilities.

(1) Location

Barangay Buntay at Municipality Dulag in Leyte Province

(2) Beneficiaries

Direct beneficiaries: A total of 39 RHU staff and employee
Indirect beneficiaries: Users of RHU

(3) Background

The Municipality of Dulag, with 9,101 households and a population of 41,757 (2010 Census), is considered to be a rather large Municipality in the Study Area. The operation and management of the facility and equipment of the Dulag Rural Health Unit (RHU) is done by the Municipality, under the policies of the Regional and Provincial Health Offices Operated by the Department of Health.

The RHU provides various important health services including; Basic medical services such as; out-patients consultation, laboratory examinations, TB Directly Observed Treatment Short-Course (DOTS) Services, Nutrition management, Public Hygiene, Health services at the Baragay level, Maternal Health Care (Pre-Natal & Post-Natal Services), Child Health Services (Newborn Care, Newborn Screening, Nutrition Activities), Water & Sanitation Inspection, Control of contagious diseases, Immunization, Vaccination, and Maintenance and issuance of birth, medical and death records. However, the facility was greatly damaged by typhoon Yolanda particularly in its apertures (doors, windows, etc.) and though several repair works have taken place, there are still problems such as leaks in the roof, which are hampering sufficient operation.

One of the functions of the Provincial Health Office (PHO) of Leyte that has been repaired under QIP-2 is to conduct regular monitoring of the services provided by RHUs in the Province. On the other hand, the RHUs are the actual providers of basic health services under

the PHO, and in order to maintain the qualities of health services and to resume the basic health service system in Leyte Province, recovering the functions of RHUs is crucial. Furthermore, the RHU will be reconstructed as a disaster resilient regional health facility. This, in collaboration with the PHO, is expected to further contribute to the formulation of a more functional and disaster resilient health service support system for the whole province of Leyte.

(4) Purpose of the Project

The purpose of the Project is to restore rural health service through the reconstruction of RHU facility into a disaster resilient structure.

(5) Expected Output of the Project

- The office building of RHU is reconstructed in a disaster resilient structure.
- Rural health services provided by RHU to the municipality will be restored.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-40.

1) Rehabilitation of RHU Building

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-41.

Table 2.1-41 Implementation Schedule for QIP-18

Activities		2015							2016					
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	Prepare Tender Documents													
2	Selection of Contractor													
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)													
4	Coordination with related agencies for Building permission and / or others													
6	Construction work by the Contractor													
7	Construction Supervision													
9	Operation of RHU													
10	Inspection for Defective Liability Period													▼

Source: JICA Study Team

2.1.20 Construction of Processing Plant for Integrated Aquaculture and Processing Development in Tanauan (QIP-20)

Under the support of QIP-15 the Sta. Cruz Women Fisherfolk Association has obtained skills in producing softbone bangus, which is a pressure cooked milk fish product that can be eaten to the bones. The association is now trying to diversify their sources of income by producing and selling this product, which is also expected to contribute to adding value to the whole supply chain of the local milk fish industry. In order to establish an environment where the association can stably produce their products and further develop their markets, a processing plant will be constructed.

(1) Location

Barangay Sta. Cruz at Municipality of Tanuan in Leyte Province

(2) Beneficiaries

Direct beneficiaries: 1,000 people: Population of Sta. Cruz (836 people), people directly involved in processing and sales activities

Indirect beneficiaries: Assumed 5,000 people: people involved in milk fish production, processing and sales

(3) Background

In QIP-15, a part of the milk fish harvested from the integrated fish-pen culture activities are processed with the aim of adding value to the product and to diversify the sources of income in the community. For this reason, a simple venue was built under QIP-15 for pressure cooking the milk fish into a product with extended shelf life. So far, the product has received good remarks from the consumers. However, the current facility is not compliant to the various requirements set by BFAR for obtaining permit for processing of fishery products, which is further required for various registrations, which will be necessary for approaching larger markets. Construction of a processing facility compliant to BFAR standards is necessary to further enable sustainable and self-reliant activities by the association processing the milk fish.

(4) Purpose of the Project

The QIP aims at supporting the diversification of income sources and adding value to the whole supply chain of the local milk fish industry through establishment of a hygienic processing facility that is compliant to BFAR standards, where people can process and sell their milk fish products.

(5) Expected Output of the Project

- A milk fish processing center is established and the women's association attains necessary skills for processing, using the facility.

- A disaster resilient processing center is established and the women's association attains necessary skills to operate and manage the facility.
- Income of the fisherfolk becomes more stable by increased sources of income and value added to the entire value chain of the local milk fish industry.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-42.

1) Establishment of a processing center that is resilient to typhoons
2) Expansion of processing skills attained by the women's association
3) Sales promotion of milk fish products

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-43.

Table 2.1-43 Implementation Schedule for QIP-20

Activities		2015				2016										
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1	Prepare Tender Documents	■														
2	Selection of Contractor		■													
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)			■												
4	Coordination with related agencies for Building permission and / or others			■												
5	Construction work by the Contractor				■	■	■	■	■	■	■	■	■			
6	Construction Supervision				■	■	■	■	■	■	■	■	■			
7	Defective Liability Period inspection															▼

Source: JICA Study Team

2.1.21 Construction of Processing Plant for Integrated Aquaculture and Processing Development in Basey (QIP-21)

Under the support of QIP-1 the four women's associations have obtained skills in producing softbone bangus, which is a pressure cooked milk fish product that can be eaten to the bones. The associations are now trying to diversify their sources of income by producing and selling this product, which is also expected to contribute to adding value to the whole supply chain of the local milk fish industry. In order to establish an environment where the associations can stably produce their products and further develop their markets, processing plants will be constructed.

(1) Location

Barangay Amandayehan, Barangay Cambayan, Barangay San Antonio and Barangay Tinaogan, in the Municipality of Basey in Samar Province

(2) Beneficiaries

Direct beneficiaries: 885 fisherfolk households engaged in milk fish culture, women's associations, BFAR

Indirect beneficiaries: Residents of the 4 Barangays (5,278 in total. Tinaogan: 1270, Cambayan: 429, Amandayehan: 995, and San Antonio: 2,584)

(3) Background

Stable harvest from the submersible fish cages installed under QIP-1 has enabled the women's associations in Basey to process and sell part of the harvest. So far, the processed product has received good remarks from the consumers. However, processing activities are currently carried out in the houses of the association members, and the conditions are not compliant to the various requirements set by BFAR for obtaining permit for processing of fishery products, which is further required for various registrations, which will be necessary for approaching larger markets. Construction of a processing facility compliant to BFAR standards is necessary to further enable sustainable and self-reliant activities by the association processing the milk fish.

(4) Purpose of the Project

The QIP aims at supporting the diversification of income sources and adding value to the whole supply chain of the local milk fish industry through establishment of a hygienic processing facility that is compliant to BFAR standards, where people can process and sell a part of the milk fish produced in QIP-1.

(5) Expected Output of the Project

- Milk fish processing centers are established and the women's associations attain necessary skills for processing, using the facility.
- Disaster resilient processing centers are established and the women's associations attain necessary skills to operate and manage the facility.
- Income of the fisherfolk becomes more stable by increased sources of income and value added to the entire value chain of the local milk fish industry.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project is indicated in Table 2.1-44.

1) Establishment of processing centers that are resilient to typhoons

2) Expansion of processing skills attained by the women's associations
3) Sales promotion of milk fish products

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-45.

Table 2.1-45 Implementation Schedule for QIP-21

	Activities	2015			2016									
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
1	Prepare Tender Documents	■												
2	Selection of Contractor		■											
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)			■										
4	Coordination with related agencies for Building permission and / or others			■										
5	Construction work by the Contractor		■	■	■	■	■	■	■	■	■			
6	Construction Supervision		■	■	■	■	■	■	■	■	■			
7	Defective Liability Period inspection													▼

Source: JICA Study Team

2.1.22 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Slaughter House (Improvement of Access Road) (QIP-22)

Design, quantity surveying, tender, contract and construction supervision are implemented with the engineers of Dulag Municipality and technical transfer of technical points to improve and strengthen the access road to the slaughter house building will be carried out.

(1) Location

Barangay Salvacion at Municipality of Dulag in Leyte Province

(2) Beneficiaries

Direct beneficiaries: Slaughterhouse workers, meat vendors, livestock farmers, Dulag Municipality and LGU Engineers
Indirect beneficiaries: Consumers of Dulag and nearby municipalities

(3) Background

The access road from the national highway to the slaughter house under reconstruction provided by QIPs was just earthen road. Therefore, it was found that the road condition itself

interrupted the approach to the slaughter house since the road situation would worsen during rain. In order to improve the access to slaughter house and the sanitary control during delivery to the communities around, the road needs to be paved.

(4) Purpose of the Project

The purpose of the Project is to improve transport of livestock to the slaughterhouse and safe handling of processed meat from the slaughter house constructed under QIP-10 to the market.

(5) Expected Output of the Project

- Through the collaborative works of design, quantity surveying, tender, contract and construction supervision for the improvement works of access road, engineers of Dulag Municipality will gain knowledge and skills necessary for construction project management;
- The access to the slaughterhouse is improved.

(6) Activities and Task Allocation

Activities for the Project are as follows and Task allocation for the Project indicated inTable 2.1-46 .

1) Collaborative implementation of design, quantity surveying, tender and contract
2) Repair of access road
3) Collaborative implementation of construction supervision

(7) Implementation Schedule

The Implementation schedule for the QIP is indicated in Table 2.1-47.

Table 2.1-47 Implementation Schedule for QIP-22

Activities		2015							2016		
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	Bidding Documentation										
2	Selection of Contractor										
3	Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)										
4	Coordination with related agencies for Building permission and / or others										
5	Construction Work by the Contractor										
7	Construction Supervision										
8	Inspection for Defective liability Period										▼

Source: JICA Study Team

2.2 Achievement of Quick Impact Projects

2.2.1 Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish) (QIP-1)

(1) Inputs

Input 1: Design of Submersible Cage

Under this QIP project, a new type of cage culture system, Submersible Cage (Figure 2.2-1), which is resilient to typhoons and other natural calamities were designed, constructed and installed in Basey Mariculture Park located in the municipal waters of Basey.

The Project contracted Nitto Seimo Co. Ltd., a fishing gear equipment company in Japan which has a patent to produce submersible cages in Japan, to design and construct a typhoon resilient cage suitable for the site condition. The design tailored to the conditions and actual construction with locally available materials was realized by Nitto Seimo in cooperation with a local fishing gear company, INCA Philippines Inc. Two Japanese engineers were assigned to transfer the Japanese submersible cage technology.

Input 2: Bathymetrical Survey

Prior to the construction of Submersible Cages, the Project in cooperation with Region-8 office of Bureau of Fisheries and Aquatic Resources (BFAR) surveyed the site condition to obtain necessary environmental data for the design. The Figure 2.2-2 shows the bathymetric map of the site as an output from the survey.

Input 3: Construction of Submersible Cages

Three main technical inputs were incorporated into the design of new cages to make it resilient to typhoons; 1) circular high density polyethylene (HDPE) frame, 2) submersing and floating device, and 3) grid mooring system. The first technical input makes the cages physically durable at the same time flexible to absorb physical shocks. The second input makes cages to be able to avoid the rough sea surface condition, while the last input secures the position of whole cage system at the surface.

Input 4: Formation of Fish Farming Associations

The cages were distributed to five fish farming associations formed in four target barangays: Tinaogan, Cambayan, Amandayehan, and San Antonio (Table 2.2-1). Distribution of cages was based on the site condition and number of cage fish farmers prior to the typhoon Yolanda. Majority of members received basic training for fish farming by BFAR Region-8 and had been waiting for the facilities but lost the opportunities due to the Typhoon.

Input 5: Training on Operation of Submersible Cage

The members of beneficiary fish farming associations were provided with a series of training on the operations of submersible cages; 1) installation of cage nets to circular frame 2) construction of circular cage nets, and 3) operations of submersible and floating devices.

Input 6: Supply of Fingerlings and Feeds

BFAR Region-8 being a responsible partner institution for supplying the required 600,000 milkfish fingerlings into the cages successfully selected two local suppliers through a public tender in November 2014.

Basey Municipal Agriculture Office which is responsible for supply of feed to the farming associations for the first year cycle.

Input 7: Market Survey on Milkfish

A market study for finding appropriate form of milkfish processed product was conducted in May 2014. The project staff interviewed fish farmers who were carrying out milkfish farming in Basey Mariculture Park in the target barangays and also interviewed dealers at the wholesale market at Sagkahan in Tacloban city, called by the name of "shed". They also collected existing statistical data from the municipal agriculture office of Tacloban and from BFAR Region-8.

Input 8: Training on Pressure Cooked Milkfish with Supply of Equipment

A product form of pressure cooked milkfish was developed in QIP-1 with the women's association of Barangay Sta. Cruz in cooperation with Leyte Provincial Agriculture Office in QIP-15 as reported later. The developed technique was transferred to the women in the four target barangays in Basey through a series of hands-on training sessions made between the women members of Basey and Tanauan.

Input 9 (Extension Period): Training on Submersible Fish Cage Maintenance

The QIP-1 was implemented according to the original plan and successfully introduced the submersible cages in the previous period. The cages were designed, constructed, and launched at the sites. The fishermen became able to do the submerging and floating operations by themselves.

During the extension period, the project focused on the maintenance and repair of the submersible cages that became apparent from the utilization of the introduced cages during the previous project period. The following training activities (Table 2.2-2) were carried out for the purpose.

Table 2.2-2 Training on Submersible Cage Maintenance for QIP-1 Conducted During the Extension Period

Date	Training Title	Venue	Participants
22 April to 10 May 2015	Relocation of submersible cages (field activities)	Tinaogan	60 of 2 Tinaogan fish farming associations
14 Sept. 2015	Maintenance of grid mooring	Tinaogan covered court	40 from 5 fish farming associations
23 Nov. 2015	Preparation of cages and mooring system for typhoon	4 cage sites	23 from 5 fish farming associations

Source: JICA Study Team

Input 10 (Extension period): Provision of Materials for Improvement of Submersible Fish Cage and Postharvest Activities

There were three main parts where the introduced submersible cages system were modified for improvement based on the opinion and evaluation by the fish farmers during the previous period: 1) Change of air exchange nozzle attached to HDPE from metal to plastic material, 2) Design of cover net that does not damage net, 3) Air compressor system for underwater maintenance work by divers. The materials for construction of the equipment necessary for carrying out these activities (Table 2.2-3) were supplied to the fish farming associations except the materials for the change of air exchange nozzle which were supplied by the manufacturer, INCA Philippines Inc. In addition, equipment for postharvest activities (harvesting platform, chilling box, and harvest net) which were not included in the original list of submersible fish cage components but were necessary to conduct the fish farming activities were supplied to the fish farming associations.

Table 2.2-3 List of materials supplied during the extension period in QIP-1

Name of equipment	Specification	Quantity
Materials for cover nets	Fishing net (PE400/6、17k、200 mesh) Plastic drum 200L Bamboo poles PE rope (12mm, 200m roll)	4 sets (1 set for each grid of 10 cages)
Materials for air supply system for diving	Oil less compressor Air reserve tank Air hose, 3/8 inch, 100m roll	4 sets (1 set for each grid of 10 cages)
Materials for harvesting raft	Galvanized steel pipe (40mm, 6m) Welding rods Plastic drum(200L) Hardwood plank (50mm x 6 inch x 5 m) Nylon monofilament thread (#200)	2 sets (1 set for every 2 grids)
Materials for fish chilling box	Marine plywood (6'x3', 18mm) Hardwood timber (2' x6', 5m) Copper nail (50mm) Epoxy resin + paint	2 sets (1 set for every 2 grids)

Source: JICA Study Team

Input 11(Extension Period)：Strengthening of Groups producing Pressure Cooked Milkfish Product

Apart from the association in San Antonio, which was established before Typhoon Yolanda, the women's associations established in Basey did not have any experience in production and

sales of processed food products. Training activities including account keeping, market development and business planning were carried out under the QIP so as to enhance their skills for independent operation even after the supporting period of the QIP was finished.

Input 12 (Extension Period)：Preparation of Business Plans

Guidance was provided to each of the women's associations so that they could prepare business plans, which would function as guidelines for further continuation of production and sales activities. Business plans were basically formulated based on the experiences of the groups during the supporting period of the QIP. However, taking into consideration the short time that the groups were engaged in the activities due to the late start (September 2015), the main contents of the business plans were drafted based on the experiences of the Sta Cruz Women Fisherfolk Association in Tanauan in Tanauan Municipality, which had started the production and sales of the same product earlier under "QIP 15: Integrated Culture of Oyster and Milk Fish Improvement for Sustainable Aquaculture and Livelihood".

Input 13 (Extension Period)：Participation in the Value Chain Analysis Workshop and Follow-up Meetings

A value chain analysis workshop for the milkfish cluster in the Easter Visayas was held under the initiative of DTI Region 8 Office with the aim of identifying the bottlenecks of milk fish production and distribution in the region, and to plan possible actions to overcome these issues. Furthermore, it was decided that a periodic follow-up meeting was to be held under BFAR Region 8 Office to monitor the progress of the planned actions. The fosherfolk and women's associations supported under this QIP are also participating in these activities.

(2) Achievement of the Project

Achievement 1: Strengthening Typhoon Resilience of Cage Culture System by Introduction of Japanese Submersible Cage Technology

a) Introduction of Disaster Resilient Fish Cages

There were a total of 40 units of cages constructed and installed under this QIP. Based on the site conditions found through the environmental study mentioned above, twenty units out of 40 were made as floating cages due to insufficient site depth for installation of submersible cages and the rest of 20 units were made as submersible cages. All cages are made of circular HDPE frame and equipped with grid mooring technology.

The equipment supplied in QIP-1 are shown in Table 2.2-4 and Table 2.2-5.

Table 2.2-4 Submersible and floating Cages

	Item	Specification	Quantity
1	Submersible cage	Frame cum float: HDPE 225mm circular with submersible device with one unit of compressor Net: 10 m diameter , 6 m depth, PE 400/12 14k, knotted mesh Grid Mooring,	20 units (2 grid mooring systems)
2	Floating cage	Same as above without submersible device	20 units (2 grid mooring units)

Source: JICA Study Team

Table 2.2-5 Supplemental netting materials for construction of smaller mesh nets

	Item	Specification	Quantity
1	PE net	PE 400/9 14k, 200MD knotted mesh	48 bundles
2	PE rope	8mm (#16), 200m/roll	90 rolls
3	Nylon twine	Nylon 210/21, 1 lb/spool	197 spools
4	Fishing net needle	150mm	100 pieces

Source: JICA Study Team

When the strong typhoon Ruby hit the region on December 6, 2014, cages made of bamboos and some cages made of steel pipes had heavy damages in the Basey Mariculture Park. All 40 cages constructed under this QIP project located in the same park survived without any damage. At the time of Typhoon Ruby, the JICA cages were not set with cage nets as no fingerlings were available yet. They were not submerged either because no compressor was supplied yet. Therefore, the constructed cage structure was not yet completely tested for the designed resilient strength against typhoon, but at least, it can be said that the Ruby incident proved its relative strength to the ordinary cage system.

In regards to the expected increase in production and income for the target fisherfolk, the Project has yet to achieve the target benefits as the actual production has not been realized due to delay in fingerling stocking.

b) Organizing Beneficiary Fisherfolk through Establishment of Fish Farming Associations

All 20 submersible cages were installed at Barangay Tinaogan which has deeper and relatively calm site condition suitable for submersible cage installation and is highly dependent on fishing activities for the village economy. These twenty cages were set in two grid mooring systems which are integral units for the cage farming operation. Two fish farming associations were established in Barangay Tinaogan in consideration for operational necessity.

Barangay Amandayehan received 10 floating cage units in a grid mooring system. The remaining 10 floating cage units in one grid mooring system was shared by Barangay Cambayan and Barangay San Antonio which had smaller fisherfolk numbers with cage farming experience.

Establishments of the five fish farming associations were done in the last week of July 2014 under supervision of the officers from Basey Municipal Agricultural Office and witnesses of

the Project staff. Associations' officials were elected through a unanimous vote and the constitutions were adopted on the same day. Assisted by the Municipal Agricultural Office, these associations were officially registered to Department of Labor and Employment (DOLE) in the following month.

c) Technology Transfer on Operation of Submersible Cage

The members of beneficiary fish farming associations were provided with a series of training on the operations of submersible cages. Those fisherfolk underwent these training sessions and successfully demonstrated the operation of fish farming practices with the newly installed cages on the turn-over ceremony carried out on the 24th of March, 2015. List of training conducted under QIP-1 was shown in Table 2.2-8.

Table 2.2-6 List of Training conducted in QIP-1

	Title	Date	Participants
1	Training on Change Net Construction	Nov. 26, 2014	60
2	Hands-on Training on Soft Bone Bangus Processing (Barangay Amandayehan)	Nov. 27, 2014	45
3	Hands-on Training on Soft Bone Bangus Processing (Barangay San Antonio)	Nov. 28, 2014	40
4	Hands-on Training on Soft Bone Bangus Processing (Barangay Tinaogan)	Nov. 29, 2014	41
5	Hands-on Training on Soft Bone Bangus Processing (Barangay Cambayan)	Nov. 30, 2014	45
6	Training on Submersible Device Operation	Jan. 23, 2015	85

Source: JICA Study Team

Achievement 2: Supply of Fingerlings and Feeds to Recommence Fish Farming Operation by Fisherfolk

BFAR Region-8 being a responsible partner institution for supplying the required 600,000 milkfish fingerlings into the cages successfully selected two local suppliers through a public tender in November 2014. Both of the winning suppliers were unfortunately hit by large scale typhoons between December 2014 and January 2015: Ruby, Seniang and Amang. They received damages on dikes and lost the fingerlings prepared for stocking into the submersible cages at Basey. BFAR Region-8 then decided to transport the fingerlings reared in one of its substations, Lavezares farm located at Northern Samar, to the Basey cages. The first stocking of milkfish fingerlings to the cages was made on the 30th of January 2015 with the fingerlings from Lavezares.

Basey Municipal Agriculture Office which is responsible for supply of feed to the farming associations for the first year cycle supplied the feed on time for the fish stocked in the cages.

Achievement 3: Determination of Product Form for Processed Milkfish Based on Market Survey

The market study for finding appropriate form of milkfish processed product concluded in

May 2014 found that the production of commonly known processed products of milkfish such as deboned, marinated, and smoked ones are likely to face difficulties in competing with those imported from outside of the region where fish are produced and processed at cheaper cost. Thus, the study recommended taking a marketing strategy to produce a unique product that is sold at local markets and avoiding competition with imported products from outside regions. The Project came to a conclusion to choose pressure cooked milkfish as the processed product to be developed based on this recommendation.

Achievement 4: Transfer of Processing Technology from QIP-15 to QIP-1

The Project successfully transferred the technology of producing pressure cooked milkfish from the women of Sta. Cruz of Tanauan (QIP-15) to the women of four target barangays of Basey (QIP-1). Those women's associations sold the produced milkfish product within the respective barangays and obtained a new opportunity for income generation.

The first training of transfer of technology between the women groups were done on the 13-14th of August 2014 when selected representative members of Basey women's associations came to learn the technique from the Tanauan women at Barangay Sta. Cruz. The second technology transfer was done from 27th to 30th of November 2014 when selected members of the women association of Tanauan came to demonstrate and advise on the pressure cooking of milkfish to all members of the women's associations of four target barangays of Basey.

Prior to the second training, each women association in Basey were provided with all equipment necessary for production and marketing of pressure cooked milkfish, including tricycles for peddling the products as listed in Table 2.2.9.

Table 2.2-7 Pressure cooking equipment

	Item	Specification	Quantity
1	Pressure cooker	All American® Pressure Cooker 941	4 units
2	Refrigerator	LG® GN-B201SLZ	4 units
3	Cooking utensils	Various small utensils	4 sets
4	Peddling tricycle	Tricycle with steamer	4 units

Source: JICA Study Team

The production by the women association, however, is still occasional due to lack of source material, milkfish, from the Basey Mariculture Park. The first large scale milkfish cage culture production had started in November 2014 from rehabilitated structures of a private company, but it stopped the production after being hit and damaged heavily by Typhoon Ruby.

Achievement 5 (Extension period): Learning on the Maintenance of Grid Mooring Structure for Submersible Cages

This QIP-1 was implemented according to the original plan and successfully introduced the submersible cages in the previous period. The cages were designed, constructed, and launched

at the sites. The fishermen became able to do the submerging and floating operations by themselves. The objective of introducing the cages with the new technology was successfully achieved.

Nitto Seimo Co., Ltd. which has the patent on the submersible cage technology in Japan designed and constructed the submersible cages of Basey using domestically available materials especially for the operation of milkfish farming practiced in the area. Its principle for the submersing/floating mechanism is based on Japanese technology but the Basey cage is a new application of the principle to the local conditions and is quite different in features and appearance in the completed design. Despite the fact that its principal technology was imported from Japan, the introduction bears an aspect of creating a new product and possesses various new parts and components which have not been used anywhere else. These new parts and components are expected to be improved through modification by incorporating opinions obtained through the end user's actual experience in their operation. In addition, it is necessary for the fishermen to master the operation of the introduced cages with understanding of the mechanism and principle of the submersible operation to complete the technology transfer.

With regard to the transfer of submersible cage technology for the sustainable and resilient cage culture operation, the project in the extension period implemented the activities with the following objectives: (i) to improve the facility through utilization of the submersible cage by the fisherfolk and (ii) to master the submersible operation with understanding of the principle of submersible technology. The project focused its activities to the introduction of the submersible cage for the solution of technical problems which became apparent though experience in using the introduced cages by the fisherfolk and at the training on the use of introduced cages especially its management aspect.

The submersible cage is made of two technological principles. The first is the technology to submerge/float the cage, which makes the cages less susceptible against the wave actions occurring at the sea surface. The second is the technology to moor the structure to the sea bed called "grid mooring[1]", which makes the cages more resistant against the current to move the cage structure underwater or to slide the anchor blocks on the seabed. The combination of these two technologies makes submersible cages more resistant both to the vertical wave actions and to the lateral current forces during the time of typhoon.

All the members of fish farming associations learned the technology of submerging and floating of cages during the installation of cages in a training session with the engineers from INCA Inc. and also during the practical exercises for the preparation for various demonstration events such as the handover ceremony of the QIP project to the LGU. The cage structure submerges and floats corresponding to the buoyancy of the HDPE pipe which is controlled by

[1] "Gawabari" in Japanese fish farming terms

injection or removal of air by the operator. The injection of air is done from a compressor installed on a fishing boat to the nozzle attached to the HDPE pipe while the removal is done by opening the same nozzle. An operation manual for the submersing/floating operation was prepared by the manufacturer, INCA Inc. The relation between the operation and the resulting effect on cage movement is straight forward in the submerging/floating operation, and it is relatively easy for the fisherfolk to understand the principle. Probably because of this visually intelligible relationship, they mastered the operation well through the training and other practical exercises carried out in the extension period. It was observed that the fisherfolk modified the method of submerging operation originally explained in the manual for simplified procedure which worked perfectly and showed their level of understanding of the principle.

On the other hand, the practical training on the grid mooring technology was not included in the training at the time of installation although its importance was emphasized in the lecture. Grid mooring does not perform effectively when the ropes are not on tension and effectively holding the anchors to stabilize the cage structure. Therefore, the key aspect of grid mooring to continue its effectiveness is to maintain the tension of all anchor ropes which hold the cage structure to the seabed. When the cages were installed initially by the supplier, the ropes were set properly with no slackness on any rope, and therefore, there would have been no allowance in the rope length to be tightened even if the Project included a practical session on grid mooring maintenance in the training conducted at the time of cage installation.

As time passes, the elastic ropes extend gradually in length due to the reciprocal pulling to the opposite directions as tide changes. The length would get longer gradually also when the ropes are continuously pulled because of gradual unfolding of the rope's twist. The downward load to the ropes also increases as time underwater lengthens due to the biofouling materials that grow on the rope, which again contributes to the extension of ropes. These changes gradually occurred to the ropes of the introduced cages in the QIP-1 project which made the rope slack little by little underwater.

When anchor ropes are on tension, they are functioning to hold the position of the cages. As times passes and the ropes get slack, only a few of those ropes located at the upstream side are on tension and perform the function of holding the cage. The tension of the ropes exchanges and the floating cage structure moves back and forth accordingly when the tide changes its direction. Those slack ropes located on downstream side do not function to hold the cages. It is possible that the entire grid structure could start moving and the anchor blocks start sliding on the seabed when the current force exceeds the capacity of the few ropes holding the cage. When the anchor ropes get slack more, the current pushing the cage structure downstream makes the grid shape deform, elongated along the current direction and narrow at the perpendicular direction to the current. The HDPE cage frame then starts moving back and

forth inside the grid, which makes the distance between the hanging cage net and the grid rope very close when the current is strong. The current can blow the net downstream and upward to touch the grid rope and may damage the net due to abrasion between the net and the grid rope. On the upstream side, extra load is exerted on a few anchor ropes to hold the whole grid structure. Those anchor ropes and the grid ropes connected to them are pulled underwater because they tend to run the shortest course between the anchors at the seabed to the floating cage structure. The buoys set at every corner of grid are pulled underwater by the sunken grid ropes and are possible to be deformed by the pressure. These various problems which could occur when the grid mooring system is not maintained for a long time.

An accident of net cutting happened in early March 2015 on one of the cages of Tinaogan fish farming association at Basey when the tips of the numerous barnacles that grew on the grid rope surface cut the net like a sharp knife. An underwater site inspection for the investigation of the accident found that the anchor ropes were extremely slack (up to 4~5 meters) and suggested movement (sliding) of the anchor blocks on the seabed. All problems explained above (net breakage, deformation of HDPE pipe frame, deformation of corner buoys, and movement of entire cage-grid structure) were observed in the site inspection.

When the torn net accident was observed in March 2015, the tidal current was much faster than the time of cage installation in Oct. 2014 and was expected to get faster as it was already spring tide season (close to Spring Equinox). After consultation with the engineers of the cage manufacturer and supplier, INCA Inc., who investigated the cages at the site and the Nitto Seimo Co. Ltd., the project decided to relocate the two grid systems of Tinaogan fish farming associations to shallower locations near the shore. The relocation activity for the two grid mooring systems (10 cages in each grid mooring system, 20 cages in total) was carried out from April 22 to May 9, 2015. Fortunately, the fishermen were familiar with the cage relocation as they had done it many times previously for the cages used before Typhoon Yolanda (individual mooring system) and the operation was done without any accident and problem on time.

The maintenance work for grid mooring system or tightening the anchor ropes does not have a visible straight forward relation with the problems which might occur as the result of poor maintenance. Experiencing actual examples are the most effective way of understanding the cause - effect relations. It takes time to fully understand the importance of the rope tightening operation. The accident did occur and the fish farming associations lost the fish inside the cages, but because of the experience and the actual loss, the beneficiary-fisherfolk for this submersible cage project were able to learn the importance in an actual lesson within the project period. The extension period provided the fisherfolk an important opportunity to handle the grid mooring maintenance problem and became better prepared technically for the future sustainable operation after the project termination.

These problems that happened also gave important experience to the consultants monitoring the situation, and provided opportunities to improve the design and operation. In particular, the tearing of net by barnacles made them learn about the possibility of blowing of cage net by current which is normal to occur that could result in a torn net incident. The sharp edge of barnacle shell can function like a knife when it touches a net on tension. The cheap polyethylene net material made in China or other Asian countries is fairly poor in durability compared to the cage net used in Japan where high quality and high value materials are used to hold the fish which are much higher in value than in the Philippines. Barnacles also grow much faster in the warm waters of tropical countries which could accelerate the occurrences of these incidents. The experience of accidental loss of fish by torn net let the consultants confirm the importance of cleaning of ropes to remove the biofouling materials in addition to periodical tightening of anchor ropes.

During October to December 2015, before the onset of the typhoon season, the fish farming associations intensively carried out the cleaning and tightening of the ropes of the grid mooring system. The method to clean the ropes using shackles that was devised by Nitto Seimo engineers was applied to the cleaning operation and the tightening of anchor ropes. The procedures for the maintenance work were explained in Appendix-2. It was found in the monitoring carried out in the pre-typhoon tightening exercises that those grid mooring systems of 20 cages which were relocated in April to May 2015 were apparently better in the rope conditions with less slackness and fewer biofouling materials attached compared to the other 20 cages which were not involved in the relocation work. This was because of the eventual tightening and cleaning of the ropes during the relocation exercises and the beneficiary-fisherfolk understood the importance through their own experience.

Achievement 6 (Extension period): Improvements of Submersible Cage Facility

There are many parts of the submersible cage which were created and introduced for the first time in this project because the cage system was tailored specifically for the milkfish farming practiced at Basey. These parts are expected to improve the quality by applying modifications based on the end user's critical opinions and advices. In this section, the technical problems which became apparent through the use of submersible cages by the fisherfolk will be explained and the responses of the project on those technical issues raised will be reported.

The submersible cages have been used by the fisherfolk for more than one year since the installation of cages in October 2014 to the end of activities in December 2015, and it is reasonable to think that all those obvious problems have appeared during the time of more than one year. The extension period gave the project to respond on those technical problems and to have opportunities to solve them to contribute to the sustainable operation of cage farming after the termination.

a) Change of air exchange nozzle attached to HDPE from metal to plastic material

The control of submersible cage position is done by injection or removal of air to/from the HDPE pipe frame. The air from the compressor installed on a fishing boat is injected or removed through a nozzle on the HDPE pipe. Air is removed by opening the nozzle and it is injected by attaching an air hose from the compressor[2]. The nozzle was made of stainless steel in the original design with one-touch connection mechanism. The fisherfolk, however, later reported on the development of rust on the metal nozzle and suspected possible problem of incomplete connection at the joint for air injection.

In response to the report, the project requested the manufacturer, INCA Inc., for the investigation which resulted in a recommendation for the change of metal material to plastic material[3]. The submersible cage in milkfish farming at Basey are usually floating and submerged only for a short time (less than a week) when the typhoon risk is high. The one-touch joint nozzle is convenient for the cages which are frequently moved to change the vertical position, but not so for the Basey cages which are expected to be submerged for a few times in a year only. The cost of a plastic nozzle was much lower than the metal nozzle because the ordinary plumbing parts are applicable for the purpose. The only disadvantage of plastic nozzles was the material weakness compared to metal. One of the replaced plastic nozzles was found broken by being hit by an outrigger of a fishing boat. The manufacture is now considering attaching a small protective panel beside the nozzle to prevent the accidental damage.

b) Design of cover net that does not damage net

A submersible cage, unlike an ordinary floating cage, needs to have a cover net to prevent fish to escape when it is underwater. The cage used in this project has only one single pipe HDPE ring on which the net bag is attached directly without stanchions to lift the upper end of net. The upper end of the net is at the same level as the HDPE ring when the cages are floating on water and the fish inside can easily jump out. Therefore, a cover net is necessary even for the floating type cage supplied in this project.

The original cover net was a circular piece of net made of the same material used for the side net for the cage. The cover net was designed to float on water. It was found by the fisherfolk that milkfish fingerlings get stuck in the net mesh when they rush to the feed broadcasted over the net. They also reported that fish died due to abrasions on the rostral end of the fish and the secondary infections, which could be attributed to the descaling/bruising of the fish when it touched the net during the feeding time. This problem became exaggerated later when the net

[2] Air enters or escapes by the nozzle as there is an opening on the opposite side of HDPE pipe which is opened during these submerging/floating operations.
[3] The change and improvement of nozzles and also the repair of damaged parts caused by sliding of cage structure (repair of HDPE pipe, repair of buoys, engineer's side examination) were done by INCA Inc. with them bearing the cost.

was infested by biofouling materials and tend to sink in a wider area in the seawater.

The fisherfolk tried to avoid having the cover net touch the water surface by lifting it in various innovative ways using the materials available at their locality. The project assisted the fisherfolk's own initiative to design the cover net, and supplied the necessary materials (bamboo, plastic drum, rope and net materials) to the associations.

Among the design by the fisherfolk, those which used bamboo materials to construct a frame to lift the net were considered to have risks of damaging the cage net when the strong wave actions during the times of typhoon disintegrate the bamboo poles. One of those made by San Antonio group which had a security hut at the center of the cage was typical for this potential problem and the fisherfolk were advised to remove the security hut before the onset of the typhoon season. During the monitoring inspection on 23rd November 2015, a small cage net breakage was found at the upper end of a net of Cambayan fish farming association which was damaged by the end of a bamboo pole touching the torn point where barnacles were again observed. For this problem the engineers of Nitto Seimo recommended a cover net design which uses no bamboo material but only ropes to lift the net.

c) Air compressor system for underwater maintenance work by divers

Fisherfolk at Basey carry out the maintenance works of the cage culture operation such as changing and repairing nets, cleaning and tightening ropes, etc. underwater with support by divers. Air for a surface air supply system for the divers is supplied from a compressor installed on fishing boats is commonly used. There are specialized fishermen who carry out the diving works in most fishing villages. Diving is a part of common activities in the small scale fishing and fish farming in cages in the project sites and also generally in the Philippines.

It was originally considered in this project to do all aquaculture operation from a fishing boat and no diving equipment was included in the original set of facility except for the compressor system for supplying compressed air for submersing/floating cages. The method for cleaning ropes and tightening ropes carried out from a fishing boat without use of a diver is considered for example to be introduced. But the method was not efficient as the boat for the operation is too small and too light so that it moved closer to the cleaning point on the rope rather than moving the cleaning point on the rope to the boat. There was much advantage of using divers for the various maintenance works for the cages supplied in this project, and it was decided to supply a set of necessary materials for diving to each grid mooring system. Those same components which were used by the fisherfolk were procured locally and supplied to the fish farming associations. They constructed them into air supply systems for diving to assist the cage maintenance works. Each association was also responsible for the provision of an engine for driving the compressor as it is the same type of engine which is used for driving the fishing boat.

The compressor machine supplied was not the same type as the type the fisherfolk at Basey were using, which was an industrial compressor often seen in machine workshops and garages. The compressor supplied by the project is called "oil-free type". The ordinary industrial compressor releases lubrication oil material and potentially delivers it to the diver's lung though the air supply hose system to cause potential health problems. The oil-less compressor has no risk for releasing any lubricating material as it is equipped with a silicone ring to reduce internal abrasion for the piston's pumping operation and uses no lubricating oil. The project also supplied a mouthpiece with a regulator to attach at the end of each air supply hose. The end of the air hose of the traditional diving system used by the fishermen was open and free for the air to be released continuously even when the diver does not need air for underwater respiration. The supply of air to the diver stops immediately in this system when the compressor stops operating and does not give sufficient time for the divers to ascend to the sea surface. The system with a regulator at the end of the hose increases the internal pressure higher than the outside of the hose end and therefore continues supplying air after the compressor failure until the internal air pressure reduces equal to the underwater pressure outside. The supply of regulators by the project was necessary for increasing the safety for the divers in times of accidental compressor failure.

Achievement 7 (Extension period): Improvements in Harvested Fish Quality and Reduction in Harvesting Operation Cost

The project supplied materials necessary for the construction of equipment used for harvesting operations from the fish cage (harvesting raft and chilling box) which were not included in the original list of supplied equipment composed of the submersible cages. The harvesting raft is a floating platform that is used when the fishermen harvest fish from the fish cage. It is made of galvanized metal pipe frame with plastic drums attached to the downside and the coco lumber floor on the upper side. The chilling box is a large-sized box which is set on the harvesting raft with plenty of ice in it to lower the body temperature of harvested fish when they are placed into the box immediately from the cage. The sudden reduction of body temperature maintains the quality of fish for packing into styrofoam boxes and for transportation to the market. It is made of marine plywood with wooden frames painted with epoxy resin for waterproofing. If the fish farming associations do not have them, the harvester who is often the wholesaler charges them a rental fee. Thus the provision of the equipment reduced the cost of harvesting and supported the sustainable operation of fish farming by the associations.

All the equipment constructed with the materials supplied during the extension period were in principle the same as those used by the beneficiary-fisherfolk who are accustomed to use and maintain them. They started using them immediately after the completion of construction and no issue on the maintenance are expected.

Achievement 8 (Extension period): Self-motivated Development for Solution of Operational Issues on Milkfish Cage Farming

The rehabilitation and recovery of the milkfish farming at Basey requires to be dealt with not only the technical issues as discussed above but also the operational issues. Milkfish farming of this QIP is operated in the Basey Mariculture Park. The beneficiary small-scale fishers had been supported through the Rent-to-Own system which was managed by BFAR/LGU. In the MOU for this project which was signed by the JICA Project, BFAR RO-8 and LGU Basey, the main responsibility of each of the participating partners were defined and demarcated: JICA Project to construct the facility, BFAR RO-8 to supply the fingerlings and LGU Basey to supply the feeds required for the first year operation conducted by the beneficiary-fisherfolk. The succeeding operations of fish farming after the project termination were assumed to be funded by the revenue from the previous operations so that self-sufficiency in the operational funding would be established.

The objective for this QIP on long term sustainability of milkfish farming needs to have the beneficiary fish farming associations become able to manage the second cycle fish farming operations and beyond. But before this can be achieved, the first cycle operations should be completed with sufficient revenue for the second cycle operations. Completion of the first year operations without problems was a prerequisite for the long-term sustainability for the operation of fish cages supplied in this QIP.

As of the end of December 2015, there were 30 times of fingerling stocking completed, but the number of harvest remains 10. The revenue from the harvest in the first 10 cages were not used for the operation of the same cage, but used for the operation of the other cages which were stocked with the fingerlings by BFAR. It means that the harvest revenue was recycled for the first cycle operations of a part of 30 cages supported for fingerlings by BFAR. If all the revenue were used for the operation of the same cages as it was assumed, there should be 30 cages operating now but there are only 20 cages under operation. The reason for this fund recycling, as it is explained later, is the shortage of total amount of funds of LGU Basey prepared for supporting the feed supply to the cages.

Table 2.2-8 Production of milkfish in QIP-1 in Basey (as of the end of Dec. 2015)

Fish farming association	No. of cage and type*	No. of stocking and harvest	Harvest volume (kg)	Gross fish sale (Php)	Total cost (Php)	Net profit (Php)
Tinaogan Mariculture Fisherfolk Association	10 (S)	7 /2	639	67,150	55,681	11,469
			1,710	184,900	148,240	36,662
Tinaogan Mariculture Operators Association	10 (S)	6 /3	0	0	0	0
			5,830	204,170	189,118	15,055
			1,582	220,340	150,970	69,370
Cambayan Fisherfolk Association	5 (F)	5 /2	1,229	123,450	123,202	248
			2,447	254,150	174,857	79,293
Amandayehan Fisherfolk Cagers Association	10 (F)	9 /3	2,526	252,620	223,430	29,190
			1,564	162,500	146,090	16,410
			1,650	176,000	134,,567	41,943

Fish farming association	No. of cage and type*	No. of stocking and harvest	Harvest volume (kg)	Gross fish sale (Php)	Total cost (Php)	Net profit (Php)
San Antonio Paragbangus Association	5 (F)	3 /1	2,274	24,800	223,445	25,355
Total	40	30 /10	18,200	1,894,080	1,569,084	324,996
Average			1,820	189,408	156,908	32,500

Source: JICA Study Team

*Cage type: (S):-submersible cage, (F):-floating cage, both are in grid mooring system

As a matter of fact, there are problems in both fingerling supply and feeds supply in the fish farming operation of the first production cycles. The revenue from the first cycle operation was credited to the account/trust fund for the management of Basey Mariculture Park, which is a revolving fund allowed to recycle the funds for the operation of the mariculture park by LGU Basey with approval from the Executive Management Committee that is co-represented by BFAR RO-8 regional director and LGU mayor. Only the "net profit" or the difference between the total revenue and the cost reserved for the next cycle operation (fingerlings and feed requirements) was deposited to the account of each fish farming association. The "net profit" alone was not sufficient to cover the total cost for the operation for the second cycle and the associations had to distribute in most cases to the member farmers as the compensation for the labor provided during the first cycle operation. Therefore, the fish farming associations did not come to the state where they are able to manage the farming operations by their own funds.

The Project completed installing all cages by October 2014. All 40 cages became ready to be stocked with fingerlings but the first stocking of fingerlings was done after 3 months and the delay in stocking continued into the first quarter of 2015. The majority of the 30 cages stocked with fingerlings were realized in the last half of 2015. The reason for the significant delay in the fingerling supply was because of general shortage of fingerlings in the Eastern Visayas region where Typhoon Yolanda hit hard. The fingerling production facilities in the region had also been damaged severely by the typhoon and majority had stopped production (Appendix-3).

The direct cause of the significant delay in fingerling supply to the QIP cages at Basey by BFAR RO-8 was related to the difficulty in the government procedure for procurement of fingerlings under the background of severe shortage explained above.

The capacity of QIP-supplied fish cages in 10 m diameter is about 20,000 fish/unit and the total capacity of stocking fingerlings for the 40 cage units is 800,000. BFAR RO-8 planned to conduct a public tender for supply of 600,000 fingerlings for the 40 QIP cages considering the fingerling shortage situation prevailing in the region and the capacity of fish farmers for growing fish in the newly introduced submersible cages. The usual fish cage in the region was 5m×5m with the fingerling stocking capacity up to 10,000/unit. Therefore, the 600,000 fingerling supply in one tender was a big contract for suppliers in the region and the nursery

farms which were able to offer for this tender were quite limited in number. The tender was opened under a heavily under-supply condition prevailing in the fingerling supply market in the region. Actually, the tender failed twice to attract any offer from the market. BFAR RO-8 made contacts with two nursery farms for the supply of 600,000 fingerlings in the third tender. However, the contracts were later revoked after finding both of the nursery farms were actually not eligible to participate to the tender as they could not show the certificates of tax payment for the previous periods. BFAR RO-8 then broke down the 600,000 fingerling supply into smaller procurements which can be done without rigorous pre-qualification examination. They concluded successfully all the contracts for supply of total 600,000 fingerlings but it took about a half of year before signing of the contracts. The fisherfolk waited additional three months for the nurseries to grow the fish until the latter half of 2015 for the beginning of full scale fingerling stocking into their cages.

BFAR RO-8 which prioritized this QIP project as one of the recovery and rehabilitation projects from Typhoon Yolanda in the region did not waste time in waiting for the fish to grow in the nursery ponds of the contracted suppliers but started supplying fingerlings by growing them in the government stations under their direct control (Lavezares station in Northern Samar, and Jaibong station in Western Samar). Because of these extraordinary arrangements by the responsible officer of BFAR RO-8 dedicated in the Yolanda recovery activities, despite the prevailing difficult market condition, it was able to stock 30 cages with fingerlings by the end of December 2015.

Because of the delay in stocking of fingerlings which occurred in the last half of year 2015, only the fish in 10 cages out of the 30 stocking events were harvested by the end of December 2015 and the fish in 20 cages are still growing in the cages and expected to be harvested in the first quarter of 2016.

Achievement 9 (Extension Period): Analysis for the Delay in Fingerlings Stocking and Efficiency in Fish Farming Operation

The fundamental cause for the delay in the fingerling supply included the general shortage in the fingerlings shortage in the market as explained above because of the severe damages on the nursery facilities in the region hit by Typhoon Yolanda. It is then considered as a temporary problem for the time after the disaster.

The significant delay in fingerling supply which occurred at Basey, however, cannot be explained by this temporary general market condition alone. It is because the supply of milkfish fingerlings in QIP-15 at Tanauan which obtained them in the same region started operations immediately after the completion of the facility and continued without any trouble. At Tanauan QIP-15, the Project rehabilitated 42 pens for milkfish farming (about the same number as 40 units of cage at QIP-1 at Basey), a total of 69 times of fingerlings stocking was

done in 31 facilities by the end of December 2015. There were 47 times of harvest carried out where some advanced farmers were already at the 4th cycle of operational cycle in the same pen. Although the form of fish farming is different, the fisherfolk in the two QIPs sourced the same milkfish fingerlings from the same region, and therefore, it is reasonable to conclude that the general fingerling shortage in the region cannot be the single cause for the significant delay for the fingerling supply for the QIP-1 in Basey.

The reason for the efficient stocking of fingerlings in QIP-15 at Tanauan was because the farmers paid cash as soon as they received fingerling in their pens. Most nursery farms in the Eastern Visayas region have been damaged by Typhoon Yolanda and were forced to halt the production. As the grow-out facilities started being rehabilitated such as in this project or by the owner's own initiatives, the demand for fingerlings gradually increased. The severe shortage in the fingerling supply market was also a business chance for those nursery operators who were able to start operating earlier. Most of them were small scaled and were limited in their financing capacities, and therefore, revived into the business using special soft loans supplied for the Yolanda victims. Under these situations, business opportunities which provided the revenue in cash payments and made them able to repay the loans were most welcome to the small scale nursery fingerling suppliers. In fact, the Tanauan farmers who started the production earlier obtained the fingerlings from small scale nursery operators often from areas that received relatively light damage by Typhoon Yolanda, such as Ormoc and southern Leyte in the region.

For those small scale nursery operators, the 600,000milkfish fingerling supply in one contract was too large to handle. In addition, the payments in the government procurement contracts are known to be delayed and even the large scale nursery operators try to avoid it under the high demand situation. A large scale fingerling supply in a government contract was unavoidably placed at low priority by the nursery operators in the region.

The reason why the Tanauan farmers in QIP-15 were able to obtain milkfish fingerlings under the fingerling shortage condition was because they were able to pay in cash as soon as the stocking was complete. This capability comes from the unique management system practiced at the site since before-Yolanda time which involves private sector partner in the operation. All three fishery-related QIPs in JICA Yolanda Project did not support the operational funds for the rehabilitation of livelihood activities. The Project assisted in supplying materials for rehabilitation of aquaculture activities and the beneficiary-fisherfolk constructed the facility on their own labor but the operational funding requirement was left to the responsibility for the Philippines sides. This project funding arrangement was different from most cases of other donor assisted fish farming projects in which operational materials for the first cycle were included in the donor's responsibility, and probably one of the special characters for the Japanese assistance in the Yolanda recovery and rehabilitation efforts by various international

agencies. The reason for this assistance policy was to increase the beneficiary's sense of ownership so as to ascertain the sustainability of the project.

How the Philippine side actually supplied the fingerlings and feeds to the beneficiary-fisherfolk depended on the situation of each project. The fish farming activity of QIP-1 at Basey was carried out in the Basey Mariculture Park and the government support system of Rent-to-Own was in place before the Typhoon Yolanda. The MOU for the QIP-1 placed BFAR and LGU as responsible for fingerling supply and feed supply, respectively.

At the barangay Sta. Cruz in Tanauan, a cooperative management system between the fish farmers and the private investors had been operational for the milkfish farming before Typhoon Yolanda hit and damaged completely the production structures. The fish farming operation as practiced in this project is highly intensive and it is usual for the feed cost to occupy the largest part of the total operational cost, often more than 60%. In the case of the milkfish pen farming at Tanauan QIP-15 in which the facility is made of simple and locally available materials like bamboos, the ratio of feed cost to the total operational cost increases to a higher value. It was more than 80% in the case of milkfish pen farming at Tanauan QIP-15. The total cost for the materials for constructing a unit of pen farming facility was about Php 60,000.00 while the operational cost (the total cost for feeds and fingerlings) was about Php 250,000.00 in the actual examples in the QIP-15 at Tanauan. It is not realistic for most small scale fisherfolk to prepare the operational cost which is more than four times the cost of facility construction.

Calling the investor for injecting capital to the operation of fish farming is probably a method originated from the necessity at Sta. Cruz, Tanauan. It is said to have started from borrowing money for the farming operation from wealthy relative members in the extended family system such as overseas workers. Many investors for the fish farming in fact are still those who are working abroad. The clear profit sharing rule to divide the net profit at 50% to 50% between the fish farm operator and the investor is established in the business system. This simplicity and transparency in the business management seems to have attracted the ordinary investors beyond the kinship boundary.

Many previous investors who lost the investment when Typhoon Yolanda hit the region withdrew from the investment into milkfish farming at Sta. Cruz. Although there was a concern on the degree of investment from the private sector for the milkfish farming operations, the QIP-15 project decided to use the same system of the fisherfolk and private investor partnership for the operational management system. Because the project took this option, the recovery of fish farming operation was solely dependent on the individual fisherfolk's creditability and business performance, and the actual recovery achievement varied greatly in performance among the beneficiary fisherfolk. Out of the total 42 fish pens owners supported for the construction, 38 establishments actually rehabilitated the facility, 31

establishments stocked fingerlings and became operational as of the end of December 2015. Eleven units have never stocked fingerlings. The total number of fish stocking to the 31 fish pens were 69 which means many fish pen owners are already in multiple operations in the same pens. The average stocking for the 31 units was 2.22 times and can be considered that the recovery of fish farming operation was successfully achieved as the whole barangay at Sta. Cruz by QIP-15.

The reason of the fast recovery achievement in milkfish pen fish farming at Brgy. Sta. Cruz was involvement of private funds into the operation, or it could be said that it was due to the economic vitality of the private sector. In QIP-1 at Basey, the government sector (BFAR RO-8 and LGU Basey) took the responsibility of supporting for the fingerling and feed requirements for the first operational cycle. But the disbursement of funds according to the government regulation was slow and cumbersome in dealing with the special condition of the fingering shortage in the aftermath of the super typhoon disaster and resulted in a significant delay in the fingerling supply.

The average economic performance of fish farming operation of QIP-1 at Tanauan was much better than that of QIP-1 at Basey. The average net profit for the former was 33,500 pesos per cycle where 40 cage units were established, while it was 66,100 pesos per cycle for the latter or about 2 times better than the former where 42 fish pen units were supported for the facility rehabilitation. The total gross sales value by the end of December 2015 was 1.9 million pesos at Basey while it amounted to 11.8 million pesos at Tanauan or 6.2 times better than at Basey.

Achievement 10 (Extension period): Awareness on Efficiency in Fish Farm Management by Assigning a Single Fish Farmer Responsible for Operation of an Entire Production Period

Each beneficiary fish farming association of QIP-1 is composed of 20 to 30 members and every member takes turn to carry out daily labor work at the cage. Because of the substantial delay in supply of fingerlings and a small number of cages were operational most of time in 2015, there were only a few days to work for each member. This situation of little working day for each member and many individuals working for the same cage prevented to generate the feeling of responsibility among the members for the performance of fish farming for a cage throughout the growing period. Every member considered that their responsibility is completed by attending the cage for a day to feed and watch the cage for security, but not sufficient attention was paid to its efficiency and performance of cage farming operational activities in detail. The small amount of shared payment given from the association because of the large number of persons involved in the operation for a cage also discouraged them to maintain high interest on their work attitude. Higher mortality rates were observed in the cages at Basey, for which BFAR RO-8 suspected water quality problems and parasite infection to the fingerlings. The other reason which might have amplified the extent of problem could be

the late attention to unusual behavior and weak fish by the fisherfolk because of the general low level in the motivation for daily works.

The importance of the sense of responsibility by the field workers was also emphasized by some participants in the investment forum. They suggested that the investor should supply their own workers to carry out the field works. As the LGU targeted the fisherfolk living in the Basey municipality, this request cannot be accepted as it was but it suggested the necessity of changing the management system to be more efficient and responsible for the cage culture operation at the field. One person is ideally assigned to take in charge of the economic performance of a cage for the entire growing period from the stocking to harvesting. The same necessity was shared with the chairmen of all fish farming associations in the meeting held before the investment forum and they agreed to assign one member for one cage if an investor is actually interested.

Achievement 11 (Extension period): Establishment of Fisheries Cooperative for Improvements in Overall Fish Farming Management

There were 20 cages under operation as of the end of December 2015 despite the number of fingerling stocking carried out was 30. There were 10 harvests from the cages and if the revenue from these cages were used for the succeeding operation of the same cages, there should be 30 cages currently operational. But only 20 were actually operational. This gap happened because the revenues from the harvested cages were used for procurement of feeds for the new cages (not the second cycle operation of the same cage which generated the revenue).

LGU Basey is bound to supply feeds for the first cycle operations of cages constructed by the JICA QIP-1 in the MOU. The budget for the feed supply comes from the Bottom Up Budget (BUB) funds for the Basey Mariculture Park. According to the information from LGU and BFAR RO-8, the fund had about 1.5 million pesos only for the procurement of feeds which was barely sufficient to support the operation of 10 cages. Even if the LGU uses other funding sources such as agriculture operation funds for the LGU or credit scheme available from some feed supplying companies, it has been said that it would not be possible to support for the feeds for all 40 cages. Under this situation, LGU Basey is currently recycling the revenue from the fish harvest from cages stocked at an earlier period to the procurement of feeds for the new cages stocked with fingerlings recently by BFAR RO-8.

BFAR RO-8 was accelerating the supply of fingerlings in the latter half of 2015 as it intended to complete their responsibility of stocking all 40 cages (40 times of stocking) stated in the MOU. Because of the late stocking, most cages will be harvested in the first quarter of 2016. The number of cages which would be in operation at a time would remain 20 even though all harvests from 40 cages are complete so long as LGU Basey continues revolving the harvest

revenue to the operation of other cages because the total budget which can support the operation of fish cages simultaneously remains to be limited. The other 20 cages are not used at least for some time unless some measure is taken to increase the total budget amount available for the cage operation.

a) Increasing number of fish cages under operation by establishment of a fisheries cooperative

In order to support the operation of all 40 cages established by the QIP project, it is necessary to increase the total amount of funds for the operation of fish cages. A new strategy that Basey LGU proposed for solving this problem is to establish a new fisheries cooperative which can access a soft loan from the Development Bank of the Philippines with a government guarantee. This new strategy was adopted officially by the Executive Management Committee for the operation of Basey Mariculture Park on the meeting held on December 11, 2015.

The beneficiary fish farming associations established in the QIP-1 period understood the LGU's fund shortage problem and agreed to proceed for the cooperative establishment strategy in the meeting. The fisheries cooperative will be set up with the members who applied from all individual fishermen, fish farmers and their associations which are active in the fisheries business operations in Basey Mariculture Park including the members of the fish farming associations of the JICA QIP-1. It was intended to be open even for the members of women fish processing association. Preference is however given to the individual residents and registered associations in the Basey municipality. The eligible individuals and associations will purchase shares to obtain the membership and the cooperative will use the funds as a capital for accessing the soft loan from the Development Bank of the Philippines, which can be guaranteed by the government. The cooperative in turn provides loans to the members for supporting their fisheries activities including fish farming operations subject to evaluation of the intended borrowers and associations. With this capital injection from the bank and offering loan access to the members from the cooperative, the operation of cages would become dependent on the association's or individual's willingness to borrow the funds and the capacity and track records sufficient enough to get the lending approval through the cooperative's loan process.

Interested individuals will purchase shares to become members of the cooperative. About 500 pesos per share is assumed according to the municipal agriculturist. The current fish farming associations established for the fish farming operations under the QIP-1 are composed of the members who had experience in fish farming or those who were trained by the government as candidates for the beneficiary for the Rent-to-Own support system before the Yolanda typhoon hit the region. The membership fee for the associations is low in value about 50 pesos/membership. As explained above, they have been working for the operation of fish cages on a rotational basis and the smallness of the number of operational cages make some

members discouraged in taking an active role in the work. Some of the association's members also lost the interest due to the long waiting period before the stocking of fingerlings started at full scale causing the low level of participation to field works. It is expected that those who lost the interest and are inactive would not apply to the new cooperative, and thus the establishment of new cooperative would probably result in a practical reshuffle of membership to be composed of those who are active and willing individuals having a higher sense of participation than before.

The amount of loan to be borrowed from the cooperative will be fundamentally dependent on the number of shares held by each member. Those who are higher in capital strength would get a large loan while those who are limited in it would get a small loan. Therefore, through the shifting process into the new cooperative establishment, the management system for the entire fisheries activities at the Mariculture Park is expected to become operated by more enabled individuals having higher capital and management capacities. Because of this change in management system, the new strategy of establishing a cooperative and the operation using the loan from the Development Bank of the Philippines is a welcome initiative that increases the efficiency and effectiveness and support the long-term sustainability

b) Restructuring the management system for operational sustainability

The Basey LGU administration adopted the new management strategy for the operation of Basey Mariculture Park which is expected to improve the efficiency and effectiveness in fish farming operation. The existing system with the fish farming associations established in the JICA QIP-1 will turn into a new cooperative management system with provision of loans to the members for the fish farming operation. The new system is expected to increase the total number of operational cages from the existing 20 to all 40 established by the QIP-1, assuming sufficient loan at a low interest rate will be available to the existing associations. The new strategy with the establishment of fisheries cooperative is considered as a practically accessible restructuring option for improvement.

Nevertheless, it does not mean that there is no other option to take. An alternative option is to distribute all the accumulated fish sale revenue to the fish farming associations established by the JICA QIP-1 when all 40 cages with fingerling stocked by BFAR RO-8 are harvested. The funds from the sales revenue of harvested fish are accumulated in an account for the operation of Basey Mariculture Park, where the fund is officially allowed to revolve for legitimate purposes approved by the Executive Management Committee. LGU Basey is practically controlling this account and has been using for procurements of feeds for the QIP cages. Each association receives the "net profit" which is the balance between the total sales revenue from the harvested fish and the total expected cost necessary for the operation of the next cycle fish farming. LGU Basey is retaining the expected cost (= the cost for the previous operation or the sum of expenditures for feeds borne by LGU and the cost of fingerlings borne by BFAR

RO-8) to make sure the association can run the next farming cycle.

If the LGU Basey give all the revenue to an association which grew and harvested the fish, that association will buy fingerlings and feeds to operate the same cage. This will halt the operation of another cage which BFAR RO-8 supplies the fingerlings because the LGU Basey does not have enough funds to support the two cages simultaneously. To prevent this to happen, LGU Basey is controlling the funds at the revolving account.

When all 40 times of fingerling stocking by BFAR RO-8 are completed, there will be no fish cage which will be supplied with fingerlings free of charge without feed arrangement. All fish farming operational cost (not only for feed but also for fingerlings) have to be paid from the revolving funds. Therefore, it would no longer be necessary for the LGU to control the funds. Each fish farming association with its own funds if received from the LGU could become able to manage purchasing the feeds and the fingerlings. The total number of cages to be operated by the fish farming associations, however, would be limited to 20 as the total funds to be distributed is limited. This limitation does not change because each association in its small funds capacity and without credible track records is not able to borrow a low interest bearing loan from a commercial bank. The associations could increase the number of operational cages gradually if they save the profit by withholding a part of net profit for supporting the additional cage operations. However, the time required to increase the number to supporting all 40 cages would be very long and would not be practical because the association has to keep saving the profit without giving it to the members who continue working for the operation.

According to the agriculture officers' experience in management of the Rent-to-Own system at Basey as well as at Tacloban, beneficiary-fisherfolk who received the revenue often were not able to manage the funds responsibly to reserve the necessary operational cost for buying fingerlings and feeds for the successive operations and often resulted in cessation of fish farming. Although those who were known to have management problems were removed from the candidate list when the beneficiary fishers were selected at the beginning of the QIP-1, the municipal agriculture office of Basey was concerned on the beneficiary associations' management capacity and the history of unfortunate termination of the project resulting in a similar situation as a consequence of distributing all the revenue to the associations' accounts.

Those fisherfolk who are smaller in the financial capacity have more frequent needs for cash for livelihood supports for the family. They tend to repeat partial harvests in small quantities from the on-going rearing cages. In previous experiences, when the 4-month growing period was completed and harvest time came, there was no more fish remaining in the cage and no revenue to purchase fingerlings and feeds to support the next operation. In worst cases, the fisherman knowing his cage did not have fish anymore sold the feed received from the LGU to other fishermen immediately.

Hearing these experiences, it is understood that the municipal agriculturist wants to keep the fish sale revenue in the revolving funds rather than distribute to the fisherfolk's accounts, although it is a theoretical option.

As a conclusion, the Basey LGU's new management strategy to establish a fisheries cooperative for the Basey Mariculture Part for accessing the soft loan from the Development Bank of the Philippines or any financial institution is considered to be a practical option that makes the beneficiary fisherfolk under the LGU leadership enable to operationalize all the 40 cages established by the JICA QIP-1 and at the same time to improve the management efficiency of the fish farming. It is a strategy to achieve the dual purposes.

One concern in taking this option is possible exclusion of beneficiary-fishers who are willing to keep participating in the farming activities but will not be able to apply for the cooperative membership due to their limited capital capacity to buy cooperative shares. It is a concern on equitability of distributing benefits from a public project supported by ODA funds from the Japanese government. The new cooperative will be open for the application for the loans to non-member associations according to the municipal agriculturist. Therefore, these individuals can use the cooperative by applying as the existing association. Although non-member loan users will not able to receive the dividend from the cooperative.

After the termination of project activity, the Basey milkfish farming with the fish cages constructed by the JICA QIP-1 will be operated through the cooperative management system led by the LGU Basey for continuous development. The total gross revenue from the 40 cages if fully utilized would amount to 20 million pesos per cycle (=Php100/kg×10,000 fish×0.5 kg×40 cages), and 60 million pesos per year. This is a large amount to handle for a local government office. The LGU Basey has to pay back the loan from the bank taking a long time through appropriate operation of the cooperative management system with a high level of corporate governance both in economic efficiency and in ethical standard. The next few years after the establishment of fisheries cooperative would be the most critical time which would determine the real long term sustainability of the Basey milkfish farming.

It is welcome for the QIP project team to see the new initiative led by LGU Basey in management system with establishment of fisheries cooperative for the Basey QIP cages. The existing management system which was established in this QIP with the LGU Basey and BFAR RO-8 supporting the fish farming associations started showing its limitation in operational capacity. The existing system failed to support the operation of all 40 cages simultaneously. Without a bold reformation in management system, there is very little hope to activate all 40 cages established by the QIP project to be operational in the near future. The Japanese assistance for the submersible cage introduction and dissemination continues in a JICA-funded project with Nitto Seimo Co. Ltd. for the next three years in which the follow-up of the introduced submersible cages will be monitored and advised continuously in the new

management system. It is considered that the termination for this emergency assistance when the new management system is about to start is timely for advancing afresh to further development opportunity.

Achievement 12 (Extension Period)：Production and Sales of Processed Products by the Women's Associations

a) OJT on production and sales activities

Necessary skills for the production of pressure cooked milk fish were attained by the women's associations at a rather early stage. However, periodical production with locally harvested milk fish had wait until mid-September 2015, due to the delay in harvest from the fish cages installed under the QIP. Therefore, active production and sales that were conducted under the QIP was only continued for four months, up to December 2015. This was considerably shorter than that of the women's groups/association supported under "QIP-03: Regenerating Local Livelihood through Processing of Agriculture and Fishery Products by Small-Scale Community Groups" and "QIP-15: Integrated Culture of Oyster and Milk Fish Improvement for Sustainable Aquaculture and Livelihood". Under such circumstances, efforts under the QIP were concentrated to have the women's associations to experience necessary actions for market development as much as possible. The women were repeatedly encouraged to contact potential buyers and to promote their products. As for production, differences in the tastes of the products were observed between different associations. However, this issue was solved by simply following the same recipe. Taking in to considerations that most of the associations did not have experience in selling their own products, On the Job Trainings (OJT: hands-on trainings) were conducted through actual sales promotion. The association members, accompanied by the Study Team started by visiting Catbalogan City, the provincial capital of Samar, to introduce their product. The product was presented to the city tourism board and to private restaurants and shops for trial. As as result, one meat shop started to merchandise the product on a regular basis, and orders has been periodically taken up to December 2015. In November, the product was brought to Gamai and General Mc Auther. The associations were able to receive one batch of order from these areas, but unfortunately, the order did not continue. The associations were further advised to contact their clients on a regular basis in order to confirm the situation of sales, availability of stock, possible orders, or any kind of feedback on the product, but this does not seem to be thoroughly practiced. When the Study Team directly contacted the clients in Gamai and General Mc Auther, the reason for not continuing the order was mainly the price. While 440 PhP/kg is already high compared to the purchasing power of the local residents, additional costs for transportation made it further difficult for the shop owners to obtain sufficient benefit. Furthermore, the lack of refrigerating devices, which resulted in shorter shelf life, was also a reason.

The associations were also strongly suggested to spend effort in searching for clients on their own. However, this is also not actively followed. When explaining the reason of the situation to the Study Team, the association members repeatedly mentioned that they were busy with other activities, which did not seem to be the actual cause. In January 2016, one of the members finally revealed the true reason was that they were frightened that they might get turned away by the shop owners if they visited the shops only by rural women.

The situation sales of pressure cooked milk fish by the four women's associations in Basey is indicated in the following table.

Table 2.2-9 Balance of Women's Associations in Basey

		Sep.	Oct.	Nov.	Dec.
Amandayehan	Expenditure	5,329	5,464	0	0
	Income	11,579	7,843	0	0
	Balance	6,250	2,379	0	0
	Acc. Balance	6,260	8,629	8,629	8,629
Cambayan	Expenditure	6,660	4,597	0	0
	Income	5,751	6,960	0	0
	Balance	-909	2,363	0	0
	Acc. Balance	-909	1,454	1,454	1,454
San Antonio	Expenditure	7,264	3,369	4,880	4,922
	Income	9,171	5,732	45,414	6,292
	Balance	1,907	2,363	534	1,370
	Acc. Balance	1,907	4,270	4,804	6,174
Tinaogan	Expenditure	6,033	0	2,070	0
	Income	7,465	0	3,180	0
	Balance	1,432	0	1,110	0
	Acc. Balance	1,432	1,432	2,542	2,542

Source: JICA Study Team

Each of the women's associations was observed to produce their products on a constant basis. However, the limited market discourages the associations from production of large quantities.

b) <u>Skills training for Accounting Keeping</u>

In advance to periodical production of pressure cooked milk fish, a workshop on accounting was carried out in June 2015 to provide guidance on account keeping. Formats to record cash balance, breakdown of income and expenditures, stock inventories were distributed and explanations on how to fill in the forms were given to the participants. After the beginning of production and sales in September, the forms were used to record the actual balance of the groups. The submitted forms were repeatedly corrected by the Study Team and fed back to the associations to improve their skills. As a result, the associations can now appropriately record their activities.

<u>Achievement 13 (Extension Period) : Preparation of Business Plans</u>

Business plans, which function as guidelines for the future activities of the women's associations were prepared based on their activities from September – December 2015. Since the period for actual production and sales of pressure cooked milk fish in Basey was

considerably short and experiences were less, the plans were primarily drafted based on that prepared by the women's association in Sta. Cruz, Tanauan, which has been carrying out the activities prior to the associations in Basey, under "QIP-15: Integrated Culture of Oyster and Milk Fish Improvement for Sustainable Aquaculture and Livelihood". The contents of the drafted business plans were explained to the women and finalized by incorporating their opinions. The basic structure of the business plans are as follows.

- Principles of the Group Activities
- Organization of the Group
- Group Activities (production, sales, wayment of wages, distribution of benefit, etc.
- Expected balance of the activities
- Work Flow
- Decision Making Process (holding of periodic meetings)

Achievement 14 (Extension Period) : Participation in the Value Chain Analysis Workshop and Follow-up Meetings

A Value Chain Analysis Workshop was held in June 2015, under the initiative of DTI Region 8 Office, with the aim of supporting the activities related to the production, processing and sales of milk fish conducted under the QIPs, and of identifying the issues and that the milkfish industry in the Eastern Visayas are facing together with possible measures to cope with these issues. The members of the fisherfolk associations and women's association engaged in the QIP also participated in this workshop. Centering the QIP participants, the workshop participants consisted of feed/fingerling suppliers, milkfish producers, processors, local business owners, and relevant government agencies. Discussions were made on issues that the different levels of the value chain were facing, together with possible solutions. After a series of discussions, the outcomes were compiled in order to formulate a 5 year action plan for the strengthening of the whole value chain. Furthermore, decisions were given to formulate regular follow-up meetings in order to monitor the progress of the action plan. The QIP members were also counted in as participants for this meeting. The contents of the formulated Action Plan are shown in Appendix-4. Some of the items indicated in the Action Plan require considerable amount of investment, and therefore have the possibility of not being completed in five years in a practical sense. However, the follow-up meeting is not only functioning for monitoring, but is also working as a regular venue for interaction between stakeholders in different levels of the value chain. Active exchange of information as well as discussions of various topics, are being continued in these meetings. In such sense, the follow-up meeting can be considered as an important function to further connect and strengthen the milk fish value chain in the region.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted

as follows.

Table 2.2-10 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Milkfish farmed in disaster resilient fish cage is harvested (kg/m^3/year)*	9.2 kg	8.6	0	0	13.4
2) Farming families gain stable income by farming milkfish (PHP/farmer/year)*	162,495 PHP	161,250	0	0	97,500
3) Farmers gain the capacity for management and farming technology using submersible fish cage (number of farmers)	95 farmers	0	0	95	95
4) Processing members start the processing fish from submersible fish cage (number of members)	116 members	0	0	0	116
5) BFAR and Municipal officers master the technology for procurement, management and operation of disaster resilient submersible fish cage. (number of BFAR and Municipal officers)	5 persons	0	0	2	5

* The production value upon completion is computed based on the actual harvest in Dec. 2015, and by multiplying this by three in consideration that average production is three times/year.

Source: JICA Study Team

Upon completion of the QIP, the harvest from the installed fish cages is assumed to reach 13.4kg/m^3, which is higher than the initial estimation of 9.2kg/m^3. However, the income of the farmer is limited to PhP 97,500/farmer/year compared to the initial estimate of PhP 162,495/farmer/year. This is mainly due to the high prices for the fingerlings and feeds procured through BFAR and Basey LGU, which according to local fish farmers, will become lower if fish farmers directly procure the input from private suppliers. This leaves possibilities for increased income for the fish farmers in the future. As for the processing of harvested milk fish, production is not stable. However, with the increasing number of people engaged in the activity, it is assumed that the activity will be stabilized as harvest of milkfish from the cages become stable in the future. Furthermore, the completion of the processing facility constructed under QIP 21 is expected to further open the door for the products to access larger markets.

2.2.2 Recovery of Rural Health Service Support System through Reconstruction of Provincial Health Office (QIP-2)

(1) Inputs

Input 1: Design of Reconstruction of Provincial Health Office (hereafter called PHO)

Through the damage assessment survey conducted by JICA Study Team on PHO, it was found that the upper part (roofing system) of the building was severely damaged but the concrete structure (building frame) had no serious damage and was still stable. Hence, the reconstruction of PHO was planned through repairing works on the upper parts (roofing system), interior partition/exterior walls of the building including the replacement/provision of equipment.

PHO had a separate building for vaccine storage which was also damaged during the typhoon. However, PHO didn't have plans yet for the repairing of the said building including the fact that it doesn't have the resources to fund for the repair works. Storage and distribution of vaccines for the Leyte Province was one of the main functions of the agency and after Yolanda it was difficult for them to handle the distribution due to the damaged building and all their storage equipment were damaged. So in order for them to have a smooth handling of vaccines, a Vaccine Storage Room was incorporated in the design of the building.

Additionally, a ramp at the entrance of the building was included as requested by PHO for the access of the elderly and handicapped people. The ramp was designed according to the design requirements for accessibility of Person with Disabilities (PWD).

A profile of the project with Building Perspective is shown in Figure 2.2-3.

In general, it can be seen that the upper portion of the building, such as the trusses and roof were severely or remarkably damaged compared to the lower portions of the building, i.e. column and foundation, which was the same scenario for all the building that were damaged by Typhoon Yolanda in Leyte and Samar. Hence, JICA Study Team, considered the necessity for strengthening and proper reinforcement of trusses and roof especially on the critical section. The As-Built Drawing provided by the Leyte Provincial Office was then used as guide for preparation of construction drawing for the Reconstruction of Provincial Health Office.

Input 2: Bidding and Contracting for Reconstruction of PHO

In order to assist the local contractors or the persons concerned to learn the disaster-resilient technology through the reconstruction from the disaster, bidding participants were limited among the local contractors. In the selection of the local bidders, the JICA Study Team requested from Leyte Province Office and PHO for the recommendation of contractors. A Pre-Qualification (hereinafter called PQ) evaluation of recommended contractors was conducted through their submitted company profile and eligibility documents. JICA Study Team then issued the invitation to bid to the contractors who qualify in the PQ.

JICA Study Team adopted the open/competitive bidding system using the two-envelope system to ensure the transparency and fairness in the conduct of bidding. A Two-Way Envelope System is a of bid opening system wherein the bidder will submit an envelope containing two separate envelopes, the Technical Envelope bearing the technical proposal, which consists of the execution plan/construction methodology, organizational chart, construction schedule, and equipment/manpower schedule, shall be evaluated first to examine the local contractor's capability, and the Financial Envelope bearing the financial proposal/bid cost. In the process of bid opening, the Technical proposals will be opened first and will be evaluated; those bidders with complying/passing Technical Proposal are the only qualified for the next round of evaluation, the opening of Financial Envelopes. Complying Financial

proposals will then be compared and the one with the lowest bid will be the first priority for Arithmetical Evaluation.

Since the project was the repair or rehabilitation works, additional quantities or change order are expected. Therefore, BOQ/fixed unit cost system was adopted in the contract, which could adjust easily on account settlement at the completion of construction. This system is generally used for the contract of construction in the Philippines.

Generally, the rate of Advance Payment on the contract conditions in the Philippines is 15%, the financial condition of the local contractors and their difficulty in raising construction funds just after the disaster were considered. Hence, a suitable payment condition was applied to avoid any construction delay caused by financial deficit, referring to the rate of the local consignment contract of JICA. In addition, since the contract term was short for six months, price escalation clause was not considered. Although the Defects Liability Period was usually within a year, three months was adopted from restrictions of the contract term of QIPs.

Input 3: Reconstruction of PHO

The damages caused by Typhoon Yolanda in the building were mostly attributed to the poor construction of the building and the usage of substandard construction materials. In the QIPs, JICA Study Team organized the inspection team and observed strict compliance in quality control by 1) inspecting on the important works such as foundation/excavation, re-bar, formwork, concrete and welding, 2) checking the working situation and 3) providing technical assistance.

Moreover, JICA Study Team had regular monthly or bi-monthly site meetings with the contractor together with the PLGU Engineer/technical staff and PHO Staff to monitor construction progress based on the submitted construction schedule, the quality of work and most importantly the discussion of technical issues that the contractors encountered.

Input 4: Equipment for Reconstruction of PHO

Office furniture and equipment of PHO were totally damaged by the typhoon. Therefore, provision of office furniture, i.e. tables and chairs, computers, air-conditioners and vaccine storage equipment, i.e. refrigerators and freezers, were necessary for the resumption of PHO management's function and operation.

However, due to the limited budget, QIPs were not able to cover the cost for the provision of office furniture and computers. Thus, JICA Philippines Office coordinated with JICA SMACHS-EV Project (Strengthening Maternal and Child Health Services in Eastern Visayas), an on-going project of JICA with the Department of Health in Eastern Visayas, for the procurement of the said items. So, QIPs only provided the air-conditioners and vaccine storage equipment.

(2) Achievement of the Project

Achievement 1: Revising Design of PHO for Disaster Resilient Reconstruction

The damages caused by Typhoon Yolanda, were mostly found in the superstructure of the building, which includes the connection joints of the building frame and truss, the roofing system itself, i.e. trusses, purlins and roof. It was in the same situation for PHO.

Based on the provided As-Built Drawing by the Leyte Provincial Office, JICA Study Team reviewed on the strengthening measure for the critical parts of the superstructure and incorporated Japanese-Technologies for reinforcement measures as follows:

a) In the Philippines "Hug method" was the common practice for truss anchorage wherein the extended/extra length of vertical re-bars in the column are the ones used to fix/hold the trusses to column, which was not stable and considered a weak type of anchorage that was partly the cause of the damages in the roofing system during the Typhoon.

   Thus, in QIPs, stable and proper connection was adopted by 1) embedding anchor bolts in the existing concrete column, 2) fixing the anchor/base plate with the embedded anchor bolts, and 3) full welding of trusses to anchor/base plate.

b) Superposed web type was mostly used in welding of truss members or joints. Actual fabricated truss does not fit as planned due to misconnection of truss members. Because of superposed type of web connections, truss members were not welded on the same plane, so there were misalignments of truss members and also, full weld length were not attained due to improper location of spot welds. As a result, the connection of truss members was weak and trusses were easily destroyed during the Typhoon.

   To resolve the said defects, gusset place was used at the connecting portions to secure the right position or alignment of truss members, to attain the required welding length and the proper connection of truss members.

c) In the Philippines, the most commonly used roofing sheet is the Galvanized Iron (G.I.) Corrugated type, which has the characteristic of low pitch corrugation, thin base metal and has weak resistance to bending or vertical motion, thus, it was easily damaged and blown off during the Typhoon. On the other hand, for school buildings built by JICA grant project in 1991, the Mega-Rib roof sheets were used that was made of thick base metal with high pitch or rib that has high resistance for bending. During Typhoon Yolanda said JICA Buildings hardly suffered damages. And said roofing materials were imported from Japan.

   In QIPs, the same roofing system, Mega-Rib type was adopted. However, the same material was not used due to the difficulty in procuring and it entails a high cost.

Therefore, domestically available materials were used instead having 0.5mm thickness, pre-coated Mega-Rib Type Galvanized Sheet. The roofing material for PHO was fabricated by process of bending the G.I. Sheet to the same rib height with the JICA Grant Building and it has high resistance to deflection due to its durable design and strength.

d) For the purlins, the common type of material used is the C-Purlin, a C-shape bended plate with 1.2mm thickness mostly used locally. It is easy to install because it is lightweight. Only that it is weak due to its thin base metal, so before the wind load could be transmitted from the roof to the truss, the C-Purlin is already damaged due to its weak resistance to shearing force.

   In order to improve this situation, in QIPs, Steel C-Channel Purlin, C-shape cold rolled steel purlin with 2-mm thickness was adopted for it to assure the transfer of load from roof to truss.

e) As the construction work has started, there were noted deflections or inclinations of about 10cm on some part of the beams and floor slab. PHO was not aware of this situation and the cause could not be identified. However, despite the noted deflections, its building frame was still stable. JICA Study Team then decided that the existing building frame will still be used for the reconstruction, and so there were some corrections and adjustment in the elevations for the installation of base plate and mounting of trusses to ensure the correct horizontal alignment for the roof framing structure.

Achievement 2: Bidding/Contract of Reconstruction of PHO

JICA Study Team collected the company profile and eligibility documents from four (4) companies that were recommended by Leyte Provincial Office and PHO. Pre-Qualification process was conducted based on their submitted documents and after PQ three (3) bidders passed and were likewise sent with the bid invitation.

Two-way envelope system was adopted for the opening of bid proposals as described previously. Bid opening was done with the presence of the bidders, PHO Representative and Leyte Provincial Office Representative. First opened were the technical proposals of the three qualified bidders. Two technical proposals passed and were qualified for the next round of evaluation. Financial proposals of the 2 qualified bidders were opened after checking, the lowest bid was determined. COLLERA CONSTRUCTION has the lowest bid and the first priority for Arithmetical and Detailed Bid Evaluation. In the bidding procedure, both technical and financial proposal were fully examined and questions were made to the contractors for documents or items that needs clarifications. After conduct of arithmetical and detailed bid evaluation, COLLERA Construction's bid proposal was found complying and was the Lowest Calculated Responsive Bid. Awarding and perfection of contract documents then followed.

BOQ/fixed unit cost system was adopted for easy adjustments in the project cost in the settlement of working quantity variations at the project completion.

In order to facilitate financing of the local contractor, the payment condition was carefully adjusted with 40% for advanced payment, 40% for an interim progress payment, and 20% for final payment. Contract period was as short as six months, so the price escalation was not applied.

Defect Liability Period is usually one year in the Philippines, but for the project was within three months in consideration for the contract term of QIPs.

During the project implementation, the contractor requested for a 60 Calendar Days Contract Time Extension due to the following reasons: 1) the provision additional leveling concrete for height adjustment for the truss anchorage, 2) shortage of the construction materials after typhoon Yolanda, 3) anchorage adjustment correction in preparation for the truss installation and 4) the weather condition and occurrence of typhoon Ruby which affected the number of working days for the project. JICA Study Team, PHO Representative and Leyte Provincial Office discussed and evaluated the reasons for time extension and were found valid and acceptable, hence, the 60 Calendar Days' time extension was granted to the contractor.

Achievement 3: Reconstruction of PHO in a Disaster Resilient form through Appropriate Construction Management

JICA Study Team required the contractor to submit and seek approval of work requests prior the start of any work item. Likewise, prior to the start of concrete works or installation of specific materials, contractor was required to submit necessary documents such as concrete design mix and mill certificates or sample of every construction material in advance. Steel materials and concrete samples were tested at a Material Testing Laboratory accredited by DPWH by tensile test and compression test, respectively including other construction materials that require material testing to ensure the strength and quality of materials to be used. As the welder played an important role for the strengthening measures of the critical parts of steel superstructures. JICA Study Team conducted an orientation and skills assessment on the welding skills of the welders to ensure quality work from them. Welders who passed the skills assessment were the ones allowed to fabricate the trusses and do the major welding works.

Moreover, JICA Study Team made a monitoring/deployment plan of Project Inspectors based on the construction schedule submitted by the contractors to for quality control. Major works such as re-bar, formworks, concrete, welding, truss fabrication and roof installation, etc. were considered in the monitoring schedule.

Proper installation of reinforcing bars for columns and beams before formworks closure was strictly monitored as it will be difficult to check/correct after concreting. Concrete works was

inspected through trial mixing, cement-sand-gravel-water mixing ratios, skills of mixer operator and placing method and operation of vibrator. Site instructions were given to contractors in case of any failure or defects in the works.

In worst cases, correction, demolition or rework of a specific structure or work item were instructed.

The following are some of the instructions made to the contractor during the construction period of PHO

- Some delivered concrete hollow blocks at site were rejected with poor quality and was ordered for replacement.
- Correction stiffener at Lintel beam should be corrected.
- Honeycombs were found on concrete surfaces, so JICA Study Team instructed the contractor to use concrete vibrator properly on concrete pouring to avoid the same defects. Concrete epoxy was advised for use in repairing of honeycombs.
- Leveling mortar should be poured evenly.
- Anchorage on roof beams should be corrected properly.

JICA Study Team required the contractors to submit the documents below as basic data for construction. However, the contractor's technical experience in documentation was not enough to prepare the documents correctly, so the JICA Study Team provided technical assistance in the preparation of such documents. The contractor could not sufficiently acquire the knowledge for these documentations through Reconstruction of PHO, and they need to learn more in order to be able to effectively manage their construction schedules.

- Monthly Construction Schedule and S-Curve
- Bar Bending Schedule
- Shop drawing of Truss
- Catch-up Plan

Achievement 4: Support for Resuming Operation through Equipment Procurement

Although the vaccines were stored and distributed at PHO before typhoon Yolanda, the numbers of vaccines handled was not reaching its target due to equipment's trouble. In QIPs, the vaccine storage equipment (refrigerators and freezers) were provided in order to handle the required vaccine volume as indicated below. The specifications of equipment were adjusted based on availability in Tacloban City.

Table 2.2-11 Equipment for PHO

Equipment	No. of Doses	Capacity (cubic feet)	set	Item for storage
Freezer	6,068 160,204	15	2	Bacille Calmette Guerin (BCG), Pneumo-Conjugate Vaccine (PCV13)

Refrigerator	18,205 9,709	10	2	Hepatitis B Vaccine, Measles Vaccine
Chiller	19,419 8,107 12,161 160,200	11	4	Measles Mumps Rubella (MMR), Tetanus Toxoids (TT), Oral Polio Vaccine (OPV), Pentavalent Vaccine
Chiller		11	2	Ice packs

Source: JICA Study Team

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-12 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) The amount of vaccine and medicine that are distributed to the RHU is restored. (%)	100%	100%	0	100%	100%
2) Medical and birth certificates are issued normally by PHO (certificates/month)	500 issues	534	148	272	272
3) Number of monitoring of RHU by PHO returns to normal (locations / quarter)	44 locations	44	0	0	44
4) Number of times for RHU training returns to normal. (times / year)	4 times	4	0	0	140

Source: JICA Study Team

Although not all RHUs have been physically reconstructed, the distribution of vaccine and medicine and monitoring of RHUs have reached the expected figures. Furthermore, with training activities being suspended for a significant period of time, the number of trainings after the reconstruction of the PHO has significantly exceeded the initial expectation. Taking into consideration of such state, it can be said that the functions of the PHO has almost recovered through the implementation of the QIP.

2.2.3 Regenerating Local Livelihood through Processing of Agriculture and Fishery Products by Small-Scale Community Groups (QIP-3)

(1) Inputs

Input 1: Design of Reconstruction of Multi-purpose Livelihood Building

Through the damage assessment survey conducted by JICA Study Team on the Livelihood Buildings utilized by the Women's Group situated in the different barangays of Tolosa, it has been noted that most of the building structures and food production's processing equipment suffered serious damage. As a result and by request of the LGU, the Multi-Purpose Livelihood Building was identified to be included in the reconstruction effort under QIPs. Assessing further of the site condition, a 2-story building with concrete roof deck was designed beside the Municipal Hall which could also serve as evacuation center during calamities.

In preparation of the drawing, the structural frame of the building (i.e., foundation, column,

and beam) was reinforced and improved, thus enhancing the Drawing provided by LGU, for it to be used as construction drawing for the Multi-purpose Livelihood Building. A profile of the project is shown in Figure 2.2-4.

Input 2: Bidding/Contract of Reconstruction of Multi-purpose Livelihood Building

In the same way as PHO (see section 2.2.2) in selection of the local bidders, JICA Study Team requested nominee of contractor's from LGU- TOLOSA. JICA Study Team issued the invitation for bid to contractors who have passed the PQ.

In the same way as PHO, JICA Study Team also adopted open/competitive bidding system and two-envelope system. Similarly, BOQ / Fixed Unit Cost system was adopted for the contract.

Payment condition was also stipulated in the same way as PHO to avoid any delay caused by the financial deficit.

Input 3: Reconstruction of Multi-purpose Livelihood Building

In the same way as PHO, JICA Study Team made the deployment/monitoring plan of Inspectors for quality control. Moreover, JICA Study Team called for regular site meetings with the contractor to monitor the progress and quality of construction as compared with the contractor’s submitted construction schedule, and discussed the technical issues encountered by the contractor.

Input 4: Technical Transfer to LGU Engineer

Through the collaborative works of design, estimation, tender, contract and construction supervision of the reconstruction of Multi-purpose Livelihood Building, JICA Study Team transferred knowledge and skills to engineers of the Municipality of TOLOSA, with the purpose of enabling them to handle recovery projects by themselves in the future.

Input 5: Guidance for the Women’s Groups (processing techniques and management)

Before the landing of Typhoon Yolanda, there were five women’s associations engaged in production and sales of processed agro-fishery products in Tolosa, supported by organizations such as LGU, DSWD, DOLE, VSU, etc. Activities of these women’s association before Typhoon Yolanda was examined in order to identify whether these activities can be resumed under the support of the QIP, and to select the associations to be supported. In the course of the QIP, guidance for operation of the equipment to be procured, as well as instructions for accounting, were provided to the women’s associations. In addition, training for processing techniques and sanitary management was provided by VSU to an association that requested such support.

Input 6: Procurement of Equipment for Restarting Processing Activities by Local Women's Groups

Almost all of the equipment that were being used for processing activities before Typhoon Yolanda were either washed away or destroyed and were not functional. Necessary tools and equipment for resuming the activities of the women's association participating in the QIP were examined, procured and provided to the LGU for their use by the women's associations.

Input 7: Promotion of Processed Products

Support was provided to the women's association for promoting the sales of processed products in nearby areas.

Input 8 (Extension Period) : Identification of Target Sales, Market and Sales Strategies

Workshops were held with the women's associations in order to discuss the direction towards which the members want their business to be developed, and to identify necessary approaches for sales promotion in order to head towards this direction. In this process, target markets and sales amounts, together with sales strategies were examined.

Input 9 (Extension Period) : Continued Production and Sales based on Identified Strategies

Production and sales activities were continued based on the strategies identified in the above mentioned "Input 8". The activities were monitored and suggestions and guidance were provided from the Study Team, taking into consideration that the process will function as an OJT for business operation. Furthermore, the associations were also encouraged to participate in sales promotion programs by DTI, including trade fairs and sales missions, so as to gain experience in sales promotion. The experiences and feedback obtained from such activities were further utilized to revise the targets and strategies that were identified at the initial work shop, so that they can be finalized adopting a realistic view.

Input 10 (Extension Period) : Preparation of Business Planes based on experiences obtained during QIP Period

In addition to the revision of the target markets, sales amounts and strategies as indicated in "Achievement 9", production costs for the products were further analyzed in order to formulate a business plan that is expected to function as a guideline for future activities of the associations.

Input 11 (Extension Period) : Support for Package Improvement and Acquisition of LTO for Market Development

Issuance of a License to Operate (LTO) by the Food and Drug Administration (FDA) is a

requirement for food product processors to widely market its product. The Study Team supported the Municipality of Tolosa to obtain LTOs for products produced in the Multi-Purpose Livelihood Building, which was constructed through "Input 3". Furthermore, groups with intentions of improving product packages in relation to the sales strategies identified and reviewed through "Input 8" and "Input 9" were also provided with the said support.

Input 12 (Extension Period)：Participation in the Value Chain Analysis Workshop and Follow-up Meetings

Out of the four women's groups supported under this QIP, one group processing milk fish products participated in the milk fish VCA workshop and follow-up meetings (refer to "QIP-3: Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish)") on a regular basis.

(2) Achievement of the Project

Achievement 1: Revising Design of Multi-purpose Livelihood Building for Disaster Resilient Reconstruction

Boring test was conducted to obtain the bearing capacity, and it was confirmed that the size of designed foundation was enough. As column and beam were important parts to receive the building load, they were modified in consideration of wind load. In addition, the beams were arranged to receive the load of stairs and a stairs hut.

Achievement 2: Bidding/Contract of Reconstruction of Multi-purpose Livelihood Building

Four contractors were recommended by LGU, and JICA Study Team issued the invitation for bids to four contractors who passed the PQ.

As described above, JICA Study Team adopted open/competitive bidding system and two-envelope system.

Bid opening was done with the presence of the bidders. First, technical proposal was opened then second, is the financial proposal of the bidder who passed through evaluation of technical proposal, was opened for comparison. Two companies participated the bidding, and one of them passed through technical review. Subsequently, the financial proposal of TRIAD A CONSTRUCTION, which passed through the technical review, was opened. After confirming that the financial proposal was within QIP's budget, TRIAD A CONSTRUCTION was nominated as the first priority for arithmetical evaluation. As bidding procedure, both of technical and financial proposals of the contractors were fully examined and evaluated. Since the bid of TRIAD A CONSTRUCTION qualified the evaluation after arithmetical evaluation,

JICA Study Team issued Award and made the contract with the contractor. In the same manner with PHO (see section 2.2.2), BOQ/Fixed Unit Cost system was adopted for the Contract.

The same conditions with the PHO were applied for the payment conditions of the contract to avoid any delay caused by financial deficit. Since the contract period was only as short as six months, price escalation clause was not also applied. And the similar to PHO project, three months was adopted for the "Defects Liability Period" in consideration for the contract term of QIPs.

During the project, the contractor issued the request for time extension with the following reasons: 1) shortage of the construction materials after typhoon Yolanda; 2) heavy rain in year-end and 3) occurrence of typhoon ruby, etc. JICA Study Team and LGU discussed and evaluated the reasonability, and granted the extension of 60 days.

Achievement 3: Reconstruction of Multi-purpose Livelihood Building in a Disaster Resilient Form through Appropriate Construction Management

In the same way as PHO, JICA Study Team confirmed all of construction material. As the welder played an important role in the strengthening measure for the critical section of the superstructure, JICA Study Team conducted the practical test of welding skill in advance, and permitted skilled welder who was assessed by JICA Study Team, to perform the welding operation.

JICA Study Team made the deployment/monitoring plan of Inspectors for quality control based on the construction plan and schedule submitted by the contractor.

The inspectors inspected center line, depth and bearing capacity of foundation excavation. Re-bar of column was inspected before formwork closure prior to concreting. Critical part of the building such as column and beam, bar installation was inspected in detail on dimensions, position, splicing lap & location, hoop, etc.

They inspected concrete works through trial mix, mixing ratio, slump test, the skill of mixer operator, placing method and vibrator operation, etc. At slab concrete of floor and roof of second floor, as concreting took long time at high elevation, the inspectors inspected full-time to avoid any defect. In case any failure or defaults in the works were noted, the inspectors issued site instruction to the contractor which resulted in correction, demolition or sometimes rework.

The following are some of the site instructions given to the contractor during the Reconstruction of Multi-purpose Livelihood Building:

- Sample of concrete hollow blocks has failed during testing. It was rejected and advised

to procure from other supplier.

- Sand/Fine Aggregates was pointed out to be sub-standard. The contractor was advised to use the material according the specification.
- Concrete slump did not meet the specification and the contractor was advised to follow the ratio of approved trial mix.
- Lack of concrete spacers was noted. JICA Study Team instructed to place more spacers.
- The proper use of concrete vibrator was instructed during concrete pouring
- Honeycombs were found on concrete surface. JICA Study Team instructed the contractor to use concrete vibrator properly during concrete pouring to avoid further honeycombs. Use of concrete epoxy was advised for repairing of honeycombs.
- Gravel beddings were noted uneven and not properly leveled. Contractor was instructed to lay and compact it evenly.
- Splicing of top bars on beam was not sufficient. The contractor was instructed to replace it as specified.

In the same case with PHO, regarding documentations required for submission, the contractor didn't acquire sufficient knowledge through Reconstruction of Multi-purpose Livelihood Building. They need to learn more in order to be able to effectively manage their construction schedules.

Achievement 4: Technology Transfer to LGU Engineer

Through the collaborative works of the reconstruction of Multi-purpose Livelihood Building, JICA Study Team transferred knowledge and skills to engineers of the Municipality of Tolosa as below, with the purpose that they would become able to handle future recovery projects by themselves.

a) Conducted explanation on the modifications made by the JICA Study Team on the technical drawing prepared by the LGU. Improved their understandings on the points to be reinforced in order increase capacity for wind load.
b) Indicated the details of the BOQ, and improved their understandings on the cost composition of construction, and the calculation method of budget.
c) Requested presence of engineers during bid opening, and improved their understandings on fair and competitive bidding using Two-envelope system.
d) Requested presence of engineers during the kickoff meeting, and improved their understandings on the procedures of the construction project.
e) Requested presence at the inspection during work, site meeting and completion inspection, and improved their understandings about construction supervision including quality control.

Achievement 5: Initial Arrangements with Participant Women's Groups

Prior to providing support to the women's associations, the Study Team interviewed the

chairpersons of the five women's associations (Olot, Tanghas, Telegrapho, Burak, Imelda) that were engaged in production and sales of processed agro-fishery products before Typhoon Yolanda. The Study Team confirmed the participation of four women's associations (five products) based on the activities that the groups were engaged in (Table 2.2-13), as stable supply of raw material for banana chip production by Imelda women's' association was considered to be difficult since most of the banana trees in the area were damaged by Typhoon Yolanda.

Table 2.2-13 Past Activities of Women's Associations in Tolosa

Name of Association	Activity (Product)	Participation to QIP
Olot	Longganiza, Tocino	Yes
Tanghas	Boneless Bangus	Yes
Telegrapho	Embutido	Yes
Burak	Vegi-fish Noodles	Yes
Imelda	Banana Chips	No

Source: JICA Study Team

Discussions were held with individual associations to collect basic information such as the number of members and scale of operation, and necessary arrangements for the re-starting of processing activities were discussed. Since the Tolosa Multi-Purpose Livelihood Center was still under construction at this time, a temporary processing place was determined with the support of the Municipality of Tolosa in a chapel near the municipal hall.

Among resuming processing and sales activities, guidance was provided to the women's association for the operation of tools and equipment and accounting for procurement of raw material and record of sales.

Achievement 6: Support for Resuming Processing Activities through Procurement of Equipment

A list of equipment required for resuming conventional processing activities was prepared by Municipality of Tolosa. Details of this list was further refined through discussions with the women's associations, and with VSU, which used to support the associations in technical aspects. Based on the final list, necessary equipment was procured by the Study Team. The list of equipment procured is indicated in Table 2.1-14. The temporary processing place provided in the chapel near the municipal hall was used for storage of the equipment, except for the freezer and refrigerator, which were placed inside the municipal hall. Though most of the equipment were procured by October 2014, the noodle machine and fryer required for the production of vegi-fish noodle, which were manufactured among order had to wait until January 2015 for its delivery.

Table 2.2-14 List of Procured Equipment

NO.	QTT.	UNIT	ITEM	NO.	QTT.	UNIT	ITEM
Production				18	3	pcs.	Carajay/Baong

1	1	set	Noodle Cutter	19	3	pcs.	Colander
2	1	set	Noodle Molder	20	5	sets	Ladle
4	3	sets	Measuring Cup	21	3	pcs.	Kitchen Scissors
5	6	sets	Kitchen Knives	22	6	pcs.	Basin
6	6	pcs.	Cutting Board	23	6	pcs.	Pail
7	3	sets	Processing Table	**Packaging**			
8	3	sets	Pressure Cooker	24	2	pcs.	Plastic Sealer
9	1	doz.	Mosquito forceps	25	1	pcs.	Vacuum Sealer
10	6	pcs.	Food Tray	**Marketing and Other Uses**			
11	1	pcs.	Board Cutter	26	12	units	Plastic Crates
12	1	pcs.	Meat Grinder	27	2	pcs.	Push Cart
13	2	pcs.	Weighing Scale	**Fixtures**			
14	1	pcs.	Weighing Scale	29	1	unit	Freezer
Kitchen Accessories				30	1	units	Refrigerator
16	3	sets	Heavy-duty gas stove	30	2	units	Cooler Box
17	3	sets	Stainless Steel Kettle				

Source: JICA Study Team

Achievement 7: Restarting of Processing Activities

The three groups of Olot, Tanghas and Telegrapho restarted processing and sales of their products in October 2014. However, the Burak women's association could not join the other groups on time due to the delay of equipment procurement and political conflicts between the municipality and barangay. The activities of Burak were finally resumed in February 2015, after the conflict was resolved.

On the other hand, access to the temporary processing place, which was supposed to be available through Monday to Saturday, was found to be more difficult than initially expected. Due to duplications with church events and difficulty in contacting the caretaker of the chapel, the women's associations could use the venue only for 1 – 3 days per week. Taking into consideration the limitation of access will result in lower production, it was decided that some of the processing activities should be temporarily done in the barangays of the respective associations.

Achievement 8: Restarting of Production and Sales of Processed Products

The situation of production and sales by the three associations during October 2014 to February 2015 is indicated in Table 2.2-15. All three associations have managed to gradually increase their sales and benefit. Initially, all products were only sold to the neighbors of the women's association members and were only produced among order. However, from January 2015, the association started to sell their products in a local canteen on a consignment basis. Each association is also selling their products to regular customers such as workers in nearby factories and farmlands. The frequency of production activities, which started with a thrice a month is now ranging from one to two times a week.

In order to maximize the profit from the processing activities, it is ideal that the associations further increase their production and sell more products on a regular basis. However, the

women's associations are not necessarily active in developing new clients such as store keepers in public markets and local super markets. As for Burak women's association, they have merely started trial production at the end of February 2015. Therefore, there are no active sales of vegi-fish noodles up to this point.

Furthermore, as of February 2015, support for hygienic / quality management and formulation of business plans with the assumed full-scale operation at the Tolosa Multi-Purpose Livelihood Center has not yet been provided to any of the associations.

Table 2.2-15 Situation of Sales of the Processed Products

Product	Amount sold	Unit Price	Total Sales	Gross Profit*	Main Costumers
Longganiza	439 Pack	60-70/pack	30,230	4,988	Barangay residents, local sari-sari store, LGU Staff, local factory workers, farm labors
Tocino	443 Pack	60-70/pack	30,590	5,047	Barangay residents, local sari-sari store, LGU Staff, local factory workers, farm labors
Boneless Bangus	126.7 kg	300/kg	38,016	11,975	Barangay residents, local sari-sari store, LGU Staff, local factory workers
Embutido	Approx. 1,000Pcs	50-60/pc	64,580	17,867	Barangay residents, local sari-sari store
Vegi-fish Noodles	-	45/pack	-	-	-

Source: JICA Study Team

*Roughly calculated from amount of sales and cost of raw material

Achievement 9: Training Activities

Training for accounting was conducted in November 2014 for the three associations that already started their production. Simple formats to record income and expenditures were prepared and explained to the associations. The chairpersons of the associations were instructed to record and submit their balance on a monthly basis. However, only one association (Telegrapho) has been submitting its balance on a regular basis. The other two associations submit their records when repeatedly requested, but the records often lack information and reporting is usually delayed.

For the Burak women's association, training by VSU on processing activities and hygienic management has been provided in February 2015, as they requested for recurrent training, because of the long gap after they suspended their activities.

Achievement 10 (Extension Period) : Identification of Target Sales, Market and Sales Strategy

In June 2015, a series of workshops were held with the women's groups in order to identify the target sales amount and markets that they want to achieve, together with their sales strategies to approach these targets. The items discussed in the workshops are as follows.

a) Analysis of production costs and calculation of expected profits
b) Confirmation of level of income expected by the members engaged in the production / sales activities

c) Calculation of necessary amounts of production and sales to achieve the income level identified above
d) Identification of target markets that need to be developed in order to sell the amount of products identified above
e) Revision of the above b) – d) in terms of practical production / sales capacity
f) Identification of necessary actions to be taken to promote the products to the target markets and expected time frame

The above process was also prepared with the intention of having the members understand the potential of their products in making profit, and how much effort they must make to bring out such potential. A set of target figures were identified through the workshops, but in general most of the figures were found to be significantly excessive. As later mentioned in "Achievement 11", actual production and sales of the products were carried out based on the identified targets and strategies. Based on this experience, meetings were again held in December 2015 to revise the targets and strategies. As a result, latest figures for some of the groups have become more realistic.

Table 2.2-16 Changes in the Target Figures of the Women's Groups

		Actual (June 2015)	Targets	
			June 2015	December 2015*
Olot (Longganisa / Tocino)	Frequency of Production	3 times / month	8 times / month	4 times / month
	Qtt. of Production/ Sales	204 packs / month	1,600 packs / month	300 packs / month
	Amont of Production/ Sales	PhP 1,020 / month	PhP 80,000 / month	PhP 15,000 / month
	Wage for Production	PhP 2,040 / month	PhP 16,000 / month	PhP 1,500 / month
	Sales-Cost	PhP 1,225 / month	PhP 9,603 / month	PhP 475 / month
Tanghas (Deboned Bangus)	Frequency of Production	4 times / month	8 times / month	4 times / month
	Qtt. of Production/ Sales	90 kg / month	270 kg / month	90 kg / month
	Amont of Production/ Sales	PhP 26,100 / month	PhP 78,300 / month	PhP 26,100 / month
	Wage for Production	PhP 6,400 / month	PhP 19,200 / month	PhP 6,560 / month
	Sales-Cost	PhP 2,060 / month	PhP 6,180 / month	PhP 326 / month
Telegrapho (Embutido)	Frequency of Production	2 times / month	4 times / month	4 times / month
	Qtt. of Production/ Sales	150 Pcs / month	600 Pcs / month	400 Pcs / month
	Amont of Production/ Sales	PhP 9,000 / month	PhP 36,000 / month	PhP 20,000 / month
	Wage for Production	PhP 801 / month	PhP 3,260 / month	-
	Sales-Cost	PhP 2,151 / month	PhP 8,605 / month	PhP 4,600 / month
Burak (Vegi-fish noodles)	Frequency of Production	2 times / month	8 times / month	4 times / month
	Qtt. of Production/ Sales	130 packs / month	1,760 packs / month	260 packs / month
	Amont of Production/ Sales	PhP 7,800 / month	PhP 105,600 / month	PhP 16,900 / month
	Wage for Production	PhP 1,300 / month	PhP 17,600 / month	PhP 3,000 / month
	Sales-Cost	PhP 2,684 / month	PhP 36,344 / month	PhP257 / month

*Sales – Cost for the target set in December 2015 is lower compared to that of June because different costs such as marketting cost, internal savings etc., are considered.

Source: JICA Study Team

In addition to the above, the target markets and approaches to the market have also become more detailed in December 2015.

Table 2.2-17 Changes in the Sales Strategies of the Women's Groups

		June 2015	December 2015
Olot (Longganisa / Tocino)	Market to be targeted	• School canteens in nearby cities • Canteens of local schools • Local public markets	• Local residents and commuters passing through Brgy. Olot
	Means of sales promotion	• Walk-in sales • Introduction of product through personal connections	• Selling cooked products by setting up a simple carranderia (food stall). Uncooked products will also be kept available there.
Tanghas (Deboned Bangus)	Market to be targeted	• Local residents • Local schools (teachers) • Restaurants and canteens in nearby cities • Fast food chain shops in urban areas	• No major changes in target market. However, more efforts will be made for negotiation with a fast food chain, which are expected to order in bulk.
	Means of sales promotion	• Walk-in sales • Introduction of product through personal connections	• Walk-in sales • Introduction of product through personal connections • Further negotiation after obtaining an LTO. • Considering sales of cooked product by setting up a simple carranderia
Telegrapho (Embutido)	Market to be targeted	• Local residents • Local canteens • Local Schools (teachers, students)	• No changes
	Means of sales promotion	• Walk-in sales • Introduction of product through personal connections	• No changes
Burak (Vegi-fish noodles)	Market to be targeted	• Canteens of nearby hospitals • Canteens of local business facilities • Canteens of nearby government offices • Major super markets • Canteens of local schoops • DSWD food stockage program • Local politicians • Local grocery stores	• No major changes in target market. However, more efforts will be made for negotiation with DSWD food stockage program and local politicians, which are expected to give orders in bulk.
	Means of sales promotion	• Walk-in sales • Introduction of product through personal connections	• Walk-in sales • Introduction of product through personal connections • Approach DSWD through the Municipal Government

Source: JICA Study Team

Achievement 11 (Extension Period) : Continued Production and Sales based on Identified Targets and Strategies

Based on the strategies identified in "Achievement 10", the groups continued their production and sales during the period of June to December 2015. However, as the renovation of the Multi-Purpose Livelihood Center (refer to "Achievement 13") took a long time, the groups from Olot, Tanghas and Telegrafo had to continue their production in their Barangays. Moreover, the group from Burank had to suspend their activities from July to early December because they needed a work space of appropriate size in order to produce their products. The situation of sales of the four groups is shown below.

Table 2.2-18 Situation of Income and Expenditures of the Groups

		Apr.	May	Jun.	Jul.	Aug.	Sep	Oct.	Nov.	Dec
Burak	Expenditures	5,724	2,491	14,046	1,474	0	0	0	2,808	5,219
	Income	4,720	4,796	12,820	3,220	0	0	0	4,140	7,720
	Balance	-1,004	2,305	-1,226	1,746	0	0	0	1,332	2,501
	Accumulated Balance	-1,004	1,301	75	1,821	1,821	1,821	1,821	3,153	5,654
Olot	Expenditures	2,239	0	5,498	1,903	0	0	0	0	0
	Income	0	1,980	6,720	1,860	1,560	0	0	0	0
	Balance	-2,239	1,980	1,222	-43	1,560	0	0	0	0
	Accumulated Balance	-2,239	-259	963	920	2,480	2,480	2,480	2,480	2,480
Tanghas	Expenditures	4,002	1,678	7,747	2,114	26,376	14,237	4,321	2,120	6,153
	Income	8,649	0	10,915	7,237	29,729	18,873	4,876	4,350	12,621
	Balance	4,647	-1,678	3,168	5,123	3,353	4,637	555	2,230	6,468
	Accumulated Balance	4,647	2,969	6,137	11,260	14,613	19,249	19,804	22,034	28,502
Telegrafo	Expenditures	2,458	5,141	5,818	11,711	5,716	9,216	2,871	9,975	8,048
	Income	3,200	7,100	8,100	13,500	7,750	12,100	5,250	12,500	10,900
	Balance	742	1,959	2,282	1,789	2,034	2,884	2,379	2,525	2,852
	Accumulated Balance	742	2,701	4,983	6,772	8,806	11,690	14,069	16,594	19,446

Source: JICA Study Team

In addition to the individual efforts of the women's groups, the following supportive activities were carried out during the extension period.

a) Sales Mission of Local Products

Sales Missions are held by DTI with the aim of providing business opportunities to local businesses, by calling out to producers of local products and by introducing them to retailers near Tacloban City. Such activities are done by the Regional and Provincial officers of DTI on an irregular basis, where necessary budget for the coming year can be secured when there are requests from local producers.

b) Trade Fairs

Trade fairs are regularly held by government agencies such as DTI, DA and BFAR. By registering to these agencies beforehand, local producers can display their products in promotion booths during trade fairs that are usually held during festive events. During the extension period, trade fairs were held both in Tacloban and Manila.

Out of the above, all groups supported under the QIP participated in the Sales Mission. Unfortunately, regular business deals were not concluded through the missions, but the groups earned valuable experiences in directly introducing their products to the buyers and receiving feedback.

On the other hand, Burak was the only group that participated in the trade fair in Tacloban. The reasons for other groups for not participating can be named as; long binding hours (penalties are applied when someone from the group cannot be attending full time during a one month period), unavailability of cooling devices, etc.

It can be said that the groups were able to obtain considerable amount of experience in production and sales activities. However, there are still numerous issues that were observed during the extension period.

Table 2.2-19 Features and Issues Observed during the Extension Period

Group (Product)	Observed Features / Issues
Olot (Longganisa / Tocino)	Product • Price compatibility of the products are low because same types of products are imported in large quantities from other areas of the country and are being sold in cheap prices. On the other hand the group experienced good sales when they established a temporary food stall to sell porridge. Form this experience, it was noted that there was considerable demand for economic food service in the area. Serving cooked product by carrenderias (local food stalls) is therefore considered to have good potential, which also adds more value to the products. Group • There were considerable gaps between the leader and the members in their attitude towards proactive engagement in the activities. The leader of the group come from a wealthy family in the area, and is engaged in many social activities in the area. This limits the time that she can spend for the group activities, and as a result, she may not be sufficiently answering to the demands of the members, who are more eager in carrying out the activities. • At the same time, the members were significantly reluctant in autonomously carrying out their activities without the presence of the leader. Therefore, group activities were often stagnant when the leader was occupied in other activities.
Tanghas (Deboned Bangus)	Product • The products can be rather easily sold to local food stalls and retiarys. It is expected that there are significant demands for the product in local restaurants and fast food stores as well. • However, deals for sales in bulk require an LTO. Group • The leader of the group has been engaged in the activities in a very proactive manner. However, there were observations that the leader was not being able to deliver sufficient information to the members, including details of the group finance. Furthermore, the leader tended to avoid debating with the members on group issues and preferred to solve the group issues by her-self. From time to time this resulted in formulating a sense of distrust by the members. • Significant gaps in attitude were observed between the active members and inactive members of the group. This further lead to factions within the group and there was a case where the inactive members attempted to slander the leader.
Telegrafo (Embutido)	Product • The group has been consistent in selling their products to employees of local business entities and to nearby residents. Their product has a good reputation and production and sales are done regularly in a stable manner. • Sales in the locality also results in reducing costs for items such as packaging and transportation. Group • The leader has significant trust form the members of the group. Activities are regularly conducted by the instruction of the leader. On the other hand, the members were noted to significantly rely on the leader and were reluctant in carrying out any activity without instructions from the leader.
Burak (Vegi-fish noodles)	Product • With higher pricing compared to other fried noodles, the product is not expected to be widely patronized by average local households. On the other hand, by efficiently advertising the nutritious value of the product, the urban population is considered to be a potential market, where there is a growing trend of people becoming more conscious of health issues. • A large part of the production used to be bought by a local congress man before typhoon Yolanda. However, there has not been such support after the typhoon. Group • Regular production could not be practiced during the extension period because of the long time

Group (Product)	Observed Features / Issues
	required for the renovation of the Multi-Purpose Livelihood Center。 • The group, which its experience in stable sales before typhoon Yolanda, is generally keen on conducting its activities. Meanwhile, being dependent on the support of local politicians before typhoon Yolanda, they still require more experience in autonomous efforts for marketing their products.

Source: JICA Study Team

The women's groups have been somewhat able to continue their activities to a certain extent. They have already been able to distribute their earnings to their members. However, as indicated in the table above, there are still many issues remaining. In general, the members of the groups tend to be strongly dependent on their leaders and proactive voluntary efforts were seldom seen. In addition, while many of the members were keen to participate in production activities, most of them were passive when it came to outbound activities such as introduction of products to potential clients and negotiation with buyers. It was often seen that the leader of the groups had to burden these tasks. Furthermore, there were several cases seen where personal relationships between members leaded to mutual distrust, which resulted in some of the members actually interfering with the group activities. Such incidents suggest the fact that some (if not many) of the members are engaged in the activities with the mindset for community activities and not in the sense of professional business. For the activities to be further strengthened/ developed in the future, the change of mindsets of the members; to consider their activities as their own professional business, is a crucial issue.

On the other hand, as described in "Achievement 10", the experiences and lessons obtained through the activities were discussed among the group members in December 2015, and were reflected to the directions for their further marketing. Through the entire process (identification of targets in June, production and sales during July to December, revision of sales target and strategy in December, expected activities after January 2016), the women's groups were able to experience a full round of the PDCA cycle. Such experience, together with further support from Tolosa Municipality, is expected to contribute to sustainable operation of the women's groups in the future.

Achievement 12 (Extension Period) : Preparation of Business Plans

Business Plans, which are expected to function as a guideline for the activities of the women's groups in the near future, were developed for each group based on the results of "Achievement 11" and "Achievement 12". The basic composition of the contents of the Business Plans is the same with that described in "QIP-01: Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish)".

Achievement 13 (Extension Period)：Improvement of Product Labels and Support for LTO Application

Through the discussions on sales targets and strategies conducted in June 2015, it was found that two of the women's groups (Burak and Tanghas) considered that improvement was required for their product labels. Since the group from Burak lost the original design of the labels during typhoon Yolanda, they were simply using paper with their product name and photograph printed. Though the features of the product is that it uses fish and vegetable as ingredients and that it has more nutritious value than other fried noodles, the label used at that point did not describe any of it. In order to improve the label, the group, together with the Study Team determined the slogan of the product together with the layout of the label. Meanwhile, the material of the label was not changed to avoid extra cost.

As for the group from Tanghans, they were using the same label that they have been using before typhoon Yolanda. However, they intended to change the design so as to appeal their products to the consumers. Because the development of the new label was not an urgent issue, the Study Team facilitated the group to participate in the Package Design Improvement Program held by DTI from July 2015. The group participated in a series of workshops with the consultant deployed by DTI and finalized the design of their new label. However, the completion of the design had to wait until January 2016.

The Multi-Purpose Livelihood Center which was constructed under the QIP was completed by the end of March 2015 and actual production using the facility started from the following May. However, the building was designed by the Municipal Engineer of Tolosa, who initially intended the building to be used for community level processing activities. Accordingly, the facility had sufficient specifications for carrying out simple processing activities, but did not fulfill the standards required for applying for a LTO. From July 2015, Tolosa Municipality started the renovation of the Multi-Purpose Livelihood Center with its own budget so as to support the women's groups in applying for LTOs. However, though the time required for renovation works were initially estimated as one month, the actual works took much more due to administrative procedures of the Municipality. Most of the works including setting up of partitions, repainting of the interior, covering of lighting devices were finished by early December, but the installation of industrial curtains to prevent pests from entering the facility was not completed at end of December 2015, and therefore, the building still does not fulfill the standards required for LTO application. In the discussions with the women's groups on future directions of their sales activities, two out of the four groups (Burak and Tanghas) intended to obtain LTOs for their future activities. The renovation of the building, together with the application for LTOs should be completed as soon as possible by Tolosa Municipality in order to enable further development of the activities of these groups.

Acheivement 14 (Extension Period) : Participation in the Value Chain Analysis Workshop and Follow-up Meetings

From the participants of this QIP, the group from Tanghas, which is engaged in milkfish processing has been participating in the VCA workshop and follow-up meetings. As described earlier in "QIP-01: Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish)", these meetings are expected to benefit the group by connecting them to different stakeholders, which can become potential vendors for ingredients or buyers of products.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-20 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Participate in Livelihood Activities in the multi-purpose facility (participant)	50 persons	125	0	71	104
2) Livelihood Activities in the multi-purpose facility is carried out (number of activities)	10 activities	5	0	0	4
3) Stable income by Livelihood Activities in the multi-purpose facility (number of people with revenue)	50 persons	0	0	71	104
4) Group members are trained by orientation for food processing. (total number of participants)	50 persons	125	0	0	104

Source: JICA Study Team

The number of persons engaged in livelihood activities in the multi-purpose livelihood building, as well as persons trained mark more than twice of the initial expectations. Although further improvements with the support from of organization will be required for sustainable operation of processing and sales activities, it may be said that the QIP has achieved its goals in terms of re-starting the activities of local women's groups.

2.2.4 Training on Disaster Resilient Construction Technologies through Reconstruction of National Agriculture School (QIP-4)

(1) Inputs

Input 1: Design of Reconstruction of NAS

Through the damage assessment survey conducted by JICA Study Team on NAS, it was found that food-processing classroom building was damaged completely including the foundation, and the two-unit school building which was built by JICA grant Project, had minor damage. Therefore, the food-processing classroom building was planned to be reconstructed and the two-unit school building be repaired on damaged portion only.

The JICA Study Team reviewed the as build drawing of the existing food processing class room building received from TESDA. As a result of review, necessary modifications were made for foundation, pillars and beams which were found with insufficient strength. The roofing system was also revised in the same manner with the PHO (see section 2.2.2) in order to reinforce its structure. The modified drawing was used for reconstruction of the food-processing classroom building. Regarding the two-unit school building, the repairing plan was made based on the damage survey. The project profile is shown in Figure 2.2-5.

Input 2: Bidding/Contract of Reconstruction of NAS

The bidding procedure was done in the same way with PHO (see section 2.2.2). JICA Study Team requested nominee of contractor's from the Municipality of Balangiga and TESDA, and issued the invitation for bids to the contractors who passed PQ.

The contractor was selected by adopting an open/competitive bidding system using the two-envelope system. BOQ/Fixed Unit Cost system was adopted for the Contract.

Considerations were made for payment conditions to avoid any delay caused by financial deficit.

Input 3: Reconstruction of NAS

In the same way with PHO (see section 2.2.2), JICA Study Team organized the inspection team and carried out quality control. Moreover, JICA Study Team called for regular site meetings with the contractor to monitor the progress of construction periodically, and discussed the technical issue that the contractor encountered, quality and construction schedule.

Input 4: Equipment of reconstruction of NAS

The previously-existing equipment of food-processing classrooms was totally damaged by the typhoon. Therefore, the equipment for curriculum of Food Processing and Root Crop Processing was supplied in QIPs for resumption of NAS management.

Input 5: Training of Construction Technology

In QIPs, JICA Study Team provided the training to TESDA welding course graduates (certificate holder) and welding trainers through the reconstruction of NAS for learning of Japanese construction technology. Japanese experts conducted the practical training on the basic technology and construction methodology for the local people to study the building construction reliably, especially in the important welding, truss and roof installation.

Moreover, the orientations were also widely conducted targeting relevant staff of neighboring LGUs and the contractors of QIPs.

JICA Study Team also documented the training activities and submitted it to TESDA so that

they can use it as one of their training material for continued training activities.

(2) Achievement of the Project

Achievement 1: Revising Design of NAS for Disaster Resilient Reconstruction

In the same way as PHO (see section 2.2.2), based on As Built Drawing provided from TESDA, JICA Study Team reviewed strengthening measures for the critical section of the superstructure such as truss and roof, and added Japanese-style reinforcing measure as follows:

a) In the same way with PHO, more stable and solid connections were employed by: 1) embedding anchor bolt in the concrete column, and 2) mounting truss welded and resting on base plate.
b) In the same way with PHO, gusset plate was placed at the connecting portion of the member of truss, to secure the right position, required welding length and connection of truss members.
c) In the same way with PHO, Mega-Rib was adopted for roofing system with domestically available material (0.5mm thickness, pre-coated galvanized sheet).
d) In the same way with PHO, C-type mold steel (2-mm thickness) was adopted for purlin to assure the transfer of load from roof to truss.
e) Since the groundwater level was high, the foundation design was modified using footing tie beams and gravel bedding of 20 cm thickness instead of 10 cm, in order to increase the stability of the foundation.
f) Two-unit school buildings that were originally constructed through Japanese grant aid were repaired partially at roofs and interior/exterior walls. As the original roof material was imported from Japan and difficult to procure due to cost, JICA Study Team ordered from local suppliers but still adopting the same pitch and corrugation for replacement.

Achievement 2: Bidding/Contract of Reconstruction of NAS

JICA Study Team collected the company profile from four companies that were recommended by LGU and NAS, and sent bid invitation to three companies selected through PQ (Pre-Qualification) procedure.

As described above, JICA Study Team adopted the open/competitive bidding system and two-envelope system.

Three companies participated the bidding, and three of them passed through technical review. After opening of the three financial proposals, ESPRERAS CONSTRUCTION AND DEVELOPMENT CORPORATION was found to have the lowest bid offer which was also within QIPs budget, so the said company was nominated as the first priority for arithmetical evaluation. As part of the bidding procedure, both of technical proposal and financial proposal

were fully examined and queries were made to the contractor. Since its position as first priority was not changed, JICA Study Team issued and made the Contract Award to the said contractor.

BOQ/Fixed Unit Cost system was adopted for the Contract since additional quantities or change order were expected.

Considerations were made for payment conditions to avoid any delay caused by financial deficit. Since the contract period was only as short as six months, price escalation clause was also not applied. And the similar to PHO project, three months was adopted for the "Defects Liability Period".

During the project implementation, the contractor issued the request for time extension with the following reasons: 1) the delays caused by excessive groundwater ponding during footing's pit excavation; 2) additional work due to introduction of footing tie beams with excavation and concrete, 3) backfill material, and 4) a typhoon ruby, etc. JICA Study Team and LGU discussed and evaluated the reasonability, and granted the extension of 60 days.

Achievement 3: Reconstruction of NAS in a Disaster Resilient form through Appropriate Construction Management

In the same way with PHO (see section 2.2.2), JICA Study Team confirmed all of the construction material. Since the welder played an important role in the strengthening measure of the vulnerable portion of superstructure, JICA Study Team also conducted the practical test of welding skill in advance, and permitted skilled welder who was assessed by JICA Study Team, to perform the welding operation.

JICA Study Team also made the deployment/monitoring plan of Inspectors for quality control based on the execution plan and detailed construction schedule which was submitted by the contractor.

The inspectors inspected center line, depth and bearing capacity of foundation excavation. Re-bar of column was inspected before formwork closure prior to concreting.

Inspection of concrete works were conducted on trial mix, mixing ratio, slump test, the skill of mixer operator, placing method and vibrator using, etc.

In case any failure or defaults in the works were noted, inspector issued site instruction to contractor, instructing correspond corrections, demolition and sometimes rework.

Repair works of the two buildings originally built through Japanese grant aid were finished by December 2014. In response to TESDA, who requested the JICA Study Team that they intend to use these buildings for providing training on electric works, partial handover of these buildings were done in January 2015.

The following are the main site instruction given to the contractor during the reconstruction of NAS:

- Excavated foundation elevation should be inspected.
- During foundation works, it was instructed to the contractor to use barrel and submersible pump for dewatering of underground water
- Proper compaction of base foundation was instructed.
- Casted concrete should not be submerged in underground water at least 24 hours.
- Rebar placement should be inspected before form works closure of column.
- Tensile strength test of angle bar sample has failed so the contractor was advised to procure from other supplier.
- Concrete slump should be inspected constantly.
- Honeycombs were found on concrete surface, so JICA Study Team instructed the contractor to use concrete vibrator properly on concrete pouring to avoid further honeycombs. Concrete epoxy was advised to use for repairing of honeycombs.
- Early removal of forms was founded so JICA Study Team instructed to the contractor to keep specified period for Curing of concrete column.
- Proper compaction for backfill was instructed.
- Concreting of roof beams should be inspected.
- Concrete spacer was instructed to place properly.
- Compaction of backfilling materials should be inspected.
- Leveling concrete was instructed to make it horizontally.
- Fabrication of Trusses should be constantly inspected.

In the same case with PHO, regarding documentations required to be submitted, the contractor didn't acquire sufficient knowledge through reconstruction of NAS, and they need to learn more in order to be able to effectively manage their construction schedules.

Achievement 4: Support for Resuming Operation through Procurement of Equipment for Food Processing

The specifications of the equipment used in the food processing building were prepared with the support of the VSU (Visayas State University). Specifications were prepared so that equipment could be procured within the Philippines.

Table 2.2-21 Equipment for Food Processing

Equipment	set	Usage
Food Processing Equipment	1	Meat, fish and vegetables
Root Crop Processing	1	cassava
Kitchen tools and equipment	1	Processing, cutting, slicing, Simmering and sealing
Communication	1	Computers

Source: JICA Study Team

Achievement 5: Technology Transfer to Relevant Workers, Engineers and TESDA Trainers

a) Technology Transfer through Construction

Two Japanese experts, Mr. Noel Watanabe (welding specialist) and Mr. Katsuya Usui (roof specialist) were invited two times (Nov 5-Dec 23, 2014 and Jan 19-Feb 18, 2015). They conducted practical training at site to TESDA welding course graduates employed through the contractor and TESDA welding trainers during actual work. Main item of training was hands-on training on welding, truss fabrication, and roof installation. The topics of training are shown below.

1) Welding
- To create a safe environment for Welding.
- To weld uniformly without any defect.
- To weld fabrication of truss with strength.

2) Truss
- To estimate the necessary member, measure and cut.
- To assemble the member with gusset plate.
- To install truss on concrete column.

3) Roof
- To study the structure of roof.
- To install roof material.

Major Training Participants were as below;

Table 2.2-22 Major Training Participants

	TESDA Graduates	Non-TESDA Graduates	TESDA Trainers
Participants	4	3	1

Source: JICA Study Team

Training Program by Japanese expert workmen was as below;

Table 2.2-23 Training Program

No	Date		Subject	Participant
1	2014/11/5	Wed	Orientation	10
2	2014/11/12	Wed	Welding	7
3	2014/11/13	Thu	Welding	7
4	2014/11/17	Mon	Welding	7
5	2014/11/19	Wed	Welding	7
6	2014/11/20	Thu	Welding	7
7	2014/11/24	Mon	Welding	7
8	2014/11/25	Tue	Welding	7
9	2014/11/28	Fri	Welding	7
10	2014/12/1	Mon	Welding	7

No	Date		Subject	Participant
11	2014/12/4	Tue	Welding	7
12	2014/12/5	Tue	Truss Fabrication	7
13	2014/12/9	Tue	Truss Fabrication	7
14	2014/12/10	Wed	Truss Fabrication	7
15	2014/12/15	Mon	Truss Fabrication	7
16	2014/12/16	Wed	Truss Fabrication	7
17	2015/1/23	Fri	Roofing Installation	7
18	2015/2/5	Thu	Roofing Installation	7
19	2015/2/9	Mon	Roofing Installation	7

Source: JICA Study Team

b) Site Orientation

In order to introduce the contents of technology transfer by the Japanese expert workmen to local Engineers, orientations regarding basic knowledge and skill of welding, truss and roof installation were organized by calling for Municipal Engineers, contractors recommended by LGU, TESDA welding course graduates (certificate holder) and welding instructors. The orientation program was prepared by summarizing the contents of the trainings conducted through the reconstruction works, and were divided into three parts namely: welding, truss and roof installation. Detailed subject and participants are shown as below. Furthermore, an orientation targeting engineers of Tacloban were also held in collaboration with QIP-5, with 33 attendees.

Table 2.2-24 Site Orientation Program

No	Date		Title	Subject	Participants		
					Total	From	No.
1	Dec. 19, 2014	Wed	Welding	Knowledge Basic Practice	25	Trainee LGU TESDA Trainer	6 17 2
2	Jan. 23,2015	Fri	Truss Fabrication	Fabrication Lifting Installation	26	Trainee LGU TESDA Trainer Contractor TESDA Students	5 6 2 1 12
3	Feb. 9, 2015	Mon	Roofing Installation	Knowledge Material System	22	Trainee LGU TESDA Trainer Roof Supplier TESDA Students	5 5 1 2 9
Total							73

Source: JICA Study Team

c) Training material

Technical manuals on welding and roofing works, as well as video material for training were prepared in collaboration with TESDA based on the contents of activities for technology transfer conducted through this QIP and QIP-5 (reconstruction of National High School). The materials were submitted to TESDA Region 8 Office for further use in its training activities. It is expected that in the near future, the materials will be utilized in

TESDA training activities in Region 8 (28 schools / course participants in 2014: 2,256 heads). Furthermore, TESDA Region 8 Office is intending to have the contents of the material to be reflected to its curriculum (SMAW NCII) so that it can be used in all TESDA courses in the country.

The manual for welding works targeted on "technologies for fabricating welded products". The text book covers the items of; 1) fabrication of products in compliance to technical drawings so that the product can perform its designed function, 2) accurately fabricate the product in the exact sizes indicated in the drawing, and 3) improve the quality of external appearance and strength of product including welded portions up to demanded levels. As for the video, the actual works by the trainees for installing truss was recorded as training material. The contents of the video taken was checked with the TESDA welding trainers every week and edited to suit the demands for TESDA training.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-25 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) TESDA's graduates and trainers obtain disaster resilient construction technologies through the construction of building. (number of TESDA's graduates and trainer)	6 persons	0	0	8	8
2) Engineers/technicians of LGU and contractors trained in disaster resilient construction technologies and techniques. (number of engineer/technicians trained)	26 persons	0	0	73	73
3) Students are trained normally in Agricultural School. (Persons in total/ year)	1,000 persons	1,028	434	2,683	2,730
4) Curriculums in Agricultural School are restarted. (Number of curriculums / year)	12 course	12	3	11	8

Source: JICA Study Team

Due to the time for preparation required by TESDA, not of all curriculum have been restarted. However, the number of skilled workers trained through the QIP has significantly exceeded initial expectations. The rate of trained workers being continuously employed in construction companies also marks more than 80%. This indicates that the trainees have sufficiently obtained skills for fabricating trusses and constructing roofs. Moreover, the technical handbook and video prepared through this QIP has been highly appreciated by TESDA. The director of TESDA Region 8 Office is officially stating that TESDA will be utilizing the material for its trainings and it is expected that skilled workers will be continuously trained with material prepared through this QIP.

2.2.5 Training on Disaster Resilient Construction Technologies through Reconstruction of National High School (QIP-5)

(1) Inputs

Input 1: Design of Reconstruction of National High School (hereafter called NHS)

When damage assessment of National High School was conducted, the following were noted; 1) Library and piloti building was collapsed completely, 2) one-story two-classroom building was damaged at upper part, and 3) school/administration building that was built by JICA grand project was slightly damaged on window, roof and wall.

Through discussion between JICA Study Team and DepED, the following plan was made for the reconstruction of NHS under the QIP.

Library/piloti building shall be demolished and six classrooms building (2-story) shall be built instead. Two-classrooms building shall be rehabilitated with new truss and roof. School/administration building shall be rehabilitated on damaged portion only.

The JICA Study Team reviewed the standard drawings of six classrooms building (2-story) and two-class room building received from DepED. As a result of review, necessary modifications were made for foundation, pillars and beams which were found with insufficient strength. The roofing system was also revised in the same manner with the PHO (see section 2.2.2) in order to reinforce its structure. As for the school/administration building, the repairing plan was made based on the damage survey. A project profile is shown in Figure 2.2-6.

Input 2: Bidding/Contract of Reconstruction of National High School

The bidding procedure was done in the same way with PHO (see section 2.2.2). JICA Study Team requested nominee of contractor's from DepED and the Municipality of Dulag, which is in charge of the management of the National High School, and issued the invitation for bids to the contractors who passed PQ.

The contractor was selected by adopting an open/competitive bidding system using the two-envelope system. BOQ/Fixed Unit Cost system was adopted for the Contract. Considerations were made for payment conditions to avoid any delay caused by financial deficit.

Input 3: Reconstruction of NHS

In the same manner with PHO (see section 2.2.2), JICA Study Team organized the inspection team and carried out quality control. Moreover, JICA Study Team called for regular site meetings with the contractor to monitor the progress of construction periodically, and discussed the technical issue that the contractor encountered, quality and construction schedule.

Input 4: Training of Construction Technology

Adopting the same method with NAS (see section 2.2.4), JICA Study Team provided the training program to TESDA welding course graduates (certificate holder) and welding trainers through the reconstruction of NHS. Japanese experts conducted the practical training on the basic technology and construction methodology for the local people to study the building construction reliably, especially in the important welding, truss and roof installation. Moreover, the orientations were also widely conducted targeting relevant staff of neighboring LGUs and the contractors of QIPs.

In the same way with NAS (see section 2.2.4), JICA Study Team also documented the training activities and submitted it to TESDA so that they can use it as one of their training material for continued training activities.

(2) Achievement of the Project

Achievement 1: Revising Design of NHS for Disaster Resilient Reconstruction

Standard drawings for the six classrooms building (2-story) and two-class room building received from DepED were reviewed by the JICA Study Team. In the same way with PHO (see section 2.2.2), JICA Study Team reviewed strengthening measures for the critical section of the superstructure such as truss and roof, and added Japanese-style reinforcing measure as follows:

a) In the same way with PHO, a more stable and solid connection was employed by: 1) embedding anchor bolt in the existing concrete column, 2) fixing anchor plate by the bolt, and 3) full welding between anchor plate and truss.
b) In the same way with PHO, gusset plate was placed at the connecting portion of the member of truss, to secure the right position, required welding length and connection of truss members.
c) In the same way with PHO, Mega-Rib was also adopted for roofing system with domestically available material (0.5mm thickness, pre-coated galvanized sheet).
d) In the same way with PHO, C-type mold steel (2-mm thickness) was adopted for purlin.
e) Since it was found that the groundwater level was high during foundation excavation, the thickness of gravel has been increased from 10cm to 20cm.
f) According to boring test result, bearing capacity at north side of six rooms building was not sufficient. Therefore, wooden piles were driven additionally to reach enough value.
g) One of the school/administration buildings that were originally constructed by Japanese grant aid was repaired partially at the roof and interior/exterior walls. As the original roof material was imported from Japan and difficult to procure due to cost, JICA Study Team ordered from local suppliers but still adopting the same pitch and corrugation for replacement.

Achievement 2: Bidding/Contract of Reconstruction of NHS

JICA Study Team collected the company profile from three companies that were nominated by LGU and NHS, and sent bid invitation to three companies selected through PQ (Pre-Qualification) procedure.

As described the above, JICA Study Team adopted open/competitive bid system and two-envelope system.

Opening of the bids were done with the presence of the bidders. Fist, the technical proposals were opened. Cost proposals were opened for bidders who passed the technical review. Three companies participated for bidding, and two of them passed through technical review. After opening of their proposals, I.D.A. JR BUILDERS AND CONSTRUCTION SUPPLY was found to have the lowest bid offer which was also within QIPs budget, so the said company was selected as the first priority for arithmetical evaluation. As part of the bidding procedure, both of the technical proposal and financial proposal were fully examined and queries were made to the contractor. Since his position as first priority was not changed, JICA Study Team issued and made the Contract Award to the said contractor.

Following the same method with PHO (see section 2.2.2), BOQ/Fixed Unit Cost system was adopted to address settlement of working quantity variation during project completion.

Payment condition was stipulated to avoid any delay caused by the financial deficit. Since the contract term was as only short as six months, price escalation clause was not included. In the same manner with PHO, three months was adopted for the "Defect Liability Period".

During the project implementation, the contractor issued the request for time extension with the following reasons: 1) shortage of the construction materials after typhoon Yolanda, 2) high groundwater level, 3) one additional boring test, 4) shortage of the construction material caused by the construction rush of NGOs and 5), the effect of Typhoon Ruby, etc. JICA Study Team and LGU discussed and evaluated the reasonability, and granted the extension of 60 days.

Achievement 3: Reconstruction of NHS in a Disaster Resilient Form through Appropriate Construction Management

In the same way with PHO (see section 2.2.2), JICA Study Team confirmed all of the construction material. Particularly for the two-classroom building and six-classroom building, the welder played an important role in the strengthening measure of the vulnerable portion of superstructure. Therefore, JICA Study Team conducted the practical test of welding skill in advance, and permitted skilled welder who was assessed by JICA Study Team, to perform the welding operation.

JICA Study Team also made the deployment/monitoring plan of Inspectors for quality control

based on the execution plan and detailed construction schedule which was submitted by the contractor.

The inspectors inspected center line, depth and bearing capacity of foundation excavation. Re-bar of column was inspected before formwork closure prior to concreting.

At slab concrete of floor of second floor, the works required the operation of three mixers. Since concreting took long time at high elevation, the inspectors inspected full-time and provided instructions on items such as the order of works, and location of vibrators to avoid any defect.

In case any failure or defaults in the works were noted, the inspectors issued site instruction to the contractor which resulted in correction, demolition or sometimes rework.

The following are the main site instruction given to the contractor during the Reconstruction of NHS:

- Foundation should be inspected for elevation and dimension.
- Alignment of Rebar should be instructed to be accurate.
- Honeycombs were found on concrete surface, so JICA Study Team instructed the contractor to use concrete vibrator properly on concrete pouring to avoid further honeycombs. Concrete epoxy was advised to use for repairing of honeycombs.
- Tensile strength test of angle bar sample has failed so the contractor was advised to procure from other supplier.
- Concrete slump should be constantly inspected during concreting.
- Submersible pump for dewatering should be used.
- Plastering material was instructed for proper mixing.
- Additional bracing for column formwork was instructed to avoid any movement during concreting.

In the same case with PHO, regarding documentations required to be submitted, the contractor didn't acquire sufficient knowledge through Reconstruction of NHS, and they need to learn more in order to be able to effectively manage their construction schedules.

Achievement 4: Technology Transfer to Relevant Workers, Engineers and TESDA Trainers

In the same way with NAS (see section 2.2.4), two Japanese experts, Mr. Noel Watanabe (welding specialist) and Mr. Katsuya Usui (roof specialist) were invited two times (Nov 5-Dec 23, 2014 and Jan 19-Feb 18, 2015). They conducted the practical training at site to TESDA welding course graduates employed through the contractor and TESDA welding trainers during actual work. In the same way as NAS, the contents of hand-on training were on welding, fabrication of truss and basic skills on roof installation.

a) Technology Transfer through Construction

The same training contents were adopted as NAS (see section 2.2.4). Major training participants were as below:

Table 2.2-26 Major Training Participants

	TESDA Graduates	Non-TESDA Graduates
Participants	5	3

Source: JICA Study Team

Training Program by Japanese expert workmen was as below:

Table 2.2-27 Training Program

No	Date		Subject	Participants
1	2014/11/6	Thu	Meeting	10
2	2014/11/7	Fri	Welding	8
3	2014/11/10	Mon	Welding	8
4	2014/11/11	Tue	Welding	8
5	2014/11/18	Tue	Welding	8
6	2014/11/21	Fri	Welding	8
7	2014/11/26	Wed	Welding	8
8	2014/11/27	Thu	Welding	8
9	2014/12/2	Tue	Welding	8
10	2014/12/9	Tue	Truss Fabrication	8
11	2014/12/10	Wed	Truss Fabrication	8
12	2015/1/21	Wed	Truss Fabrication	8
13	2015/1/23	Fri	Truss Fabrication	8
14	2015/1/26	Mon	Truss Fabrication	8
15	2015/1/27	Tue	Truss Fabrication	8
16	2015/1/28	Wed	Truss Fabrication	8
17	2015/1/29	Thu	Truss Fabrication	8
18	2015/1/30	Fri	Truss Fabrication	8
19	2015/2/2	Mon	Roofing Installation	8
20	2015/2/3	Tue	Roofing Installation	8
21	2015/2/4	Wed	Roofing Installation	8
22	2015/2/5	Thu	Roofing Installation	8
23	2015/2/9	Mon	Roofing Installation	8
24	2015/2/10	Tue	Roofing Installation	8
25	2015/2/11	Wed	Roofing Installation	8
26	2015/2/12	Thu	Roofing Installation	8

Source: JICA Study Team

b) Site Orientation

In order to introduce the contents of technology transfer by the Japanese expert workmen to local Engineers, orientations regarding basic knowledge and skill of welding, truss and roof installation were organized by calling for Municipal Engineers, contractors recommended by LGU, TESDA welding course graduates (certificate holder) and welding instructors. The orientation program was prepared by summarizing the contents of the trainings conducted through the reconstruction works, and were divided into three parts namely: welding, truss and roof installation. Detailed subject and participant are shown as below.

Furthermore, an orientation targeting engineers of Tacloban were also held in collaboration with QIP-5, with 33 attendees.

Table 2.2-28 Site Orientation Program

No	Date		Title	Subject	Participants		
					Total	From	No.
1	Dec. 11, 2014	Fri	Welding	Knowledge	31	Trainee	7
				Basic		LGU	4
				Practice		TESDA Trainer	5
						DepED	6
						Contractor	9
2	Jan. 22,2015	Fri	Truss Fabrication	Fabrication	22	Trainee	6
				Lifting		TESDA Trainer	6
				Installation		DepED	5
						Contractor	2
3	Feb. 6, 2015	Mon	Roofing Installation	Knowledge	28	Trainee	6
				Material		TESDA Trainer	6
				System		DepED	7
						Contractor	4
						Roof Supplier	3
						TESDA Students	2
Total							81

Source: JICA Study Team

c) Training material

In the same way with NAS (see section 2.2.4), the contents of technical transfer conducted through this QIP and QIP-4 (reconstruction of National Agricultural School) was incorporate into technical manuals and video material for training. The materials were submitted to TESDA Region 8 Office for further use in its training activities. It is expected that in the near future, the materials will be utilized in TESDA training activities in Region 8 (28 schools / course participants in 2014: 2,256 heads). Furthermore, TESDA Region 8 Office is intending to have the contents of the material to be reflected to its curriculum (SMAW NCII) so that it can be used in all TESDA courses in the country.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-29 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) TESDA's graduates and trainers obtain disaster resilient construction technologies through the construction of building. (number of TESDA's graduates and trainer)	4 persons	0	0	8	8
2) Engineers/technicians of LGU and contractors trained in disaster resilient construction technologies and techniques. (number of engineer/technicians trained)	30 persons	0	0	81	81

3) Students return to high school. (Persons/ year)	500 persons	567	495	495	581
4) Lessons in high school are normally conducted (Minutes of lessons in total/ year)	2,400 minutes	2,400	1,200	1,200	1,600

Source: JICA Study Team

Due to the time for preparation required by National High-school, not of all curriculum have been restarted. However, the number of skilled workers trained through the QIP has significantly exceeded initial expectations. The rate of trained workers being continuously employed in construction companies also marks more than 80%. This indicates that the trainees have sufficiently obtained skills for fabricating trusses and constructing roofs. Moreover, the technical handbook and video prepared through this QIP has been highly appreciated by TESDA. The director of TESDA Region 8 Office is officially stating that TESDA will be utilizing the material for its trainings and it is expected that skilled workers will be continuously trained with material prepared through this QIP.

2.2.6 Reconstruction of Daycare Center for Community Rehabilitation (Vitalization of Peoples' Dialogue) (Salcedo) (QIP-6)

(1) Inputs

Input 1: Design of Reconstruction of Daycare Center

JICA Study Team conducted damage assessment survey of Daycare Centers, in Salcedo and identified five sites where the facilities were totally damaged and should be reconstructed under the QIP.

The standard size for Daycare Centers given by DSWD is at 56 square meters (7m x 8m). As selected sites had limited access, size of material/parts for prefabricated units had to be considered from the view of handling and transportation. However, based on the data collected by the JICA Study Team from the suppliers in the Philippines, Japanese style prefabricated building units with suitable sizes of material/parts were not available. As a result, it was necessary to request a supplier who can provide Japanese style prefabricated building to newly prepare a basic design for the structure. JICA Study Team then revised this basic design with consideration to handling, transportation, assemblage and strength, and used it as the construction drawing for Daycare Center. A project profile is shown in Figure 2.2-7.

Input 2: Bidding/Contract of Reconstruction of Daycare Center

From the aspect of introducing Japanese technology and to assure the quality of products, JICA Study Team collected company profiles from several contractors who have experiences constructing Japanese prefabricated frame structures in the Philippines, and sent bid invitation to the contractors who qualified in the PQ.

In the same way as PHO (see section 2.2.2), JICA Study Team adopted open/competitive bidding system and two-envelope system.

BOQ/Fixed Unit Cost system was adopted for the contract. Payment condition was stipulated to avoid any delay caused by the financial deficit.

Input 3: Reconstruction of Daycare Center

JICA Study Team Engineer conducted the material inspection of panels for Daycare Center regarding the dimension, welding, and painting at the factory in Manila before delivering them to site. Quality Control on site was conducted in the same way as PHO (see section 2.2.2). JICA Study Team organized an inspection team and carried out quality control regarding site works such as excavation of foundation, installation of re-bars, formwork, placement of concrete and assembly works of panel, and called for site meetings with the contractor to monitor the progress of construction periodically, and discuss the technical issues that the contractor encountered such as quality and construction schedule.

Input 4: Equipment of Reconstruction of Daycare Center

In accordance with the request of LGU, JICA Study Team procured the desks and chairs for students.

Input 5: Orientation of Prefabricated Method

JICA Study Team made explanation to the participants regarding the merit of prefabricated method for Daycare Center during the handover ceremony.

(2) Achievement of the Project

Achievement 1: Designing of Daycare Center for Improving Disaster Resiliency

JICA Study Team designed Daycare Center buildings with frames bearable against typhoon wind, and at the same time easily handled for transportation and assembling on the following points;

a) The foundation and floor concrete was designed not only for supporting the structural weight, but also for counter weight against wind load caused by typhoons.
b) Steel frames were fabricated by cutting of molded steel, welding and painted at the factory, and to be assembled with bolt at site.
c) Sandwich panel, with steel plates both side and insulation in center, for roof and wall, was factory - cut and to be assembled on site.

Achievement 2: Bidding/Contract of Reconstruction of Daycare Center

JICA Study Team collected the company profile from four companies who have experiences in construction of Japanese-style panel in the Philippines, and sent bid invitation to three companies which passed in PQ evaluation.

As previously described, JICA Study Team adopted open/competitive bid system and two-envelope system.

Bid opening was done with the bidder's presence. First, technical proposal was opened. Then, financial proposal of the bidder who passed the evaluation of technical proposal was opened for comparison. Two companies participated in the bidding, and only KVCC passed through technical review. The financial proposal of KVCC was opened and it was confirmed that the bid was within the QIP budget, so the company was nominated as the first priority for negotiation. As a bidding procedure, both of technical proposal and financial proposal were fully examined and question was made to the contractor. As a result, no deficiencies were found, and the JICA Study Team issued Award and made the contract with the contractor.

In the same manner with PHO (see section 2.2.2), BOQ/Fixed Unit Cost system was adopted for the contract since additional quantities or change order were expected.

Considerations were made for payment conditions to avoid any delay caused by financial deficit. Since the contract period was only as short as six months, price escalation clause was not also applied. And the similar to PHO project, three months was adopted for the "Defects Liability Period".

During the project implementation, the contractor issued the request for time extension with the reasons of intensive rain during the period from October to December, and transportation of material affected by Typhoon Ruby. JICA Study Team and LGU discussed and evaluated the reasonability, and granted the extension of 45 days.

Achievement 3: Reconstruction of Daycare Center in a Disaster Resilient Form through Appropriate Construction Management

The necessary site clearing was shouldered by LGU as preparation works.

Assembly works of panels was done by KVCC's skilled workers, and simple works such as installation of septic tank was done by local labors.

Panels for Daycare Center were inspected by JICA Study Team engineer regarding quality and strength at the factory and transported to the site. JICA Study Team required the contractor to submit necessary data or sample of other construction materials in advance, and obtain approval of JICA Study Team. Steel materials and concrete were tested at laboratory by tensile test and compression test respectively.

In the same way as PHO (see section 2.2.2), JICA Study Team made schedule for the Inspectors for quality control, based on the execution plan and detailed construction schedule submitted by the contractor.

The inspectors inspected center line, depth and bearing capacity of foundation excavation.

Inspection of concrete works were conducted on trial mix, mixing ratio, slump test, the skill of mixer operator, placing method and vibrator using, etc. As for the assembly work of panels, the inspectors checked the placing of panels and firmness of fixation by bolt.

In case they find any failure or defects in the works, they instructed the contractor for correction, demolition or rework.

The following are some of site instruction given to the contractor during the Reconstruction of Daycare Center:

- Proper compaction should be instructed.
- Some concrete aggregates were rejected due to excessive presence of clay.
- Gravel materials was rejected and instructed to use the ones specified in the plan.
- Replacement of bolts, nuts and washer was instructed as its sizes were sub-standard.
- Cracks on floor concrete were pointed out for repair.
- Concrete spacer was instructed to be placed properly.
- Vapor Barrier was instructed to be clean prior to concrete pouring.
- Proper placement of roof and wall panels was instructed.

In the same case as PHO, regarding documents required to be submitted, the contractor didn't acquire sufficient knowledge through Reconstruction of Daycare Center, and they need to learn more in order to be able to effectively manage construction schedules.

Achievement 4: Support for Resuming Operation through Procurement of Equipment

Based on the student's numbers provided from LGU, JICA Study Team procured necessary tables and chairs as shown below:

Table 2.2-30 Equipment for Daycare Center

Type of Furniture	Quantity
Table	12
Chair	50

Source: JICA Study Team

Achievement 5: Disseminating Information on Emergency Recovery Model for Public Facilities through Orientation of Prefabricated Daycare Center (main characteristics, procurement process and work period)

JICA Study Team made the explanation to the participants regarding the merit of prefabricated method for Daycare Center in the Handover Ceremony as indicated below.

- Level of strength and durability
- Steady quality
- Handling and transport / accessibility
- Low cost

- Availability of procurement from other supplier in case of material shortage
- Short-term work

KVCC was also introduced as the local construction company who had experienced in this project.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-31 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Recover utilization number of children in Day Care (total number of users / month)	500 persons	2,500	0	0	832
2) Recover utilization number of women in Day Care Center (total number of users / month)	500 persons	670	0	0	375
3) Recover utilization number of local communities in Day Care Center (total number of users / month)	150 persons	0	0	295	300
4) Disaster enlightenment activities are carried out in Day Care Center (times / month)	5 times	0	0	0.4	6

Source: JICA Study Team

Though not reaching the state before typhoon Yolanda, the number of children and women using the daycare centers are gradually increasing. As for the aspect of multi-purpose utilization of the daycare centers including disaster enlightenment activities, the current state has already reached the initial expectations. It can be said that the benefit of multi-purpose use is duly understood by the local population, and that the facility will be efficiently utilized as more children come back.

2.2.7 Reconstruction of Daycare Center for Community Rehabilitation (Vitalization of Peoples' Dialogue) (Guiuan) (QIP-7)

(1) Inputs

Input 1: Designing of Daycare Center

JICA Study Team conducted damage assessment survey of Daycare Centers, in Guiuan and identified two sites where the facilities were totally damaged and should be reconstructed under the QIP.

In the same way with the Daycare Centers in Salcedo (see section 2.2.6), JICA Study Team requested a supplier who can provide Japanese style prefabricated building to newly prepare a basic design for the structure. JICA Study Team then revised this basic design with consideration to handling, transportation, assemblage and strength, and used it as the

construction drawing for Daycare Center. A completion figure is shown in Figure 2.2-8.

Input 2: Bidding/Contract of Reconstruction of Daycare Center

From the aspect of introducing Japanese technology and to assure the quality of products, JICA Study Team collected company profiles from several contractors who have experiences constructing Japanese prefabricated frame structures in the Philippines, and sent bid invitation to the contractors who qualified in the PQ.

In the same way with PHO (see section 2.2.2), JICA Study Team adopted open/competitive bidding system and two-envelope system.

BOQ/Fixed Unit Cost system was adopted for the contract. Payment condition was stipulated to avoid any delay caused by the financial deficit.

Input 3: Reconstruction of Daycare Center

In the same way with the Daycare Centers in Salcedo, JICA Study Team Engineer conducted the material inspection of panels for Daycare Center regarding the dimension, welding, and painting at the factory in Manila before delivering them to site. Quality Control on site was conducted in the same way as PHO (see section 2.2.2). JICA Study Team organized an inspection team and carried out quality control regarding site works such as foundation and assembly works of panel, and called for site meetings with the contractor to monitor the progress of construction periodically, and discuss the technical issues that the contractor encountered such as quality and construction schedule.

Input 4: Equipment of Reconstruction of Daycare Center

In accordance with the request of LGU, JICA Study Team procured the desks and chairs for students.

Input 5: Orientation of Prefabricated Method

JICA Study Team made explanation to the participants regarding the merit of prefabricated method for Daycare Center during the handover ceremony.

(2) Achievement of the Project

Achievement 1: Design Reconstruction of Daycare Center for Improving Disaster Resiliency

As described in the Daycare Centers in Salcedo (see section 2.2.6), JICA Study Team reviewed the basic design for easy handling during transport and assembly.

Achievement 2: Bidding/Contract of Reconstruction of Daycare Center

JICA Study Team collected the company profile from four companies who have experiences in construction of Japanese-style panel in the Philippines, and sent bid invitation to three companies which passed in PQ evaluation.

Two-envelope system with technical proposal and financial proposal was adopted for bidding, as mentioned earlier.

Bid opening was done with the bidder's presence. First, technical proposal was opened. Then, financial proposal of the bidder who passed the evaluation of technical proposal was opened for comparison. Two companies participated in the bidding, and only KVCC passed through technical review. The financial proposal of KVCC was opened and it was confirmed that the bid was within the QIP budget, so the company was nominated as the first priority for negotiation. As a bidding procedure, both of technical proposal and financial proposal were fully examined and question was made to the contractor. As a result, no deficiencies were found, and the JICA Study Team issued Award and made the contract with the contractor.

BOQ/Fixed Unit Cost system was adopted for the Contract since additional quantities or change order were expected.

Considerations were made for payment conditions to avoid any delay caused by financial deficit. Since the contract period was only as short as six months, price escalation clause was also not applied. And the similar to PHO project, three months was adopted for the "Defects Liability Period".

During the project implementation, the contractor issued the request for time extension with the reasons of intensive rain during the period from October to December, and transportation of material affected by Typhoon Ruby. JICA Study Team and LGU discussed and evaluated the reasonability, and granted the extension of 45 days.

Achievement 3: Reconstruction of Daycare Center in a Disaster Resilient Form through Appropriate Construction Management

In the same manner with the Daycare Centers in Salcedo (see section 2.2.6), site clearing was shouldered by LGU.

Assembly works of panels was done by KVCC's skilled workers, and simple works such as installation of septic tank was done by local labors.

In the same way with the Daycare Centers in Salcedo (see section 2.2.6), panels for Daycare Center were inspected by JICA Study Team engineer regarding quality and strength at the factory and transported to the site. JICA Study Team required the contractor to submit necessary data or sample of other construction materials in advance, and obtain approval of

JICA Study Team. Steel materials and concrete were tested at laboratory by tensile test and compression test respectively.

In the same way as PHO (see section 2.2.2), JICA Study Team made schedule for the Inspectors for quality control, based on the execution plan and detailed construction schedule submitted by the contractor.

The contents of quality control were the same with those for the Daycare Centers in Salcedo (see section 2.2.6).

In case they find any failure or defects in the works, they instructed the contractor for correction, demolition or rework.

The following are some of site instruction given to the contractor during the Reconstruction of Daycare Center:

- Gravel materials was rejected and instructed to use the ones specified in the plan.
- Leveling concrete was instructed to be placed evenly.
- Proper placement of roof and wall panels was instructed.

In the same case as PHO, regarding documents required to be submitted, the contractor didn't acquire sufficient knowledge through Reconstruction of Daycare Center, and they need to learn more in order to be able to effectively manage construction schedules.

Achievement 4: Support for Resuming Operation through Procurement of Equipment

Based on the numbers of students provided from LGU, JICA Study Team procured necessary tables and chairs as shown below;

Table 2.2-32 Equipment for Daycare Center

Furniture	sets
Table	12
Chair	50

Source: JICA Study Team

Achievement 5: Disseminating Information on Emergency Recovery Model for Public Facilities through Orientation of Prefabricated Daycare Center (main characteristics, procurement process and work period)

JICA Study Team made the explanation to the participants regarding the merit of prefabricated method for Daycare Center in the Handover Ceremony as indicated below.

- Level of strength and durability
- Steady quality
- Handling and transport / accessibility
- Low cost

- Availability of procurement from other suppliers in case material shortage
- Short-term work

KVCC was also introduced as the local construction company who had experienced in this project.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-33 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Recover utilization number of children in Day Care (total number of users / month)	200 persons	1,000	0	0	1,000
2) Recover utilization number of women in Day Care Center (total number of users / month)	200 persons	362	0	0	362
3) Recover utilization number of local communities in Day Care Center (total number of users / month)	60 persons	0	0	175	175
4) Disaster enlightenment activities are carried out in Day Care Center (times / month)	2 times	0	0	0.4	3

Source: JICA Study Team

Both numbers of children and women using the daycare centers have reached the state before typhoon Yolanda and exceeded initial expectations. The frequencies of multi-purpose use of daycare centers including disaster enlightenment activities have also exceeded initial expectations. It can be said that the facilities constructed under the QIP are already being efficiently utilized.

2.2.8 Regenerating Livelihood through Introduction of Disaster Resilient Submerged Fish Cage (Lapu-Lapu Culture) (QIP-8)

(1) Inputs

Input 1: Designing Submerged Grouper Cage

The Project together with Guiuan Marine Fisheries Development Centre (GMFDC, a production and research facility of BFAR Region-8) conducted a survey in the Guiuan municipality to study the current grouper culture technology of local fishermen and the environmental condition. Through the discussion and consultation with local fisherfolk, the Project came to a new design of grouper cage based on the existing system but using seamless HDPE circular frame and feeding float with circular concrete anchor which is more durable and stable than the existing structure (Figure 2.2-8).

Input 2: Construction and Delivery of Grouper Cages

The design was made into real products by a fishing gear company (INCA Philippines Inc.) selected through a nominated selective tender with three fishing gear manufacturers that BFAR Region-8 recommended as potential bidders. A total of 100 units of the newly-designed cages were produced and distributed to two sites; 70 units to Barangay Victory Island and 30 units to Barangay Camparang, in the municipality of Guiuan.

Input 3: Training of New Grouper Cage

Series of training were conducted by the Project to master the operation and maintenance techniques of new grouper cage. List of training conducted in QIP-8 was shown in Table 2.2-34.

Table 2.2-34 List of training conducted in QIP-8

	Title	Date	Participants
1	Orientation on quick Impact project: improved livelihood through environmentally sustainable grouper farming in typhoon resistant submerged cages	Sept. 22, 2014	100
2	Training on operation of grouper cage and construction of change net	Dec. 3, 2014	100
3	Training on conversion of net direction from diamond to square mesh	Feb. 15, 2015	62

Source: JICA Study Team

Input 4: Supply of Improved Diving Equipment

Use of diving equipment is necessary for carrying out the grouper farming developed at the Victory Island but the existing hookah system used by the resident fisherfolk is not reliable and potentially health hazardous to the divers. The Project introduced the SASUBA system in order to eliminate the health risk while supporting the locally developed indigenous grow-out technology.

Input 5 (Extension period): Supply of Hatchery-bred Grouper Fingerlings and Machinery for Producing Moist Feeds

The project obtained 2,400 pieces of hatchery-bred grouper fingerlings and supplied to the target fisherfolk and also supplied equipment (pelletizer, mincing machine, and freezer) necessary for production of moist feed which is made of 50% of dry pellet and 50% of fresh fish materials. For Brgy. Victory Island where there is no public electricity supply, a feed production shed equipped with a set of solar power generation system was also constructed by the Project. The detail for this construction is reported as a separate QIP.

Input 6 (Extension period): Training on the Operation of SASUBA and Diving Risks

The project conducted a two-day training course at Brgy. Victory Island on the proper use of the surface air supply underwater breathing apparatus (SASUBA) which was supplied before the extension period. The training was conducted by two licensed divers as the trainers and

included the basics on diving risks for the aquaculture operations.

Input 7 (Extension period): Design of Artificial Feed Preparation Facility

As a part of the environmentally-friendly fish culture system, JICA Study Team designed a feed preparation facility to make supplemental pelleted (moist pellet). This facility is equipped with diesel powered pelletizers and solar powered cold storage equipment; i.e. refrigerators and freezers, for the storage of processed pellet feed. The building has a solar powered electricity supply since there is no electrical power connection in Victory Island. The completion drawing is shown in Figure 2.2-9.

Input 8 (Extension Period): Bidding/Contract for Construction of Artificial Feed Preparation Facility

Though the equipment cost was bigger than the construction cost, this project was handled as the construction project in most priority in quality control in Victory Island. The bidding procedure for the procurement of the project was done among the experienced contractors of the first batch of the QIPs in the same way as PHO (see section 2.2.2).

Open competitive bidding system was adopted in the selection of the contractor and two-way envelope system was used in the submission, and opening of bids in the same way as PHO (see section 2.2.2). Likewise, BOQ or Fixed Unit Cost system was used for the contract.

In the payment process, adjustments were made in the same way as PHO (see section 2.2.2), where the percentage of advance payment and progress payment were adjusted to avoid any delay caused by financial deficit of the contractor.

Input 9 (Extension Period): Construction of Artificial Feed Preparation Facility

In the same manner as PHO (see section 2.2.2), the inspection team of JICA Study Team supervised and monitored the implementation of the project to ensure the quality of construction. Regular site meetings were held with the contractor to monitor the progress of construction and to discuss technical issues encountered in the project, quality and schedule.

(2) Achievement of the Project

Achievement 1: Formulation of Operational Guidelines for Sustainable Grouper Culture

The Project implantation team with staff from GMFDC and municipal agriculture office formulated a guideline for environment-friendly operation of aquaculture for the Project as the first activity and presented it at the opening ceremony on 23rd of September 2014.

Achievement 2: Construction and Delivery of Typhoon Resilient Grouper Cages

The design was made into real products by a fishing gear company (INCA Philippines Inc.)

selected through a nominated selective tender with three fishing gear manufacturers that BFAR Region-8 recommended as potential bidders. All necessary parts were produced in Cebu or Manila factories and transported to the site where construction and assemblage were done.

The cages and other equipment supplied in QIP-8 were listed in Table 2.2-35 and Table 2.2-36.

Table 2.2-35 Grouper cages

	Item	Specification	Quantity
1	Grouper cage for Victory Island	Frame cum float: HDPE 50mm circular Net: 2 m diameter ,1.79 m height, PE 400/12 14k, knotted mesh Circular concrete ring anchor	72 units (2 units for BFAR Guiuan Marine Fisheries Dev. Center)
2	Grouper cage for Camparang	Sane as above but with double layer PE net of 400/12 12k mesh	30 units

Source: JICA Study Team

Table 2.2-36 Netting materials for change net and plastic trap

	Item	Specification	Quantity
1	Netting material for change net	PE Net 400/12 14k, 200MD, 100m	10 bundles
		PE net 400/12, 10k, 200MD, 100m	5 bundles
		PP Rope, 7mm, 7 ply, 200m/roll	15 rolls
		PP Rope, 3mm, 3 ply, 200m/roll	8 rolls
2	Materials for plastic trap	Amazon net, 1-inch mesh, 3ftx30.m	105 rolls
		Amazon net, 3/4-inch mesh, 3ftx30m	30 rolls
		Nylon monofilament thread. #100, 1.4mm	50 kg

Source: JICA Study Team

Construction and distribution of 100 cages as planned were completed in December 2014 which was about a month later than scheduled. The delay was caused partially by slow progress in construction of concrete anchor rings at the Victory Island site because of unavailability of quality aggregate materials and necessary transportation of them from the mainland to the island. Typhoon Ruby which forced all island population to evacuate out of the island also caused additional delay.

Achievement 3: Acquirement of Installation and Operation Techniques on the Introduced Grouper Cage through Participatory Training

The manufacturer demonstrated installation of the completed cages at Victory Island on November 24, 2014. The demonstration was conducted with the beneficiary fisherfolk of the two sites as a training session organized by the Project. Mastering the installation of cages is required for them as they have to do this every time they intend to stock/harvest the fish and change the nets.

The second training conducted for the beneficiary fisherfolk was on construction of change net which involves conversion of net meshes from diamond meshes to square meshes. The training was conducted at Barangay Camparang on December 3, 2014. The net construction materials (fishing net, rope, and twine) sufficient for one additional net to be used as a change

net for every cage frame were distributed to the beneficiary fisherfolk before the training. A supplemental training session was carried out on February 15, 2015 to clarify on the method of cutting net for this conversion as monitoring of fish farming activities started in December, 2014 found the beneficiary fisherfolk in this barangay had been hesitating cutting net to implement the learnt mesh conversion because of some technical uncertainty.

Achievement 4: Installation of Grouper Cages with Fisherfolk

As of early February 2015, 28 beneficiaries out of 70 at Victory Island and 12 beneficiaries out of 30 at Camparang have installed their cages with fingerlings. Feeding at these cages had started. Installation of cages depends on the collection of fingerlings which is a responsibility of the beneficiary fisherfolk. Continuous rough sea condition after delivery of cage nets in the last quarters of 2014 made it difficult for the fisherfolk to collect the fingerlings.

Two activities which were planned but were not achieved within the project period were 1) Supply of pelleted feed and 2) harvesting grouper.

Supplemental pelleted feeds were to be supplied after the majority of cages were stocked with fingerling, which is expected to be done in the next season of fingerlings collection in the summer for the passive fishing methods recommended by the guideline (trap and hook and line). No harvesting was made by the end of March 2015. It is expected after about 8 months from the stocking of fingerlings. Delay in these activities occurred because of the delay in the installation of cages and collection of fingerlings which were affected by rough seas due to bad weather condition that continued in November – December including several typhoons that hit the region.

Achievement 5: Supply of Improved Diving Equipment

The Project introduced a new type of diving equipment (Surface Air Supply Underwater Breathing Apparatus, SASUBA) into the Victory Island for implementation of aquaculture operation under this Project as shown in Table 2.2-37.

Table 2.2-37 SASUBA Diving equipment

	Item	Specification	Quantity
1	SASUBA diving equipment	Compressor with engine	2 units
		Reserve tank	2 units
		Airline hose and regulator set	2 units

Source: JICA Study Team

Achievement 6 (Extension period): Use of Hatchery Produced Fingerlings for Demonstrating a Sustainable Grouper Farming Practices with Lessor Dependency to Natural Resources

The objective of QIP-8 at Guiuan is to revitalize the damaged grouper fish farming for the fisherfolk to recover their source of income, but at the same time, to use the recovery process

as an opportunity to improve the livelihood even better than the state before the Typhoon Yolanda by increasing the long-term sustainability of the aquaculture practices. The current method of grouper farming practiced in the Guiuan waters uses wild juvenile fish as the seed fingerling and trash fish as the feed materials. As this type of fish farming develops and the production increases, the natural fish resources on which the aquaculture system depend decreases. The current aquaculture practice of grouper farming has this contradictory relationship, and therefore, it is unsustainable in the long-term perspective.

This QIP-8 intends to re-direct the current practice of grouper farming to a more sustainable farming system for the next generation and beyond by reducing the dependencies to the natural resources in the two main aquaculture inputs, namely seed fingerling and feed materials. This project intends to recover the livelihood of the grouper fisherfolk, however, it does not aim to increase the short-term profit by increasing production volume but to improve the quality of life by achieving the long-term sustainability of the aquaculture practices. During the extension period, the project focused its activities in the improvements in these two issues (i.e. fingerling and feeds) to make the grouper farming methods more sustainable in terms of dependency to the natural resources.

The grouper cage fish farming currently practiced in the Guiuan area grows juvenile fish caught from the wild as the seed stock and uses fish of low value (trash fish) captured from the nature as feeds. The fish grown to the market size (more than 500g) are sold as live fish at buying stations in the town. The dependency of the two input materials on the natural resources needs to be reduced for the development of sustainable aquaculture. More specifically, fingerlings produced in the hatchery have to replace the wild juveniles and the artificial feeds manufactured from feed factories have to replace the trash fish. This project implemented in actual examples these sustainable aquaculture methods in the project activities.

The fundamental solution with regards to the fingerling in the sustainable aquaculture is to switch the source from the wild-caught juvenile to hatchery produced fingerlings. The project of QIP-8 purchased 2,400 pieces of green grouper[4] fingerlings (about 1 inch long and less than 1g) from a commercial hatchery in General Santos in Mindanao and distributed to the beneficiary fisherfolk after rearing them to 4 inch size at the counterpart BFAR station of Guiuan Marine Fisheries Development Center (GMFDC) for two to three months. The two project site barangays (Brgy. Victory Island and Brgy. Camparang) received 1,000 fish each. About 200 fish were lost during the intermediate growing at GMFDC due to accidental breakdowns of aeration caused by irregular power supply. GMFDC kept the remaining fish of about 200 pieces with the purpose of growing them to breeders for artificial breeding at the center in the future. The center had this species which were already grown to mature size and

[4] Green grouper: *Epinephelus coioides*

intended to use for spawning in the same year when the super typhoon Yolanda devastated the facility including all cages keeping the fish.

Green grouper is not the main species for the grouper farming in the Guiuan area because of lower buying price compared to Suno[5], and the introduction of green grouper fingerlings alone is not expected to affect the switching of the fisherfolk's current practice to a hatchery produced species at once. However, some fisherfolk had shown interest to the species as the availability of suno in the region is getting scarcer in recent years especially after the Multi-Sectoral Environmental Law Enforcement Task Force (MELETF) started enforcing a very strict prohibition of compressor use on fish boat with confiscation of whole fishing boat in the last quarter of 2014. In the Guiuan area, many suno fingerlings are caught by illegal use of cyanide poison by divers who are supplied air for underwater respiration from compressors. Continuation of suno farming was getting difficult and some fisherfolk are considering to switch the other species.

The green groupers distributed to the beneficiary fisherfolk were grown to the market size of more than 500g by the end of December 2015. A part of the fish stocked was sold by the fishermen in December 2015. The project also transported the grown fish as live fish to Tacloban for sale at a seafood restaurant. The buying price was Php400/kg for the fish purchased at Php350/kg from the fisherfolk. Depending on the volume of fish to be harvested, this experimental sale showed that green group farming at Guiuan could be viable. In fact it is the most common species sold in seafood restaurants in Tacloban although the majority is supplied from the fishing villages (not as live fish) closer to the city. The price of green grouper at the buying stations in Guiuan town can reach to Php350/kg during the high price season from December to February, but it could be lower in the other seasons depending on the demands at the overseas markets such as Hong Kong, Singapore and Shanghai in the southeastern Asia.

GMFDC are currently working for importation of hatchery bred suno in the same way the Project did for the green grouper, that is, obtaining fingerlings from a hatchery, grown to the distribution size of about four inches at GMFDC, and distribute for the fisherfolk in the Guiuan area. The artificial breeding of suno is not yet established internationally, and no commercial or public hatchery in the Philippines is currently able to supply constantly the fingerlings of this species. Under the situation, GMFDC started communicating in early 2015 with a government hatchery in Bali Island in Indonesia, but the importation was not realized by the end of December 2015. It also tried to import from Japan, and the JICA Philippines office contacted the Fisheries Research Agency of Japan for possible assistance to BFAR for the technology transfer although it did not materialize either. GMFDC under BFAR will continue to seek ways to import the suno fingerlings and to acquire the breeding technology. It

[5] Suno (Waray-waray), English name:- Coral Trout, Scientific name:-*Plectropomus leopardus*

can be seen as a project's achievement that the project's importation of green grouper provided an opportunity for the counterpart institution, BFAR, to start working for the importation of suno in order to substitute the wild-caught suno juvenile to the artificially produced fingerlings as part of conservation effort to preserve this specific fish resources in the nationally declared marine protected area, GMRPLS.

Achievement 7 (Extension period): Introduction of Moist Feeds for Demonstrating Sustainable Fish Farming Practices with Lesser Dependency to natural Resources

The current practice of grouper farming at Guiuan uses trash fish as a single source for the grouper farming feeds. Pelleted feeds manufactured by commercial feed companies for grouper farming are available already in the Philippines but fisherfolk do not use it. According to their experience using those pelleted feeds, suno did not grow as fast as when fed with trash fish. It is also true that feeding of pelleted feeds to the fish in cage set at the bottom of sea is not easy because the dry feeds tend to float underwater not like chopped trash fish which remain in water column. Grouper as a demersal fish does not have the feeding habit to rush to dry pellets like milkfish. A part of the floating and dispersing feed would not be consumed by the fish but would be wasted. Because of these reasons, it is not realistic to expect the fisherfolk at Guiuan to immediately change to dry pellets as feeds for suno from the current practice of using trash fish. Under the circumstance, the Project aimed to introduce "moist feed" made of a mixture of dry pellet and trash fish so that the complete dependency to trash fish is partly reduced. Moist feeds have the advantage of having about the same specific gravity as the trash fish so it remains in the water column and is also soft to be more palatable to grouper than the dry feeds.

Trial production and development of trash fish were done at GMFDC and tested with the green grouper kept in the cages. The feed made of 50% trash fish and 50% dry pellet (on weight bases) gave a good result in the acceptance by the fish. For making moist feed, trash fish and dry pellet of equal weight were combined and passed twice through a meat mincing machine of heavy duty household type to make a homogenized "dough" of the two ingredients. Then it was passed through a pelleting machine to yield pelletized moist feed. The project procured two sets of pelleting machine for the two project sites of Brgy. Camparang and Brgy. Victory Island.

Training on production of moist feeds to the fisherfolk was carried out at GMFDC and the produced feeds were used at their cages. It was agreed that the feeds for the beneficiary fisherfolk at the Brgy. Camparang site were to be produced by the fisherfolk at GMFDC as the barangay is close to the center. For the production of moist feed, a set of moist feed production equipment composed of pelleting machine, freezer and mincer machine etc. was installed. Victory Island is far from the town of Guiuan and it takes about one hour by fishing boat. There is no public power supply system at this island. So another set of moist feed production

was decided to install at the barangay with a solar power generation system.

The shift from the current practice of 100% utilization of trash fish to moist feeds is expected to be achieved gradually. This work will be continued by GMFDV after the termination of project activity.

Achievement 8 (Extension period): Analysis on the Economic Performance of Suno Grouper Farming

The project completed the installation of grouper cages in October 2014, and the fisherfolk started stocking fingerlings to the cages. As mentioned earlier, there was no funding support for buying fingerlings to the fisherfolk from the project, but the fisherfolk was asked to manage by themselves to collect or purchase them. Those who started stocking suno fingerling earlier grew the fish to marketable size by the end of December 2015.

The buying price of suno varies greatly depending on season. The suno procured at the buying station are packed alive in plastic bags with pure oxygen and exported to overseas live fish markets. The packed fish in styrofoam boxes are transported to Tacloban on land and then to Manila by air, where they are further exported to the final destinations in southeastern Asia such as Hong Kong, Shanghai, and Singapore. This fish in bright crimson color is highly appreciated by Chinese people in these markets who use the fish for special occasions and the price increase to the peak just before and during the Chinese New Year. Those buying stations in Guiuan are operated by the companies established with the financial supports from Chinese establishments who are involved in the live fish transportation and export system. The grouper fish farming at Guiuan is the original supply source for this super high-end live fish value chain system.

The buying price of suno at the buying stations rises up to Php 3,000 to 4,000/kg, which is more than 10 times higher than the price of high value fish in local and domestic markets. These buying stations buy suno in the size between 500g to 1kg in body weight. Fish below 500 g are not purchased because of low demand in the overseas markets and more than 1 kg (called over-sized) also fetch a very low price per unit of weight because of the difficulty in transportation as live fish.

The grouper famers at Guiuan target harvesting during the season with highest buying price, between the Christmas holidays to the Chinese New Year. The beneficiary fisherfolk of QIP-8 started stocking fingerlings after the cages were installed in October 2014 and now (in January 2016) they are waiting for the best timing for harvest for maximum profit. There were 6 fishermen of Victory Island who harvested their suno on January 3rd. The income and expenditure data were obtained from the 6 fishermen as presented for the summary in Table 2.2-38.

Table 2.2-38 Grouper farming harvesting and selling summary for six Victory Island fishermen

No.	Date of stocking	No. stocked (pcs)	Mortality (pcs)	Survival (pcs)	No. harvested fish	Stock after harvest (pcs)	Date of harvest	Rear-ing Period (days)
1	2014/12/12	40	10	30	10	20	2016/1/3	387
2	2014/12/16	60	10	50	12	38	2016/1/3	383
3	2014/12/20	38	8	30	8	22	2016/1/3	379
4	2014/11/10	65	12	53	12	41	2016/1/3	419
5	2014/11/9	30	4	26	10	16	2016/1/3	420
6	2014/12/2	50	12	38	12	26	2016/1/3	397
Tot		283	56	227	64	163		
Avg		47.2	9.3	37.8	10.7	27.2		389

No.	Harvested fish weight (kg)	Sale value (Php)	Average unit price (Php/kg)	Expense for fingerlings (Php) (a)	Expense for trash fish (Php) (b)	Current profit/loss
1	12.15	14,270.00	1174.49	10,000.00	4,500.00	-230.00
2	54.83	21,040.00	383.73	15,000.00	8,000.00	-1,960.00
3	8.29	14,910.00	1,798.55	9,000.00	5,600.00	310.00
4	12.71	19,040.00	1,498.03	13,000.00	7,000.00	-960.00
5	11.42	13,680.00	1,197.90	8,000.00	5,000.00	680.00
6	12.37	19,390.00	1,567.50	12,000.00	5,500.00	1,890.00
Tot	117.77	102,330.00		67,000.00	35,600.00	-127.00
Avg	18.63	17,055.00	1,270.03	11,166.67	5,933.33	-45.00

No.	Remaining stock after harvest	Average unit Price (Php/kg)	Estimated value of remaining fish	Estimated final profit/loss (c)	Estimated ROI (c/(a+b)	Daily profit (Php/day)
1	20	1,270.03	28,540.00	28,310.00	195%	77.56
2	38	1,270.03	66,626.67	64,666.67	281%	177.17
3	22	1,270.03	74,048.33	74,358.33	509%	203.72
4	41	1,270.03	65,053.33	64,093.33	320%	175.60
5	16	1,270.03	109,980.80	110,660.80	851%	303.18
6	26	1,270.03	257,752.00	259,615.00	1,484%	711.27
Tot	163		601,974.13	601,704.13		1,648.50
Avg	27.2		100,3329.02	100,284.02	607%	272.75

Source: JICA Study Team

Based on the data obtained from the 6 fishermen of Victory Island who harvested on January 3, 2016, they stocked the fish between November and December 2014 and harvested a part of them in January 2016. The rearing period for the fish harvested was more than one year (389 days). The average number of stocked fingerlings was 47 and the average mortality before the harvest was 9. They harvested on average 11 pieces of fish out of the remaining 38 fish (or sold 29% of the standing stock per person on average). The total weight of fish sold by 6 fishermen was 117.77 kg (16.63kg/person) and the total value for the harvested fish was Php 102,330.00 (Php 17,055.00/person). The overall average price of suno sold was Php 1,207.03/kg and they were graded in three categories. The highest grade called “red grade” fetched Php 2,300.00/kg, the second grade called “pink grade” fetched Php 1,800.00/kg, and the lowest grade called “brown grade” was Php 1,100.00/kg. The red grade was more than twice higher than the brown grade.

The average expenditure for the 6 fishermen for buying fingerlings was Php 11,066.67 and the average expenditure for trash fish (as feeds) was Php 5,933.00. The average balance at the time of harvest in January between the total expenditure and the gross revenue for the partial harvest was almost zero (a loss of Php 45.00) suggesting they had just paid off all the expenditure for growing the fish by the sale revenue when they harvested 29% of the standing stock. This means that the sales revenue expected from the 71% of fish would be the net profit for the operation as the fish are going to be sold shortly by the Chinese New Year (February 8 in 2016).

Examining the sales data in detail, it would be noted that the fish sold were all close to 1 kg size or the highest in the marketable range. So the early sales before the Chinese New Year was probably for disposing the large sized fish to avoid the low unit price as oversized fish. The data of selling large sized fish also infer that the fish remaining in the cages were already in the marketable size and the fisherfolk were waiting to sell near the Chinese New Year when the buying price is highest. Then, they do not need to spend a lot of money for feed as the fish are already more than 500 g and the expected time of harvest would come within one month. Based on these speculations, if we assume that the fishermen sell the remaining 79% of fish at the average price of Php 1,207.03/kg (the same price as on January 3rd), the expected total revenue per person for the 6 fishermen would be Php 28,310.00 ~ 259,615.00/person depending on the fisherman's stock and the average would be Php100,284.00/person. The return on investment (net profit/total investment) would be very high at 607%. The actual price of fish as the fishermen expect may be even higher than the average price in the January sale (Php 1,207.00/kg) and will increase the profit.

The grouper farmers of Guiuan target to sell their fish during the peak price season between Christmas and Chinese New Year. For this season so far, only the 6 fishermen sold a part of their stock in January. They and all the other grouper farmers are waiting for the price to rise further until the Chinese New Year. There were some fishermen who sold their stock during the time of barangay fiesta in August 2015 for paying for their celebration needs. The situation was the same in the other site of Brgy. Camparang. Some fisherfolk sold their stock in December 2015 and also in August 2015 during the fiesta time. The summary of harvest data for the two barangays as of January 2016 since the rehabilitation of cage facilities by the project in October 2014 was presented in Table 2.2-39. At that time, a total of 20 fishermen sold 359.92 kg of fish and received a total of Php 206,194.00 from the sales. The average per person was then Php 17,493.50. The average unit price sold by the Camparang fishermen was much lower than the price of the Victory fishermen as their fish were all graded as brown groupers because they keep the fish near the surface where fish lose the bright body color. The reason is assumed to be solar radiation reaching to the fish in the cages set in shallow water. The total profit of the Camparang fish farmers is less than half of the Victory fish farmers partly because of the lower grade of fish.

Table 2.2-39 Aquaculture production Data of Guiuan QIP-8

	Gross sale	Weight	Beneficiary	Average gross sale
Brgy. Victory Island				
Aug 2015 (Fiesta)	74,875.00	50.10	8	9,3591.38
Jan 2016 (Winter sale)	102,330.00	111.77	6	17,055.00
Total	177,205.00	161.87	14	12,657.50
Brgy. Camparang		323.74		
Aug 2015 (Fiesta)	19,230.00	50.10	4	4,807.50
Dec 2015 (Winter sale)	9,759.00	20.74	2	4,879.50
Total	28,989.00	36.18	6	4,831.50
	206,194.00	359.92	20	17,493.50

Source: JICA Study Team

Because the beneficiary fisherfolk of this project are still holding the fish waiting the price hike toward the Chinese New Year as of this report writing, it is not possible to show the total sale value and its livelihood contribution in this project yet. Based on the previous analysis made for the 6 fish farmers of Victory Island, however, it is obvious that the economic profitability of grouper farming at Guiuan is very high. The reason for the high profitability originates from the fact that they are taking the major inputs for the aquaculture (fingerlings and feeds) from the wild without paying the proper social costs to maintain the natural resources. If the costs being spent by BFAR, DENR, LGU and all the nature conservation associations are included in the cost/profit calculations for the entire society, there would be much less or even negative profit generated in the current grouper farming practiced at Guiuan.

Achievement 9 (Extension period): Lobbying Stakeholders for Amendment of Guiuan Fisheries Ordinance and Advocating the Importance of Sustainable Aquaculture Development

If the project successfully demonstrate the new direction of sustainable aquaculture with less dependency to the natural resources in the project activities, that technical achievements need to be disseminated to the other places with administrative backing under a supportive policy framework. The sea inside of the Guiuan municipal boundary is defined[6] as Guiuan Marine Reserve Protected Landscape and Seascape (GMRPLS) and a part of National Integrated Protected Area System (NIPAS) by the presidential proclamation 469 on September 29, 1994, and Protected Area Management Board (PAMB) is specified as the regional management institution. On the LGU level, the management and protection of natural resources is handled by Fisheries and Aquatic Management Council (FARMC) legally authorized by the Guiuan fisheries ordinance No. 7 Series of 2010. The advocative activities were carried out in the project to facilitate the sustainable development of grouper farming to these relevant institutions and other stakeholders. In practice, the project intended to institutionalize the demonstrated sustainable aquaculture development technology by facilitating an amendment

[6] The Guiuan water is originally defined as a GMRPLS by P.P 1801 on 11/10/1978, and later integrated into NIPA on P.P. 469 on 9/29/1994.

of the fisheries ordinance regarding the use of compressor for aquaculture operations.

This QIP project worked for showing sustainable aquaculture technologies in the actual examples of the introduction of hatchery bred seed fingerlings and the moist feed. The hatchery produced fingerlings actually used, however, was green grouper and not suno which is the main target species of Guiuan fisherfolk. The moist feed used was a mixture of artificially made pelleted feeds and trash fish combined at 50%:50% ratio. Therefore, what was demonstrated in the project was actually the direction to which the future grouper aquaculture development has to progress. The concerned stakeholders need to work continuously for the realization of more completely sustainable aquaculture operations in the Guiuan waters. This requires deep understanding by those stakeholders on the sustainable aquaculture with less dependence to the natural resources.

This project kept the relationship of cooperation with these concerned stakeholders while implementing the field activities of introducing green grouper and moist feed in the grouper farming, keeping in mind that we were advocating sustainable aquaculture with actual practical examples to them so that they can continue what we have achieved in the project. An activity which the project did in relation to this purpose was the work for the amendment of municipal ordinance regarding the use of compressor for air supply to the diver fisherfolk.

As discussed above, the price of suno at the live fish buying stations at Guiuan could increase up to Php 3,000 - 4,000/kg during the peak winter season. A fisherman selling one kilogram of suno can receive revenue far more than the amount by selling a whole day's catch of other fish to a local market. This extremely high income prospect motivates fishermen with the very incentive to catch this species selectively from the nature. They will even take risks of using illegal fishing methods for catching suno by dive fishing using explosive substances or toxic cyanide agents. The fishermen in the region dive using air supplied from a compressor installed on a fishing boat. Because of these illegal fishing practices, the municipal fisheries ordinance of Guiuan prohibited the use of compressor installed on a fishing boat. And as it is mentioned in the previous section, the municipal waters of Guiuan is declared as Guiuan Marine Reserve Protected Landscape and Seascape (GMRPLS) in National Integrated Protected Area System (NIPAS) and thus the ordinance was strictly enforced. Since the last quarter of 2014 especially, the Multi-Sectoral Environmental Law Enforcement Task Force (MELETF) activated the patrol with confiscation of fishing boat which have compressor system on board. Some fisherfolk at Victory Island moved the cages to shallow areas where feeding can be done without deep diving.

The grouper farmers at Victory Island set the cages at the bottom of seabed at around 20 m from the surface and feed the fish every other day by diving. This depth of cage setting is necessary for making the color of the fish bright and red grade as screened at the buying stations, fetching a price of more than twice higher than the price of brown grade. Fish retains

the bright color when they are reared at the depth at which the solar radiation penetrates at a greatly reduced rate and live in a similar environment as the natural condition for a demersal fish. An added advantage of this rearing method is the low chance of infestation by biofouling organisms on the cage materials which often cause various management problems. The operation of this culture method requires dealing with pressure about two times higher than at the surface such as stepwise acclimations for the vertical movement of cages. It is a different set of culture technology developed by the local fisherfolk of Victory Island[7].

In order for the Victory Island farmers to be able to continue doing this unique and brilliant aquaculture system which requires diving for various works like feeding and maintenance of cage at deep water, the project decided to request the municipal government to allow the compressor aided diving for aquaculture operation purposes as a temporary gratuitous permit during the project implementation period.

The fisheries ordinance of Guiuan municipality promotes aquaculture development in principle as an alternative fisheries development policy which enables fisheries development and preservation of natural fish resources at the same time. While the article in the same ordinance contains a total ban of compressor use, which is necessary for continuous implementation of Victory Island grouper culture, the total ban regardless of its purpose was actually preventing the development of local aquaculture. It could be said that the ordinance contains a contradiction at least with regard to this article for the particular condition at Victory Island.

Amendment of the ordinance requires an approval by the municipal legislative body, Sangguniang Bayan (S.B.) and the Mayor. Prior to that advices from all relevant stakeholders such as public offices under DA-BFAR and DENR and nongovernment organizations working for environmental preservation, educational institution, and local fisherfolk communities are sought. This means working for the change of the ordinance will be an excellent opportunity for advocating the sustainable grouper farming in actual practice by the project. This is the implicit but important true objective behind the direct objective of rehabilitation of grouper farming for livelihood recovery for the grouper fisherfolk.

The municipal ordinance contains a section in which the mayor can issue a gratuitous permit for approving the restricted activities by the ordinance with special reasons such as for research purposes. This is easier to obtain than change of the municipal ordinance. Therefore, a two-step strategy was set to obtain first a temporary gratuitous permit for the compressor use at the Victory Island for the period within the project implementation, and then by the end of the project, have the municipal government amend the article regarding the total compressor ban.

[7] GMFDC once documented this farmer's research for presentation in a national seminar.

The actual section regarding the use of compressor in fisheries, as shown below, states that the main reason of the total ban of compressor is the unhealthy effects to the fisherfolk divers because of inappropriate and low quality parts in the air supply system using an industrial type compressor and other substandard quality materials. Based on tenor of the section, the illegal use to deplete the natural resources is a secondary reason for the total ban. Therefore, it was considered essential to supply a type of compressor system that was properly designed for supplying air for diving. The project procured and supplied two sets of readymade systems of surface air supply underwater breathing apparatus (SASUBA) to the Victory Island fish farming association.

> *Section 68. USE OF COMPRESSOR AS AN ACCESSORY IN FISHING – Use of industrial compressor as a* breathing *apparatus is very hazardous to the health of our fishermen as the air filter system is not designed for breathing. It usually results to headache and nausea. Since the diver is directly connected to a hose for breathing, any obstruction of the hose results to directly cutting the air supply to the diver, causing an emergency ascent and eventually, decompression sickness, paralysis and even death. This method is highly depletive. The use of compressor in fishing is therefore strictly prohibited in the municipal waters. The mere presence of compressor mounted in the fishing vessel shall be sufficient ground for presumption that this is being used for fishing and therefore shall be confiscated.*

The project held several meetings with the core members of MELETF, PAMB, FARMC, the secretary and the members of agriculture committee of S.B. in the first quarter of 2015 and finally obtained the gratuitous permit on March 15, 2015.

The gratuitous permit was a temporary measure for the fish farmers at the Victory Island to continue legally operating the grouper cage culture using the supplied diving system during the project period. As planned, the project continued to approach the relevant stakeholders to advocate the sustainable aquaculture development with application of indigenous technology of deep water grouper culture which requires the use of compressor on board. The S.B. secretary gave advise to try for an amendment of the section which is much simpler in the official process rather than to change the whole ordinance. The project followed his advice and supplied necessary technical information to the secretary who in turn drafted the amendment and presented to the agriculture committee. A legal attorney of BFAR RO-8 was also consulted for the drafted article and provided recommendations for the improvements. The work for amending the ordinance was carried out intensively in the last quarter of 2015 and the amendment was finally approved in the plenary session of S.B. on January 7, 2016.

During the training session conducted at the Victory Island on November 4 to 5, 2015 to understand the diving risks and the use of the provided SASUBA system, it was noticed that many participants (members of beneficiary fish farming association at Victory Island) were

affected and showing symptoms of decompression sickness (diving sickness). In addition to the use of inappropriate diving compressor system, lack of knowledge on diving risks seems to have made the effect even more serious. One of the diving instructors who were called from a NGO project for alternative livelihood support for fishing communities in Palawan where the problem with illegal fishing activities were more frequently observed pointed out the symptoms must be related to decompression sickness.

Table 2.2-40 shows the summary of decompression sickness symptoms classified in 6 categories observed among the 59 fisherfolk participants during the training sessions at the Victory Island. Fifty seven persons showed some symptoms which were considered to be related to the disease. The two remaining participants who did not have any problem were new members of the fish farming association and had less than one year of diving experience. Fifteen persons (25.4%) showed irreversible damage typical to the decompression sickness as classified in Category 1 to 4 in Table 2.2-40. The results showed that one quarter of the fishermen in the Victory Island were possibly affected severely by the disease. The barangay captain recalled that there were more than 20 fishermen who apparently died of diving related disease/accidents. Most diving operation are assumed to be connected to illegal fishing activities and this may have caused hesitations to report or even concealing of the disease occurrences to the responsible government authorities. This may have resulted to exaggeration of the problems at the site and lack of public services for provision of appropriate diagnosis and treatments for the severe health problem. Lack of proper understanding on the decompression sickness is another cause for this problem at Victory Islands. As the depth of diving around the island is limited to about 20 m from the surface, the occurrence of the disease should have been low if the fishermen have had limited dive within the duration that does not cause decompression sickness. Education on the knowledge on the disease is another area necessary to reduce the problem. Because of this finding, the registration process of the compressor for aquaculture use based on the new amendment of the fisheries ordinance will include a mandatory training session for the fisherfolk user of compressor to learn the diving related risks. The training handbook (Appendix-7) prepared for the SASUBA training by the project should be a good starting point for developing such a training course.

Table 2.2-40 Observed symptoms of decompression disease during the SASUBA training at Victory Island on November 4 - 5, 2015

Category of Symptom		Observed symptoms	Severity of symptom
1	Lymphatic edema	Swelling on arms, shoulders, or legs. Aging persons more frequently affected. Takes two months to recover most cases.	Severe, Irreversible
2	Spinal cord decompression sickness	Paralysis from west down is usual, sometimes half body. Urination difficulty and sexual impotence is associated.	
3	Brain decompression sickness	Convulsion attack, disturbance of consciousness, high fever. Most succumb to death after a day	
4	Pulmonary decompression sickness (Chokes)	Shortness and difficulty in breathing, chest pain, blood sputum, needed to breathe through the mouth, lungs when x-rayed had holes, breathy speech	

Category of Symptom		Observed symptoms	Severity of symptom
5	Arthritic pain, muscle pain	More felt itchy skin, arthritic pain very common, on all joints of four limbs	Light, reversible
6	Inner ear decompression sickness	Vertigo, nausea, vomiting, temporary hearing loss, observed often but recovery is high	

Source: JICA Study Team

Achievement 10 (Extension Period): Design for Artificial Feed Preparation Facility

JICA Study Team designed the Artificial Feed Preparation Facility so that the solar panel will be installed on the roof and the battery and processing equipment inside the building. Taking into consideration that the facility is adjacent to the sea, concrete roof slab was applied to maintain the durability of the structure.

Achievement 11 (Extension Period): Bidding/Contract of the Construction of Artificial Feed Preparation Facility

In the selection of prospective bidders, JICA Study Team invited three Contractors that experienced the QIP construction activities in the first batch.

As earlier mentioned, two-way envelope system was adopted in the Bidding.

Opening of the bids were done with the presence of the bidders. The technical proposals were opened first and then the cost proposals were opened for bidders who passed the technical review. Three companies participated in the bidding and all of them passed the technical review. DAYBREAL ENTERPRISES-ENGINEERING & CONSTRUCTION had the lowest bid which was also within the QIP budget. Therefore, DAYBREAL ENTERPRISES - ENGINEERING & CONSTRUCTION was nominated as the first priority for arithmetical evaluation. As a bidding procedure, both the technical and financial proposals were fully examined and questions were made to the contractor. Since its position as first priority was not changed, JICA Study Team issued the Award and made the contract with the contractor.

BOQ/Fixed Unit Cost system was adopted for the contract since additional quantities or change order was expected.

Considerations were made for payment conditions to avoid any delay caused by financial deficit. Since the contract period was only as short as three months, price escalation clause was not also applied. And the similar to PHO (see section 2.2.2), three months was adopted for the defects liability period.

During the project implementation, the contractor issued a request for time extension with the reasons of changes in the scope of works and unavailability of construction material. JICA Study Team and LGU discussed and evaluated the reasonability, and granted the extension of 30 days.

Achievement 12 (Extension Period): Construction of Artificial Feed Preparation Facility

The quality of all construction material was controlled with the same method applied in PHO (see section 2.2.2). In the same approach with PHO, JICA Study Team also made the deployment/monitoring plan for inspection for quality control based on the execution plan and detailed construction schedule which was submitted by the contractor. The center line, depth and bearing capacity was expected during foundation excavation, and re-bar of the column was inspected before formwork closure prior to concreting. While excavating the foundation, it was noticed that seawater was infiltrating through the seawall. Therefore, the foundation concrete was covered with plastic sheets to protect it from seawater.

Mixing ratio, slump test, the skill of mixer operator, placing method and vibrator using, etc. were checked during trial mixing in order to inspect the concrete works.

In case any failure or defaults in the works were noted, the inspector instructed the contractor of correspond corrections, demolition and sometimes rework.

The following are the main site instruction given to the contractor during the construction of the facility.

- Inspection of excavated foundation elevation should be held.
- Submersible pump should be used for dewatering underground water during foundation works.
- Compaction of base foundation should be done properly.
- Casted concrete should not be submerged in underground water at least 24 hours.
- Re-bar placement should be inspected before form works closure of column.
- Concrete spacer should be placed properly.
- Compaction of backfilling materials should be inspected.

In the same case as PHO (see section 2.2.2) regarding documentations required to be submitted, the contractor didn't acquire sufficient knowledge through construction of the feed preparation center, and they need to learn more in order to be able to effectively manage their construction schedules.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-41 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Lapu-lapu farmed in environmentally-friendly and disaster resilient fish cage is harvested (kg/cage)	50 kg	46	0	0	78.96

2) Fisherfolk gain stable income by farming lapu-lapu (PHP/family/year)	100,000 PHP	92,000	0	0	100,284
3) Fisherfolk gain the capacity for management and farming technology using environmentally-friendly and disaster resilient fish cage (number of fisherfolk)	100 fisherfolk	0	0	100	100
4) BFAR and Municipal officers master the technology for procurement, management and operation of environmentally-friendly and disaster resilient fish cage. (number of BFAR and Municipal officers)	5 persons	0	0	5	5

Source: JICA Study Team

The amount of harvested lapu-lapu and income of the fish farmers exceeded initial expectations. Apart from these, the number of fish farmers trained on fish farming techniques and knowledge on management has also reached the initial expectations. With Lapu-lapu being merchandised in high prices, its culturing has conventionally been known to bare good profit. Through the implementation of the QIP, the participant fish farmers experienced that even higher benefit can be attained even when adopting environmentally-friendly fish culture practices. This is expected to contribute to further establishment of sustainable Lapu-lapu culture in the area.

2.2.9 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market (Guiuan) (QIP-9)

(1) Inputs

Input 1: Design of Reconstruction of Guiuan Public Market

Through the damage assessment survey of Guiuan Public Market by JICA Study Team, it was found that the Upper part of the building was damaged, and the concrete structure (Building Frame) seemed not affected seriously. But as the Municipality reported that it had suffered from fire and earthquake, the quality of the concrete frame was suspicious by visual inspection and noted with disintegration. Thus the reconstruction of the whole concrete frame was planned.

The JICA Study Team reviewed the technical drawing for the Public Market prepared by the Municipality. As a result of review, necessary modifications were made for foundation, pillars and beams which were found with insufficient strength. The roofing system was also revised in the same manner with the PHO (see section 2.2.2) in order to reinforce its structure, particularly for the truss and roofing. The modified drawing was used as the technical drawing for the Public Market. A completion figure is shown in Figure 2.2-10.

Input 2: Bidding/Contract of Reconstruction of Guiuan Public Market

In the same way as PHO, bidders were limited among local contractors. In selection of the local bidders, JICA Study Team requested recommended contractors from the Municipality.

After collecting information on the recommended contractors, JICA Study Team issued the invitation for bid to the contractors who passed PQ.

In the same way as PHO, JICA Study Team adopted open/competitive bidding system and two-envelope system for the bid opening.

For the contract, BOQ system was adopted. Payment condition was also stipulated in the same way as PHO to avoid any delay caused by the financial deficit.

Input 3: Reconstruction of Guiuan Public Market

In the same way as PHO, JICA Study Team made the deployment/monitoring plan of Inspectors for quality control. Moreover, JICA Study Team called for regular site meetings with the contractor to monitor the progress and quality of construction as compared with the contractor's submitted construction schedule, and discussed the technical issues encountered by the contractor.

Input 4: Technical Transfer to LGU Engineer

Generally, it was noted that the poor construction quality intensified the damage of buildings caused by Typhoon Yolanda in Leyte and Samar. Through the collaborative works of design, technical specification, estimation, tender, contract and construction supervision of the reconstruction of Guiuan Public Market, JICA Study Team transferred the knowledge and skills to engineers of the Municipality, with the purpose of enabling them to handle recovery projects by themselves in the future.

(2) Achievement of the Project

Achievement 1: Revising Design of Guiuan Public Market for Disaster Resilient Reconstruction

Based on the technical drawings of the Guiuan Public Market prepared by the Municipality, JICA Study Team revised the designs for the critical section of the superstructure such as foundation, pillars and beams. In the same way with the PHO, reinforcing measures were particularly examined for the truss and roof. Japanese style reinforcing measures that were applied are as follows.

a) Solid connection was employed by; 1) embedding anchor plate (L shape) in the concrete column, and 2) fixing between anchor plate and truss by bolts.
b) Wooden truss was used for Guiuan Public Market adopting the existing Public Market for anti-corrosion effect as the location is near the coastal side.
c) In the same way as PHO, Mega-Rib was adopted for roofing system with domestically available material (0.5mm thickness, pre-coated galvanized sheet).

Achievement 2: Bidding/Contract of Reconstruction of Guiuan Public Market

JICA Study Team collected the company profile from five companies that were recommended by the Municipality and sent bid invitation to three companies that passed through PQ procedure.

As described above, JICA Study Team adopted the open/competitive bidding system and two-envelope system.

Opening of the bids were done with the presence of the bidders. Fist, the technical proposals were opened. Cost proposals were opened for bidders who passed the technical review. Three companies participated in the bidding and one of them passed through technical review. Subsequently, the financial proposal of PABLO S. LABASBAS CONSTRUCTION, which passed through the technical review, was opened. After confirming that the financial proposal was within QIP's budget, PABLO S. LABASBAS CONSTRUCTION was nominated as the first priority for arithmetical evaluation. As bidding procedure, both of technical and financial proposals of the contractors were fully examined and evaluated. Since PABLO S. LABASBAS CONSTRUCTION qualified the evaluation, JICA Study Team issued Award and made the contract with the contractor.

In the same manner with PHO (see section 2.2.2), BOQ/Fixed Unit Cost system was adopted for the contract since additional quantities or change order were expected.

Considerations were made for payment conditions to avoid any delay caused by financial deficit. Since the contract period was only as short as six months, price escalation clause was not applied. And the similar to PHO project, three months was adopted for the "Defects Liability Period".

In the course of the project duration, the contractor requested for time extension with the reasons of 1) shortage of the construction materials due to Typhoon Yolanda, 2) high groundwater level, 3) effect of Typhoon Ruby, and 4) shortage of truss timber material, etc. JICA Study Team and the Municipality discussed and evaluated the basis, and accepted the extension for 60 days.

Achievement 3: Reconstruction of Guiuan Public Market in a Disaster Resilient Form through Appropriate Construction Management

The quality of all construction material was controlled with the same method applied in PHO (see section 2.2.2).

In the same way with PHO, JICA Study Team made the deployment/monitoring plan of Inspectors for quality control based on the execution plan and detailed construction schedule which was submitted by the contractor.

The inspectors inspected center line, depth and bearing capacity of foundation excavation. Re-bar of column was inspected before formwork closure prior to concreting.

Inspection of concrete works were conducted on trial mix, mixing ratio, slump test, the skill of mixer operator, placing method and vibrator using, etc.

In case any failure or defaults in the works were noted, inspector issued site instruction to contractor, instructing correspond corrections, demolition and sometimes rework.

The following are some of the site instruction given to the contractor during the reconstruction of Guiuan Public Market.

- Equipment for Demolition works was instructed to augment as they were not sufficient to respond the demolition volume.
- Construction planning was required for on time deployment of manpower and equipment, and procurement of materials as scheduled.
- Use of submersible pump was instructed for dewatering.
- Proper compaction of backfilling using plate compactor was instructed.
- Misalignment of column on third lift was found and removal and replacement was instructed.
- Discard concrete mix, non-compliance of required time of pouring
- It was instructed that casted concrete should not be submerged in underground water at least 24 hours
- Some material for truss fabrication was rejected because of cracks.
- Some backfilling materials were instructed to be replaced due to sub-standard.

In the same case as PHO, regarding documentations required to be submitted, the contractor didn't acquire sufficient knowledge through reconstruction of Guiuan Public Market, and they need to learn more in order to be able to effectively manage their construction schedules.

Achievement 4: Technical Transfer to LGU Engineer

With the same methodology applied in the Tolosa Multi-Purpose Livelihood Building (see section 2.2.3), JICA Study Team transferred knowledge and skills to engineers of the Municipality of Guiuan through the series of project activities with the purpose that they would become able to handle future recovery projects by themselves. The contents of technical transfer are also the same with those in the Tolosa Multi-Purpose Livelihood Building.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-42 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Municipal capacity and skills of its engineers for project management are improved.	Improved	Not Enough	Not Enough	Improved	Improved
2) Public Market is rebuilt with appropriate design and within construction schedule.	Rebuilt	Constructed	Collapsed	On Going	Rebuilt
3) Revenue by public market use fee is recovered. (Peso / Month)	4,000	3,750	0	0	411,494

Source: JICA Study Team

Through the QIP, the public market has been reconstructed in a more disaster resilient manner, which also resulted in revenue that is far more than initial expectations. This suggests that the facility satisfies requirements of both the LGU and tenants, and that the facility will be utilized in a sustainable manner. In addition, the capacity of the Municipal Engineers in project management, which has been improved through the QIP is expected to contribute to future construction of public facilities through appropriate supervision and management.

2.2.10 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Slaughter House (QIP-10)

(1) Inputs

Input 1: Design of Reconstruction of Slaughter House

Through the damage assessment survey of Slaughter House by JICA Study Team, it was found that the roof of the main building and equipment were damaged, but the concrete structure (building frame) including the truss had no serious damage. Therefore, reconstruction Slaughter House was planned through repair of roof, interior/exterior renovation and provision for equipment. On the other hand, the livestock shed located next to the Slaughter House was completely destroyed and hence planned to be newly reconstructed.

The JICA Study Team reviewed the as built drawing for the Slaughter House prepared by the Municipality. As a result of review, necessary modifications were made for foundation, pillars and beams which were found with insufficient strength. The roofing system was also revised in the same manner with the PHO (see section 2.2.2) in order to reinforce its structure, particularly for the truss and roofing. The modified drawing was used as the technical drawing for the Slaughter House. A completion figure is shown in Figure 2.2-11.

Input 2: Bidding/Contract of Reconstruction of Slaughter house

In the same way as PHO, bidders were limited among local contractors. In selection of the local bidders, JICA Study Team requested recommended contractors from the Municipality. After collecting information on the recommended contractors, JICA Study Team issued the

invitation for bid to the contractors who passed PQ.

In the same way as PHO, JICA Study Team adopted open/competitive bidding system and two-envelope system for the bid opening.

For the contract, BOQ system was adopted. Payment condition was also stipulated in the same way as PHO to avoid any delay caused by the financial deficit.

Input 3: Reconstruction of Slaughter house

In the same way as PHO, JICA Study Team made the deployment/monitoring plan of Inspectors for quality control. Moreover, JICA Study Team called for regular site meetings with the contractor to monitor the progress and quality of construction as compared with the contractor's submitted construction schedule, and discussed the technical issues encountered by the contractor.

Input 4: Equipment of Reconstruction of Slaughter house

Most of the equipment used in the Slaughter House was damaged during Typhoon Yolanda and were not functional. In order to resume the functions of the Slaughter House, as set of lines for slaughtering cows and pigs needed to be repaired. Therefore the necessary equipment were examined with the Municipal Meat Inspector and repaired under the QIP.

Input 5: Technical Transfer to LGU Engineer

Generally, it was noted that the poor construction quality intensified the damage of buildings caused by Typhoon Yolanda in Leyte and Samar. Through the QIP, collaborative works on facility design, cost estimation, bidding, contract, and construction supervision were done with the relevant staff of the Municipality in order to transfer knowledge and skills with the purpose of enabling them to handle recovery projects by themselves in the future.

(2) Achievement of the Project

Achievement 1: Revising Design of Slaughter house for Disaster Resilient Reconstruction

Based on the as built drawings of the Slaughter House prepared by the Municipality, JICA Study Team revised the designs for the critical section of the superstructure such as foundation, pillars and beams. In the same way with the PHO (see section 2.2.2), reinforcing measures were particularly examined for the truss and roof. Japanese style reinforcing measures that were applied are as follows.

a) In the same way as PHO, Mega-Rib was adopted with domestically available material (0.5mm thickness, pre-coated galvanized sheet).
b) In the same way as PHO, C-type mold steel (2-mm thickness) was adopted for purlins to assure the transfer of load from roof to truss.

c) In the same way as PHO, solid connection was employed at the livestock shed by; 1) embedding anchor bolt to the concrete column which in turn hold the base plate, and 2) fixing truss to the baseplate through full welding.
d) In the same way as PHO, gusset plate was placed at the connecting portion of the members of truss in the livestock shed, in order to secure the right position. It required full welding along length and connection of truss members.

Achievement 2: Bidding/Contract of Reconstruction of Slaughter house

JICA Study Team collected the company profile from four companies that were recommended by the Municipality and sent bid invitation to three companies that passed through PQ procedure.

As described above, JICA Study Team adopted the open/competitive bidding system and two-envelope system.

Opening of the bids were done with the presence of the bidders. Fist, the technical proposals were opened. Cost proposals were opened for bidders who passed the technical review. Two companies participated in the bidding and two of them passed through technical review. After opening of their cost proposals, NSDS Construction and Supply had the lowest bid which was also within the QIP budget. Therefore, NSDS Construction and Supply was nominated as the first priority for arithmetical evaluation. As a bidding procedure, both of technical proposal and financial proposal were fully examined and questions were made to the contractor. Since its position as first priority was not changed, JICA Study Team issued Award and made the contract with the contractor.

In the same manner with PHO (see section 2.2.2), BOQ/Fixed Unit Cost system was adopted for the contract since additional quantities or change order were expected.

Considerations were made for payment conditions to avoid any delay caused by financial deficit. Since the contract period was only as short as six months, price escalation clause was not applied. And the similar to PHO project, three months was adopted for the “Defects Liability Period”.

In the course of the project duration, the contractor requested for time extension with the reasons of 1) shortage of construction materials and labor due to Typhoon Yolanda, 2) effect of Typhoon Ruby, and 3) insufficiency of electricity for conducting the works, etc. JICA Study Team and the Municipality discussed and evaluated the basis, and accepted the extension for 60 days.

Achievement 3: Reconstruction of Slaughter house in a Disaster Resilient form through Appropriate Construction Management

The quality of all construction material was controlled with the same method applied in PHO (see section 2.2.2).

In the same way with PHO, JICA Study Team made the deployment/monitoring plan of Inspectors for quality control based on the execution plan and detailed construction schedule which was submitted by the contractor.

The inspectors inspected center line, depth and bearing capacity of foundation excavation. Re-bar of column was inspected before formwork closure prior to concreting.

Inspection of concrete works were conducted on trial mix, mixing ratio, slump test, the skill of mixer operator, placing method and vibrator using, etc.

Finding that the existing access road was suitable for use during construction, costs for concrete pavement in the premise of the facility was reduced from the contract.

In case any failure or defaults in the works were noted, inspector issued site instruction to contractor, instructing correspond corrections, demolition and sometimes rework.

The following are some of the site instruction given to the contractor during the reconstruction of the Slaughter House.

- Proper compaction was instructed.
- As instructed, splicing of C-Channels to be done resting directly on top chord of the truss. A 10mm gap between channels was also observed.
- Concrete slump was inspected constantly during concreting, before pouring into the structural forms.
- Proper use of concrete vibrator was instructed.
- Additional bracing on beam forms was instructed to prevent movements of forms during concreting.
- Connections without bolts were pointed out during C-Channel installation on the purlin cleat.
- Roof installation was inspected constantly.

In the same case as PHO, regarding documentations required to be submitted, the contractor didn't acquire sufficient knowledge through reconstruction of Slaughter House, and they need to learn more in order to be able to effectively manage their construction schedules.

Achievement 4: Support for Resuming Operation of Slaughter House through Procurement of Equipment

Through discussion with the Meat Inspector of the Municipality of Dulag, it was planned that hanging line such as rail and hook should be repaired while electronic equipment such as motor should be replaced to resume the below operation capacity.

Table 2.2-43 Equipment of Slaughter House

Equipment	Capacity	set
Slaughtering Line	400 kg/day	1

Source: JICA Study Team

Achievement 5: Technical Transfer to LGU Engineer

With the same methodology applied in the Tolosa Multi-Purpose Livelihood Building (see section 2.2.3), JICA Study Team transferred knowledge and skills to engineers of the Municipality of Dulag through the series of project activities with the purpose that they would become able to handle future recovery projects by themselves. The contents of technical transfer are also the same with those in the Tolosa Multi-Purpose Livelihood Building.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-44 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Municipal capacity and skills of its engineers for project management are improved.	Improved	Not Enough	Not Enough	Improved	Improved
2) Slaughter House is rebuilt with appropriate design and within construction schedule.	Rebuilt	Constructed	Collapsed	On Going	Rebuilt
3) Revenue by slaughter house use fee is recovered. (Thousand Peso / Month)	200	100	85	110	65,187

Source: JICA Study Team

Through the QIP, the slaughter house has been reconstructed in a more disaster resilient manner, which also resulted in revenue that is far more than initial expectations. This suggests that the facility satisfies requirements of both the LGU and users, and that the facility will be utilized in a sustainable manner. In addition, the capacity of the Municipal Engineers in project management, which has been improved through the QIP is expected to contribute to future construction of public facilities through appropriate supervision and management.

2.2.11 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market (Mercedes) (QIP-11)

(1) Inputs

Input 1: Design of Reconstruction of Mercedes Public Market

Through the damage assessment survey of Mercedes Public Market by JICA Study Team, it was found that the building, including the foundation was completely damaged.

The JICA Study Team requested the Municipality to prepare basic drawings for the Public Market. Based on the basic drawings, necessary modifications were made for foundation, pillars and beams which were found with insufficient strength. The roofing system was also revised in the same manner with the PHO (see section 2.2.2) in order to reinforce its structure, particularly for the truss and roofing. The modified drawing was used as the technical drawing for the Public Market. A completion figure is shown in Figure 2.2-12.

Input 2: Bidding/Contract of Reconstruction of Mercedes Public Market

In the same way as PHO (see section 2.2.2), the Municipality was requested to recommend local contractors. The invitation to bid was issued to contractors who passed PQ.

In the same way as PHO, JICA Study Team adopted open/competitive bidding system and two-envelope system for the bid opening. For the contract, BOQ system was adopted.

Payment condition was also stipulated in the same way as PHO to avoid any delay caused by the financial deficit.

Input 3: Reconstruction of Mercedes Public Market

In the same way as PHO, JICA Study Team made the deployment/monitoring plan of Inspectors for quality control. Moreover, JICA Study Team called for regular site meetings with the contractor to monitor the progress and quality of construction as compared with the contractor's submitted construction schedule, and discussed the technical issues encountered by the contractor.

Input 4: Equipment of Reconstruction of Mercedes Public Market

Before Typhoon Yolanda, the Municipality supported the tenants of the Public Market by lending out refrigeration equipment for meat preservation. The Municipality used to temporarily purchase the meat products by volume and store it in their refrigeration equipment. This was an auxiliary policy of LGU to secure the handling of volumes of products of market tenant every day, and perform assistance in the storage of these goods. Each tenant could handle certain amounts of fresh fish/meat without loss, since any excess can be stored. JICA Study Team supplied this refrigeration equipment required as requested by the Municipality

for operation resumption of Mercedes Public Market.

Input 5: Technical Transfer to LGU Engineer

Generally, it was noted that the poor construction quality intensified the damage of buildings caused by Typhoon Yolanda in Leyte and Samar. Through the QIP, collaborative works on facility design, cost estimation, bidding, contract, and construction supervision were done with the relevant staff of the Municipality in order to transfer knowledge and skills with the purpose of enabling them to handle recovery projects by themselves in the future.

(2) Achievement of the Project

Achievement 1: Revising Design of Mercedes Public Market for Disaster Resilient Reconstruction

Based on the basic drawings of the Public Market prepared by the Municipality, JICA Study Team revised the designs for the critical section of the superstructure such as foundation, pillars and beams. In the same way with the PHO (see section 2.2.2), reinforcing measures were particularly examined for the truss and roof. Japanese style reinforcing measures that were applied are as follows.

a) In the same way as PHO, solid connections were employed by 1) embedding anchor bolts to the concrete column – roof beam, 2) fixing anchor plate with the anchor bolts, and 3) full welding between anchor plate and bottom chord of truss.
b) In the same way as PHO, gusset plate was placed at the connecting portion of the members of truss, to secure the right position, required welding length and connection of truss members were added in the plan specifications.
c) In the same way as PHO, Mega-Rib was adopted for roofing system with domestically available material (0.5mm thickness, pre-coated galvanized sheet).
d) In the same way as PHO, C - type mold steel (2-mm thickness) was adopted for purlins to assure the transfer of load from roof to truss.
e) It was confirmed with Municipality that the main drainage along highway shall be laid by responsibility of the Municipality to receive the discharged water from Mercedes Public Market.

Achievement 2: Bidding/Contract of Reconstruction of Mercedes Public Market

JICA Study Team collected the company profile from seven companies that were recommended by the Municipality and sent bid invitation to three companies that passed through PQ procedure.

As described above, JICA Study Team adopted the open/competitive bidding system and two-envelope system.

Opening of the bids were done with the presence of the bidders. Fist, the technical proposals were opened. Cost proposals were opened for bidders who passed the technical review. Three companies participated in the bidding and two of them passed through technical review. After opening of their proposals, DAYBREAK ENTERPRISES was found to have the lowest bid offer which was also within QIPs budget, so the said company was selected as the first priority for arithmetical evaluation. As part of the bidding procedure, both of the technical proposal and financial proposal were fully examined and queries were made to the contractor. Since his position as first priority was not changed, JICA Study Team issued and made the Contract Award to the said contractor. In the same way as PHO (see section 2.2.2), BOQ contract was conducted to make settlement of working quantity variation at the project completion.

Payment condition was stipulated to avoid any delay coursed by the financial deficit. Since the contract term was as short as six months, the escalation clause was not applied. In the same manner with PHO, three months was adopted for the "Defect Liability Period".

During the course of the project, the contractor issued request for time extension with the following reasons, 1) shortage of the construction materials and labor after typhoon Yolanda, 2) the difficulty in procurement of material with sufficient quality, 3) shortage of necessary electric power for the construction works, 4) effect of Typhoon Ruby, etc. JICA Study Team and LGU discussed and evaluated the reasonability, and accepted the extension for 60 days.

Achievement 3: Reconstruction of Mercedes Public Market in a Disaster Resilient Form through Appropriate Construction Management

The quality of all construction material was controlled with the same method applied in PHO (see section 2.2.2). For the reconstruction of the Public Market, the welder played an important role in the strengthening measure of the vulnerable portion of superstructure. Therefore, in the same way with PHO, JICA Study Team conducted a practical test of welding skill in advance, and permitted skilled welder who was assessed by JICA Study Team, to perform the welding operation.

JICA Study Team also made the deployment/monitoring plan of Inspectors for quality control based on the execution plan and detailed construction schedule which was submitted by the contractor.

The inspectors inspected center line, depth and bearing capacity of foundation excavation. Re-bar of column was inspected before formwork closure prior to concreting.

Inspection of concrete works were conducted on trial mix, mixing ratio, slump test, the skill of mixer operator, placing method and vibrator using, etc.

In case any failure or defaults in the works were noted, inspector issued site instruction to contractor, instructing correspond corrections, demolition and sometimes rework.

Apart from the above, JICA Study Team requested the Municipality to turn off the electric current of the high-tension wires along highway during the construction period for safety measure, though it was distant from the working zone.

The following are the main site instruction given to the contractor during the reconstruction of the Public Market.

- Alignment of column footings was inspected and correction was instructed.
- Gravel materials was rejected and instructed to use the one specified on the plan.
- Concrete mixers broke out, so the contractor was instructed to bring another from their other site.
- Concrete slump should be inspected constantly during concreting.
- Tensile Strength Test of angle bar sample failed so the contractor was advised to use a different supplier.
- Welding joints on connecting angle bars on truss was inspected and corrected in some portion.

In the same case with PHO, regarding documentations required to be submitted, the contractor didn't acquire sufficient knowledge through reconstruction of Public Market, and they need to learn more in order to be able to effectively manage their construction schedules.

Achievement 4: Support for Resuming Operation of Mercedes Public Market through Procurement of Equipment

JICA Study Team supplied refrigeration equipment for the auxiliary policy of the Municipality, as listed below.

Table 2.2-45 Equipment for Mercedes Public Market

Type of Storage Equipment	Set	Capacity (cu.ft.)	Items for Storage
Chiller	2	14	Fruits/Vegetables
Chest Type Freezer	2	15	Meat (Beef, Pork, Poultry, Fish)
Refrigerator	6	12	Combination of Meat, Vegetables and Fruits

Source: JICA Study Team

Achievement 5: Technical Transfer to LGU Engineer

With the same methodology applied in the Tolosa Multi-Purpose Livelihood Building (see section 2.2.3), JICA Study Team transferred knowledge and skills to engineers of the Municipality of Mercedes through the series of project activities with the purpose that they would become able to handle future recovery projects by themselves. The contents of technical transfer are also the same with those in the Tolosa Multi-Purpose Livelihood Building.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-46 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Municipal capacity and skills of its engineers for project management are improved.	Improved	Not Enough	Not Enough	Improved	Improved
2) Public Market is rebuilt with appropriate design and within construction schedule.	Rebuilt	Constructed	Collapsed	On Going	Rebuilt
3) Revenue by public market use fee is recovered. (peso / month)	3,000	3,000	0	0	4,912

Source: JICA Study Team

Through the QIP, the public market has been reconstructed in a more disaster resilient manner, which also resulted in revenue that is far more than initial expectations. This suggests that the facility satisfies requirements of both the LGU and tenants, and that the facility will be utilized in a sustainable manner. In addition, the capacity of the Municipal Engineers in project management, which has been improved through the QIP is expected to contribute to future construction of public facilities through appropriate supervision and management.

2.2.12 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market (Mayorga) (QIP-12)

(1) Inputs

Input 1: Design of Reconstruction Mayorga Public Market

Through the damage assessment survey of Mayorga Public Market by JICA Study Team, it was found that the roof and truss of the second story and the market facilities of the first story was completely damaged. However, the concrete structure (Building Frame) had no serious damage. Therefore, Reconstruction of the building included repair works of roof, truss, interior/exterior spaces, and market facilities.

The JICA Study Team reviewed the as built drawing for the Public Market prepared by the Municipality. Revisions were made on the drawing in the same manner with the PHO (see section 2.2.2) with particular focus on strengthening the critical sections of the truss and roofing. The modified drawing was used as the technical drawing for the Public Market. A completion anticipation figure is shown in Figure 2.2-13.

Input 2: Bidding/Contract of Reconstruction of Mayorga Public Market

In the same way as PHO (see section 2.2.2), the Municipality was requested to recommend local contractors, the invitation to bid were issued to contractors who passed PQ.

In the same way as PHO, JICA Study Team adopted open/competitive bidding system and two-envelope system for the bid opening. For the contract, BOQ system was adopted.

Payment condition was also stipulated in the same way as PHO to avoid any delay caused by the financial deficit.

Input 3: Reconstruction of Mayorga Public Market

In the same way as PHO, JICA Study Team made the deployment/monitoring plan of Inspectors for quality control. Moreover, JICA Study Team called for regular site meetings with the contractor to monitor the progress and quality of construction as compared with the contractor's submitted construction schedule, and discussed the technical issues encountered by the contractor.

Input 4: Technical Transfer to LGU Engineer

Generally, it was noted that the poor construction quality intensified the damage of buildings caused by Typhoon Yolanda in Leyte and Samar. Through the QIP, collaborative works on facility design, cost estimation, bidding, contract, and construction supervision were done with the relevant staff of the Municipality in order to transfer knowledge and skills with the purpose of enabling them to handle recovery projects by themselves in the future.

(2) Achievement of the Project

Achievement 1: Revising Design of Mayorga Public Market for Disaster Resilient Reconstruction

Based on the as built drawings of the Public Market prepared by the Municipality, JICA Study Team revised the designs for the critical section of the superstructure, particularly for the truss and roofing, in the same way with the PHO (see section 2.2.2). Japanese style reinforcing measures that were applied are as follows.

a) In the same way as PHO, solid connection was employed by 1) embedding of anchor bolts to the existing concrete column, 2) fixing anchor plate with the anchor bolts, and 3) full welding between anchor plate and truss.
b) In the same way as PHO, gusset plate was placed at the connecting portion of the member of truss, to secure the right position, full welding was required along length and connection of truss members.
c) In the same way as PHO, Mega-Rib was adopted for roofing system with domestically available material (0.5mm thickness, pre-coated galvanized sheet).
d) In the same way as PHO, C-type mold steel (2-mm thickness) was adopted for purlins to assure the transfer of load from roof to truss.

Achievement 2: Bidding/Contract of Reconstruction of Mayorga Public Market

JICA Study Team collected the company profile from four companies that were recommended by the Municipality and sent bid invitation to three companies that passed through PQ procedure.

As described above, JICA Study Team adopted the open/competitive bidding system and two-envelope system.

Opening of the bids were done with the presence of the bidders. Fist, the technical proposals were opened. Cost proposals were opened for bidders who passed the technical review. Three companies participated in the bidding and one of them passed through technical review. Subsequently, the financial proposal of JUCONS CONSTRUCTION & SUPPLY, which passed through the technical review, was opened and confirmed that it was within the QIP budget. As bidding procedure, both of technical and financial proposals of the contractors were fully examined and evaluated. Since JUCONS CONSTRUCTION & SUPPLY qualified the evaluation, JICA Study Team issued Award and made the contract with the contractor.

In the same manner with PHO (see section 2.2.2), BOQ/Fixed Unit Cost system was adopted for the contract since additional quantities or change order were expected.

Considerations were made for payment conditions to avoid any delay caused by financial deficit. Since the contract period was only as short as six months, price escalation clause was not applied. And the similar to PHO project, three months was adopted for the "Defects Liability Period".

During the project, the contractor issued request for time extension with the following reasons, 1) delay of tenants' transfer to a temporary structure, 2) shortage of materials and laborers due to typhoon Yolanda, 3) influence of Typhoon Ruby, 4) occurrence of additional construction works (foundation of concrete block wall), etc. JICA Study Team and LGU discussed and evaluated the reasonability, and accepted the extension for 60 days.

Achievement 3: Reconstruction of Mayorga Public Market in a Disaster Resilient Form through Appropriate Construction Management

The quality of all construction material was controlled with the same method applied in PHO (see section 2.2.2). For the reconstruction of the Public Market, the welder played an important role in the strengthening measure of the vulnerable portion of superstructure. Therefore, in the same way with PHO, JICA Study Team conducted a practical test of welding skill in advance, and permitted skilled welder who was assessed by JICA Study Team, to perform the welding operation.

JICA Study Team also made the deployment/monitoring plan of Inspectors for quality control

based on the execution plan and detailed construction schedule which was submitted by the contractor.

The inspectors mainly inspected concrete works, assembly of re-bars and concrete formworks. Inspection of concrete works were conducted on trial mix, mixing ratio, slump test, the skill of mixer operator, placing method and vibrator using, etc.

In case any failure or defaults in the works were noted, inspector issued site instruction to contractor, instructing correspond corrections, demolition and sometimes rework.

The following are the main site instruction given to the contractor during the reconstruction of the Public Market.

- Caution on the existing sewerage pipe was instructed to avoid any damage.
- Concrete slump should be inspected during concreting.
- Some concrete hollow blocks were rejected because of low quality.
- Cover gaps between installed forms was inspected to avoid any leakage of poured concrete.
- Thickness of CHB plastering was pointed out for correction.
- Provisions for additional concrete spacers were pointed out.
- Connection gaps in between joints for truss members were corrected.
- Additional manpower was advised.
- Layout of fish tables was corrected.

In the same case with PHO, regarding documentations required to be submitted, the contractor didn't acquire sufficient knowledge through reconstruction of Public Market, and they need to learn more in order to be able to effectively manage their construction schedules.

Achievement 4: Technical Transfer to LGU Engineer

With the same methodology applied in the Tolosa Multi-Purpose Livelihood Building (see section 2.2.3), JICA Study Team transferred knowledge and skills to engineers of the Municipality of Mercedes through the series of project activities with the purpose that they would become able to handle future recovery projects by themselves. The contents of technical transfer are also the same with those in the Tolosa Multi-Purpose Livelihood Building.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-47 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Municipal capacity and skills of its engineers for project management are improved.	Improved	Not Enough	Not Enough	Improved	Improved
2) Public Market is rebuilt with appropriate design and within construction schedule.	Rebuilt	Constructed	Collapsed	On Going	Rebuilt
3) Revenue by public market use fee is recovered. (peso / month)	155,000	85,000	63,000	71,000	400,000

Source: JICA Study Team

Through the QIP, the public market has been reconstructed in a more disaster resilient manner, which also resulted in revenue that is far more than initial expectations. This suggests that the facility satisfies requirements of both the LGU and tenants, and that the facility will be utilized in a sustainable manner. In addition, the capacity of the Municipal Engineers in project management, which has been improved through the QIP is expected to contribute to future construction of public facilities through appropriate supervision and management.

2.2.13 Promotion of Local Products to Improve Livelihoods for the Survivors of Typhoon Yolanda (QIP-13)

(1) Inputs

Input 1: Study of the Framework of Promotion Activities for the Processed Products with the Task Force

A Task Force, consisting of relevant government agencies, organizations and producers was formulated in order to examine various marketing strategies for the sales promoting of processed ago-fishery products produced through the four QIPs implemented under this Study. The QIPs and target products to be examined by the Task Force are indicated below.

Table 2.2-48 Relevant QIPs and Target Products Examined by the Task Force

QIP No.	Name of QIPs	Products
QIP-01	Regenerating Livelihood Through Introduction of Disaster Resilient Submersible Fish Cage (Milkfish)	Softbone Bangus
QIP-03	Regenerating Local Livelihoods Through Processing of Agriculture and Fishery Products by Small-Scale Community Groups	Longganisa, Tocino, Embutido, Deboned Bangus, Vegi-fish Noodles
QIP-14	Regenerating Livelihood Through Production of Coco Charcoal Briquette	Coco-trunk Charcoal
QIP-15	Integrated Culture of Oyster and Milkfish improvement for Sustainable Aquaculture and Livelihood	Softbone Bangus, Processed Oyster products

Source: JICA Study Team

Input 2: Implementation of the Framework of Promotion Activities for the Processed Products

There were initial plans for implementing the actual marketing strategies for the products produced through relevant QIPs. However, the overall strategies could not be developed

within the planned period. On the other hand, individual actions for sales promotion were taken for the individual products produced through: "QIP-03 : Regenerating Local Livelihoods Through Processing of Agriculture and Fishery Products by Small-Scale Community Groups", "QIP-14 : Regenerating Livelihood through Production of Coco Charcoal Briquette", and "QIP-15 : Integrated Culture of Oyster and Milkfish improvement for Sustainable Aquaculture and Livelihood."

Input 3: Examine Possibilities of a Promotion Center

In addition to the above, possibilities for establishing a promotion center in order to sell the processed products as regional specialties were also planned to be examined by the Task Force. With the absence of actual marketing strategies, examination of the promotion center could also not be carried out.

Input 4 (Extension Period) : Determination of Further Approaches for Sales Promotion

Taking into consideration that the development of sales promotion strategies did not proceed as initially planned, discussions were held with each production group to identify the issues that they face in terms of sales promotion and the basic directions towards which they want to develop their markets.

(2) Achievement of the Project

Achievement 1: Selection of Task Force Members and Topics to be Discussed

Contents of the QIP and features of the products to be produced through their activities were explained to relevant officials of the Department of Trade and Industry (DTI) Region 8 office, and candidate members of the Task Force as well as the topics to be discussed were identified.

Table 2.2-49 Identified Candidate Task Force Members

Department of Trade and Industry	Tacloban City officials in charge of supporting business promotion
Bureau of Fishery and Aquatic Resources	QIP Participants
Department of Science and Technology	Organizations involved in QIP activities (LGUs, VSU, etc.)
Existing organizations and private business entities involved in the distribution / sales of local products	Other organizations that may relate to sales and distribution of local products (unions, restaurants, etc.)

Source: JICA Study Team

[Draft Agenda for Task Force Meetings]

1st Meeting: Understanding the features of processed products and examining their potential target markets and distribution routes

- Understanding the features and pricing of processed products produced through QIP activities
- Identification of potential markets for individual products
- Identification of possible distribution routes

2nd Meeting: Examination of means for sales promotion in consideration of the identified

target markets and distribution routes

- Remaining agenda from 1st Meeting
- Examination of possible tools for promotion
- Examination of promotion center (necessity, effect of establishment, suitable location, means of operation, etc.)

3rd Meeting: Examination of promotion center

- Remaining agenda from 2nd Meeting
- Continued examination of promotion center (necessity, effect of establishment, suitable location, means of operation, etc.)

Achievement 2: Discussions for Sales Promotion of Processed Products in 1st Task Force Meeting

The 1st Task Force meeting was held on 5 August 2014. The participants in the meeting are as shown below.

Table 2.2-50 Participants of the 1st Task Force Meeting

DTI, Region 8	VSU, Tolosa
DTI, Leyte Province	LGU, Tolosa
BFAR, Region 8	Women's Association, Tolosa
BFAR, Leyte Province	JICA Study Team

Source: JICA Study Team

However, at the time of the 1st Task Force meeting, actual production has not been started for most of the processed products. Information on the actual products such as their features, production capacities and prices could not be provided, and actual means for marketing of these products could not be discussed on a concrete basis.

Suggestions raised in the 1st Task Force meeting are as follows.

About the products:

- Information of the processed products should first be collected and reviewed to further examine their marketing strategies (production capacity, means of packaging, wholesale/retail price, situation of sales before being hit by Typhoon Yolanda, etc.)
- The market to be targeted will significantly differ depending on the quality of products and their packaging.
- The products and producers should be registered under DTI.

Immediate actions to be taken:

- Sales should be started during the Leyte Landing Ceremonies to be held in late October.
- Full scale production should be started so that products could be sold before Christmas season.

Marketing center:

- A certain level of production in terms of quantity must be realized before examining the possibilities for the establishment of marketing centers.

Achievement 3: Further Activities

In response to the suggestions raised through the 1st Task Force meeting, activities of relevant QIPs were further supported to restart (QIP-03) or newly start (QIP-15) the production of processed products.

As a result, the production of Softbone Bangus, prepared under QIP-15 has started to produce considerable amount of production. On the other hand, with the Multi-Purpose Livelihood Building in Tolosa being yet to be completed, the participants of QIP-03 have not been able to attain full-scale production because they lack access to venues for constant production. Accordingly, they are also yet to formulate a business plan based on full production of products. Products under QIP-01 and oyster products of QIP-15 are also not being produced because their raw material is yet to be harvested. Moreover, charcoal produced through QIP-14 is already steadily sold in nearby areas and do not require promotion activities at this point.

Under such circumstances, examination of marketing strategies planned in the 2nd and 3rd Task Force meetings have not been actually commenced. Actual means for sales promotion are currently undertaken by individual QIPs taking into consideration the situation of their production. The activities conducted are as follows.

1) Participation in local events

The QIP participants have been participating in a series of local events to exhibit their products. Free tasting and sales of food products are also done within these events. So far, there are many queries about the products during the event, and the products seem to be accepted by the local people with favor. However, amounts of sales after participation in these events did not significantly changed with the exception of events held in LGUs, where production is being done (Tanauan and Tolosa).

Table 2.2-51 Participation in Local Events

Event	Date	Activity	Products
Launching Ceremony for QIP-15 (Tanauan)	6 Oct 2014	Exhibit	QIP-15: Softbone Bangus
Palo Leyte Landing (Palo)	20 Oct 2014	Exhibit Tasting Sales	QIP-03: Longganiza, Tocino, Boneless Bangus, Embutido QIP-15: Softbone Bangus
Tolosa Typhoon Yolanda Commemorial (Tolosa)	8 Nov 2014	Exhibit Tasting Sales	QIP-03: Longganiza, Tocino, Boneless Bangus, Embutido
JICA Seminar (Tacloban)	17 Nov 2014	Exhibit Tasting Sales	QIP-03: Longganiza, Tocino, Boneless Bangus, Embutido QIP-14: Coco-Charcoal / Briquette QIP-15: Softbone Bangus
JICA Forum (Tacloban)	23 Feb 2015	Exhibit Tasting Sales	QIP-03: Longganiza, Tocino, Boneless Bangus, Embutido, Vegi-Fish Noodles QIP-15: Softbone Bangus
JICA Forum (Manila)	5 Mar 2015	Exhibit Tasting	QIP-03: Vegi-Fish Noodles QIP-15: Softbone Bangus

Source: JICA Study Team

2) Preparation of flyers and banners for promoting locally produced products

Flyers indicating that the product is being made by local residents, and the purchasing of locally produced products will contribute to the recovery of local economy have been prepared in Waray-Waray Language, and distributed to the participants in the above events and to the consumers who purchase the products. Banners with the same contents were also prepared and are posted near the Women Friendly Space in Tolosa (where local women's groups frequently visit), and at the charcoal store that the QIP participants established near the main road passing through Mercedes.

3) Securing stores that regularly can merchandise the products

The products produced through QIP-03 and QIP-15 were introduced to local stores and canteens and conditions for merchandising these products were discussed in order to secure stable sales. As a result, one store in Tolosa started to constantly merchandise products of QIP-02 from January 2015, while another in shop in Tanauan started selling products of QIP-15 from March 2015.

4) Attainment of support from DOST

The processing method for Softbone Bangus produced through QIP-15 has caught the attention of DOST, when the participants delivered their product for microbial testing (Aerobic Total Counts) to determine its shelf life. As a result, DOST proposed and committed to specify the QIP participants engaged in processing activities as a Target Group for its supporting scheme in FY 2015. Through this scheme, DOST will be supporting the participants through 1) provision of consultancy service for product development, 2) support in providing training opportunities and 3) use of Food Innovation Center (FIC). The use of FIC, which is a facility accredited with License to Operate (LTO) by Bureau of Food and Drug (BFAD), can significantly contribute to increasing the production volume of the products and its LTO can be a large advantage when approaching the markets outside of barangay Sta. Cruz, such as large supermarkets in the area.

Achievement 4 (Extension Period)：Determination of the Directions for Sales Promotion and Preparation of Business Plans

Discussions were held with each of the production groups engaged in processing activities under relevant QIPs to examine possible directions for sales promotion of local products. In this process, it was found that it is necessary to identify sales strategies for individual products than setting a uniform strategy for all products that have considerably different characteristics. Therefore, sales promotion activities were decided to be carried out within the activities of the individual QIPs.

Table 2.2-52 Identified Directions of Individual Production Groups

QIP No.	QIP Title	Produced Products	Identified Future Direction of Sales
QIP-01	Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish)	Softbone Bangus	Sales in the national market through establishment of processing women's federation and obtaining of LTO
QIP-15	Integrated Culture of Oyster and Milk Fish Improvement for Sustainable Aquaculture and Livelihood	Softbone Bangus, Processed Oyster products	
QIP-03	Regenerating Local Livelihood through Processing of Agriculture and Fishery Products by Small-Scale Community Groups	Longganiza, Tocino	Selling of more value added products to local consumers by establishment of food stall to serve cooked products
		Embutido	Continuation of sales to local residents
		Deboned Bangus	Continued sales to local residents and restaurants, food stalls in nearby cities. Development of large scale buyers (fast food restaurant chains) through obtaining of LTO
		Vegi-fish Noodles	Sales to nearby restaurants and food stalls. Development of large scale buyers (large scale retailers, DSWD food stockage programs) through obtaining of LTO
QIP-14	Regenerating Livelihood through Production of Coco Charcoal Briquette	Coco-trunk Charcoal	― *

* The support from "QIP-14: Regenerating Livelihood through Production of Coco Charcoal Briquette" under this QIP was terminated because; the participants intended to use their products for self-consumption more that to bring them to the market, and the raw material for charcoal became difficult to collect as those nearby were already processed, and fallen trees in other areas were already decomposing.

Source: JICA Study Team

2.2.14 Regenerating Livelihood through Production of Coco Charcoal Briquette (QIP-14)

2.2.14.1 Charcoal Production

(1) Inputs

Input 1: Invitation of Participant Farmers and Group Formulation

Out of the 18 LGUs in the Study Area, the Municipality of Mercedes is one of the LGUs that suffered most severe damages in its coconut farms. At the same time, the economy of the LGU has been conventionally dependent on coconut farming. The QIP aims to apply a process for clearing damaged coconut trees from the coconut fields and to generate cash income through processing them into charcoal in the Municipality. In implementing the QIP, two barangays were selected from the six proposed by the Mayor of Mercedes. Candidate participants for QIP activities were further called for through the barangay captains. The contents of the QIP were explained to the candidate participants and a production group was formulated in each of the barangays, consisting of those who showed their intensions to participate.

Input 2: Provision of Necessary Tools

Several methods for charcoal production were examined to identify a method most effective for producing charcoal from fallen coconut trees. As a result, *Fuse Yaki* method, which is relatively easy to apply and requires minimal initial cost, was selected and introduced to the barangays. The production groups were provided with minimum tools required for carrying out *Fuse Yaki*, while the kiln for *Fuse Yaki* was excavated by the production groups themselves.

Input 3: Provision of Training

An instruction manual for *Fuse Yaki* was prepared in Waray-Waray language and distributed to the production groups in order to provide them with the knowledge for charcoal production from fallen coconut trees. Hands-on training for charcoal production was also conducted to practice the actual techniques. Follow-up on production techniques were also made by visiting the production groups and providing them with technical advice after they started regular production. With regard to sales of the produced charcoal, the activities were supported through training for accounting and provision of advice for marketing.

Input 4: Examine Possibilities for Charcoal Briquetting

When compared with charcoal made from coconut shells (coco-shell charcoal) or illegally felled mangroves, which are commonly seen in the market, the quality of charcoal produced from fallen coconut trees (coco-trunk charcoal) is somewhat inferior in terms of burn time and heat produced. In consideration of its quality, possibilities for processing coco-trunk charcoal into charcoal briquettes were examined in order to add value and enhance their sales. Briquettes samples were prepared from coco-trunk charcoal that was produced through the QIP on a trial basis, and their quality was compared with conventional briquettes made from coco-shell charcoal. The sample briquettes were also distributed to vendors in nearby markets to collect their comments on possibilities for future production and sales.

(2) Achievement of the Project

Achievement 1: Selection of Target LGU and Barangay

Apart from the other QIPs that were formulated based on needs identified from the LGUs, the activities for this QIP has been designed by the Study Team with the aim of accelerating the process of clearing damaged coconut trees from coconut fields, reviving and diversifying the local industry through replanting of coconut trees and practicing inter-cropping, and at the same time, utilizing the damaged coconut trees to generate cash income. Since none of the LGUs in the Study Area proposed such activities, the target LGU had to be selected before implementing the activities.

The criteria for selecting the target LGU for the QIP were: level of damage to coconut fields, general level of income of the residents, economic situation (situation of local industries), and level of economic dependence on coconut farming. By comparing the situations in each LGU, the Municipality of Mercedes has been selected as the target LGU for QIP implementation.

Table 2.2-53 Comparison of Damage and Dependency on Coconut Farming

LGU	Damaged tree / hectare	Income level*	Ratio of External / Local Revenue (Dependency on Central Govt.)**	Rate of coconut farming in major income source
Abuyog	19	10,000	6.9	60%
Dulag	46	3,500	4.1	20%
Javier	43	2,500	10.3	76%
Macarthur	71	3,000	5.7	65%
Mayorga	55	3,000	-	30%
Palo	10	-	4.2	ND
Tacloban	10	-	0.9	ND
Tanauan	29	2,000	2.8	5%
Tolosa	67	5,000	8.8	20%
Basey	31	8,000	24.6	10%
Marabut	19	6,000	38.9	20%
Balangiga	35	3,750	-	65%***
Giporlos	69	3,934	39.7	87%
Guiuan	48	5,000	4.4	15%
Lawaan	24	1,667	18.4	20%
Mercedes	**65**	**1,500**	**39.7**	**50%**
Quinapondan	61	3,500	19.6	65%
Salcedo	28	2,800	8.9	42%

Source: JICA Study Team, based on data from LGU and NSO

*: Indicative amount per household per month based on impression of LGU staff.
**: Higher figures indicate that the LGU does not have sufficient economic activities to gain necessary revenue for running the LGU, thus means that economic situation in the LGU is not active.
***: Figure for whole agricultural sector

Furthermore, in order to select the barangays for implementation of QIP activities, the Study Team explained the contents of the QIP to the Mayor of Mercedes and requested him to propose several candidate barangays that are in need of clearing of fallen coconut trees, and would be interested in participating in the activities. In response, the Mayor proposed the six barangays of Brgy-01, Brgy-02, Brgy-03, Brgy-04, Busay and Buyayawon. In consideration of the capacity for support, the Study Team selected the two barangays of Busay and Buyayawon, because they had large extents of coconut fields that could be continuously worked on after technical transfer for charcoal production was completed.

Table 2.2-54 Distribution of Coconut Fields in the Proposed Barangays

Barangay	Land area (km^2)	Area of coconut farm (ha)	Number of coconut farmers
Brgy. 01	70.5	8,740	247
Brgy. 02	53.3	6,603	212
Brgy. 03	38	4,712	156
Brgy. 04	81.4	10,097	262
Busay	257.4	31,918	325
Buyayawon	197.8	24,531	261

Source: JICA Study Team, based on Data from PCA

Achievement 2: Formulation of Production Groups

The contents of the QIP activities were explained to the captains of the two selected barangays, and the captains were requested to call for candidate participants. Trial production of coco-trunk charcoal was conducted together with the candidate participants to demonstrate the process of production. After this, one production group, consisting of candidates that showed interest in the activities, were formulated in each barangay. At the time of the formulation of the production group, one leader and one accountant was selected in each group. Furthermore, it was decided that decisions to be made in the groups will be done based on mutual discussions facilitated by the group leader. The number of members in each group is indicated in the following table.

Table 2.2-55 Members of the Production Groups

Barangay	Number of Members		
	Total	Male	Female
Busay	18	15	3
Buyayawon	31	25	6

Source: JICA Study Team

Achievement 3: Support for Initiating Charcoal Production through Installation of Kiln and Provision of Material

The basic structure of the kiln used for *Fuse yaki* is a simple ditch excavated in the ground. In addition, there are few other material required to formulate the fire opening and chimney. The size of the kiln for *Fuse Yaki* was decided based on two factors: the kiln should be small enough to ensure easy operation, and large enough to produce a certain amount of charcoal in one production. As a result, the kiln was designed with a size of 1.5m width, 2.0m length and 0.3m depth, which is large enough to produce around 2.5 sacks[8] of charcoal in one production. The kiln was excavated by the candidate participants at the time of the trial production, where two were excavated in Busay and one was excavated in Buyayawon. The necessary material for charcoal production was provided by the QIP. The materials provided are indicated in the following table.

Table 2.2-56 List of Material Provided for Charcoal Production

Material	Description	Quantity	
		Busay	Buyayawon
Shovel (round blade)	Excavation of kiln, harvesting of charcoal	4 units	4 units
Shovel (square blade)	Excavation of kiln, harvesting of charcoal	4 units	4 units
GI Sheet / tie wires	Formulation of chimney and roof for fire opening	2 sets	2 sets
Tarpaulin	Prevention of rain from falling on the kiln, tent for working under the sun	2 sheets	3 sheets
Brick	Formulation of fire opening	20 pcs.	40 pcs.
Screen	Separating harvested charcoal from soil	2 sets	2 sets
Others	Gloves, fans, etc.	1 set	1 set

Source: JICA Study Team

Apart from the above, the use of chainsaws is required for coco-trunk charcoal production,

[8]In the Study Area, charcoal is measured and merchandised in sacks that are originally used for storing 50kg of rice.

because the coconut trunks need to be cut into smaller pieces before burning. However, chainsaws were not provided through the QIP in consideration that each barangay in Mercedes has been allocated with chainsaws from the Philippine Coconut Authority (PCA) for the clearing of the coconut fields.

Trial production in Buyayawon was initially done in a low-lying area near the sea. However, the results of the trials conducted in this location were not successful and much of the raw material remained raw after burning. This may have been caused due to the sandy soils of the area, where moisture from rain water could easily penetrate through the soil. Based on this assumption, a kiln was newly excavated in the hilly area with loamy soil, which resulted in successful production of charcoal.

Achievement 4: Production of Coco-Trunk Charcoal

As earlier described, regular production of coco-trunk charcoal by the production groups was conducted after trial production.

In beginning regular production, both barangays requested the Study Team to provide necessary fuel for the chainsaws and fees for the chainsaw operators. However, this was not provided taking into consideration the sustainability of the activities after the support by the QIP is finished. Discussions were held with the production groups and decisions were made that each group member will provide a small share to pay for the necessary expenses, which will be returned after the products are sold. Furthermore, an amount will be kept from future sales to pay for the expenses for further production. The amount of production and sales of coco-trunk charcoal up to February 2015 are as follows.

Buyayawon:

A total of four trials have been conducted in Buyayawon during the period of 6-17 September 2014 (two trials in the lowland near the sea and two in the hilly areas). Regular production of coco-trunk charcoal has started from 20 September. The production group was keen to bare more production, and applied its own improvement to the production process. As a result, it succeeded to produce more charcoal in one production cycle. By November 2014, the group already removed most of the fallen coconut trees near the kiln. Due to this reason, the group decided to excavate another kiln in a different location and started its activities there. At this time, the group requested the Study Team to provide the necessary material for the establishment of a new kiln. This was provided to the group in premise that the amount required for the material will be reserved from the sales of charcoal so that it can further fund the expansion of the activities.

Production of charcoal was not active during December, when Typhoon Ruby hit the area, which was followed by the festive season of Christmas. However, production has resumed in January 2015, and the group has produced 127 sacks of coco-trunk charcoal up to February

2015. Based on the amount of charcoal produced, it is estimated that the group has cleared around 2 ha of farmland through its activities.

Busay:

After the trial production conducted in 31 August 2014, the production group committed to conduct regular production of coco-trunk charcoal. However, because most of its male members became engaged in the shelter program implemented by the International Organization for Migration (IOM) right after the trial, activities for charcoal production remained stagnant. Discussions were held with group members, and it was confirmed that the members intend to actively carry out their activities as soon as the shelter program finishes at the end of the year. In response, the group was provided with a round of training in December, and has re-started its activities in January 2015. Up to February 2015, the group has produced 22 sacks of coco-trunk charcoal, which is equivalent to raw material from 0.3 ha of damaged farmland.

Achievement 5: Sales of Coco-Trunk Charcoal

Conventionally, the charcoal merchandised in the southeastern areas of Eastern Samar province, where Mercedes is located, was produced in areas such as General Macarthur and Borongan, which are located some 30-70km away from the area. The average price of charcoal was around 300-450 pesos per sack for coco-shell charcoal, which have better quality than others, and 160-240 pesos for charcoal produced from wood material. Prices of charcoal usually become high in rainy seasons. Typhoon Yolanda also affected the production of charcoal through the destruction of coconut farms. This resulted in scarce supply of coco-shell charcoal in the region and the average price for charcoal made from wood is currently around 240 pesos per sack

Based on the above situation, the sales price of coco-trunk charcoal was discussed with the production groups. Taking into consideration that the coco-trunk charcoal is a new product in the area and that it may take time for retailers and consumers to become familiar with the product, it was decided that the price should be 200 pesos per sack, which is cheaper than the charcoal produced from wood.

Attempts for marketing of charcoal were also made through the Mayor of Mercedes. With the aim of securing stable sales in large volume, the Mayor introduced coco-trunk charcoal to a fast food shop in the Municipality of Guiuan by providing free samples. However, the shop declined from patronizing the product since it sometimes crackled and resulted in the ashes flying in the air. Based on this experience, the group has decided to target individual customers instead of large scale clients.

Currently, the production group in Buyayawon sells their products to clients such as retailers in Guiuan, people passing through the barangay through the main road, and local residents in

the Municipality. So far, they have been able to sell around 80 sacks, which is equivalent to 16,000 pesos. In overall, coco-trunk charcoal is selling relatively well. On the other hand, the production group in Busay has not yet been actively selling their products. They intend to wait until the rainy season for starting sales so that they can sell the product in better prices.

Taking into consideration the sales of coco-trunk charcoal is easily done in local areas including the market of Guiuan, sales of products in other areas such as Tacloban is not examined under the QIP because it will require additional costs items such as transportation.

As described above, the production group in Buyayawon has already sold around 16,000 pesos of charcoal, and Busay is also expected to follow. Sales of coco-trunk charcoal are expected to bare certain amounts of profit in the near future. However, up to this point, there have been no concrete business plans that determine the rules for profit distribution and internal reserves in both of the barangays.

Achievement 6: Possibilities for Marketing of Charcoal Briquettes

Samples of charcoal briquettes were prepared from the coco-trunk charcoal produced through the QIP in order to check their quality and to distribute them to retailers for their opinions. The quality of the sample briquettes were checked by burning it in parallel with commercial briquettes made from coco-shell charcoal, and by observing the difference of burn-time, heat produced and state of ash, etc.

Table 2.2-57 Comparison of Charcoal Briquette Quality

Items		Briquette A (produced from coco-shell)	Briquette B (produced from coco-trunk)
Easiness to burn		Easy	Easy
Amount of smoke		Almost none	Almost none
Crackling		None	None
Burn time*	30 minutes	10% burned out	30% burned out
	45 minutes	20% burned out	50% burned out
	75 minutes	50% burned out	90% burned out
Heat		Stable and strong up to 74 minutes	Strong but fluctuates in accordance to burn time
Ash		Occurs but does not fly	Occurs but does not fly

Source: JICA Study Team

*: Based on visual observation

The briquettes produced from coco-trunk charcoal did not crackle or produce any smoke. However, the burn-time was significantly shorter that that produce from coco-shell charcoal, and the heat generated from burning was also observed to be lower.

The sample briquettes were also distributed to retailers of Guiuan, but up to this point, there are no promising feedbacks. The samples are also being presented by the Mayor to private enterprises in other areas of the country. However, results have not yet been provided as of February 2015.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-58 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Coco charcoal and its briquette using acquired technique are produced. (kg/farmer/month)	Cha: 100 Bri: 50	Cha: 0 Bri: 0	Cha: 0 Bri: 0	Cha: 4 Bri: 0	Cha: 6.75 Bri: 0
2) Coco farmers draw their income by producing coco charcoal and its briquette (PHP/farmer/month)	10,000P	0	0	0	96
3) Coco farmers gain production technique of coco charcoal and its briquette (number of farmers)	40 farmers	0	0	49	49
4) The standing decayed stocks and the fallen dawn trees of the coco are removed, and the farmlands are recovered. (total Recovered farmland in ha)	2 ha	0	0	0.6	2.3

Source: JICA Study Team

Production of charcoal briquette was not conducted in the QIP because marketability was not found to be promising in examinations conducted after project implementation. However, the number of farmers obtaining skills in charcoal production exceeded initial expectations as well of the farmlands cleared of debris through autonomous efforts by the farmers. Unfortunately, it seems to be inevitable for the area to encounter more typhoons someday in the future. Obtainment of skills for clearing fallen trees and to make use of them in order to start growing alternative crops can be said to be an important fruit for the local farmers.

2.1.14.2 Introduction of intercropping with horticultural crops

(1) Inputs

Input 1: Selection of Participate Farmers

This project was conducted with the farmers groups formed by the above-mentioned charcoal briquette production for utilizing cleaned coconut field in 2 barangays (Buyayawon and Busay). Before the selection of participants, the project team explained difference from the coconut farming; the horticultural cultivation requires daily routine work to keep the productivity and the can be easily influenced by the climate change including natural disasters and so one. Then the participating farmers were selected among who still have a high intention to participate he program after clear understanding of the explanation, and organized as groups of each Barangay for the project.

Projects were implemented at a few locations where the fallen trees were cleaned for each Barangay to expect more demonstration effects. Distribution of materials and technical

trainings were also exercised by each groups of Barangay.

Input 2: Designing of Intercropping with Horticultural Crops and Techniques to be Introduced

The environmental condition in the target area, Mercedes, is not quite suitable for horticultural production. There are periods with high temperature and severe dry season while there is a season with the heavy rain. Such heavy rain washes off nutrients of the soil, which causes acidic soil and lack of phosphate. For that reason, local coconut farmers have only exercised horticulture at backyard gardening scale.

For that reason, first of all, a market condition and good practice examples of horticultural production in the neighboring developed area are well studied. Based on the findings, an intercropping model to be feasible and sustainable in the target area was designed. Namely, the introduction crops are Sweet potatoes, Bitter gourd, Eggplant and Okura etc., which are generally grown for home consumption and highly marketable.

Agricultural inputs and materials were selected under conditions to be available locally and be used to meet the cost and benefit factors. Horticultural techniques which can be easily practiced and effective for local environment were introduced. The project team provided the good combination and rotation methods to the farmers in order to practice the intercropping continuously.

Input 3: Procurement of Agricultural Inputs and Materials

Locally available agricultural inputs and materials were chosen as above mentioned. Seeds produced in the farmers' field were used. Compost, chicken dung and chemical compound were applied as fertilizers. Vermi-compost which is generally available in the agricultural input stores and may be efficient for local soil condition was chosen to use. Chicken dung was procured from the poultry farmers and the compound fertilizer such as Urea and NPK14-14-14 available in the local shops were used for top dressing.

As for the materials, mulches, nets, strings and stakes which are generally sold and affordable for the farmers were used.

Input 4: Implementation of Horticultural Production and Sales (with technical training)

Cultivation techniques were introduced to alleviate the risk of local natural and environmental condition. Namely; application of compost and coconut ash to improve the local soil fertility, introduction of nursery work for increasing the resistance to heat and drought and measures for pest and disease control, etc.

A simple instruction that summarizes the basic techniques and technology on the horticultural production was distributed for lecture before implementation to participating farmers. The

instruction was prepared using images and drawings to enhance farmers to understand visually about the techniques on fertilizer application and management methods by crops, etc. Cropping calendar described the plant management necessary by each crops were distributed to facilitate the farmers to care plants at in appropriate condition at right timing.

Table 2.2-59 Example of crop calendar distributed to the participating farmers

Name _____ Baranguy _____ Contact # _____

Commodity Amparaya Area 10 m² Commodity Coc 003

Work	Material/Application	Quantity	Purpose	scheduled date	applied date
Field Preparation		10 m²		06/20/15	
Tiller		1m interval	make stright rows	07/01/15	
Raising seedling	Sowing	30 seed		07/01/15	
	Pot up	15 plant		07/05/15	
Fertilization	Cocoash	1.3 kg	basal Fertilizer	07/05/15	
Reseive Material	Fertilizer, Mulch			07/10/15	
Soil improvement	Compost	10 kg	application of organic matter	07/12/15	
Fertilization	Chicken manure	2.5 kg	basal Fertilizer	07/12/15	
Fertilization	Complete	0.3 kg	basal Fertilizer	07/19/15	
Fertilization	Urea	0.25 kg	basal Fertilizer	07/19/15	
Transplant		11 plant		07/20/15	
R*R Distance	100cm				
P*P Distance	90cm				
Fertilization	Complete	1 kg	Topdressing 1st irrigation	09/20/15	
Pest Control					
Harvest start		kg		09/25/15	
Harvest end	Total harvest	kg		12/25/15	

Source: JICA Study Team

Input 5： Evaluation of Economic Efficiency and Feedback

The project recommended a horticultural cultivation by using commonly known inputs and materials. The farmers are reluctant to spend extra cost in their farming, and may lose their incentive for the horticultural production. Thus, it was necessary to promote a coconut intercropping after participating farmers understand the cost effectiveness how the extra inputs can creates the sales profit.

For that reason, the intercropping was designed necessary input cost and profit expected from the activity was calculated. Once the farmers were indicated the cost effectiveness and

understood, the intercropping was started implementation.

All the cost of input was stated clearly by each unit area. Then the project requested the farmers to take records of sales for same unit area on order for the farmers to compare the cost and profit. Finally participated farmers understand the benefit of practicing the introduced techniques.

Project team collected feedback from the participating farmers about issues and points to be improved that farmers faced during the implementation, and reexamined a coconut intercropping model for further promotion.

Input 6: Preparation of Manual for Intercropping

A promotion manual to promote coconut intercropping was prepared for the purpose of continuous practice of coconut intercropping with horticultural production. This was compiled basic information and techniques improved with knowledge and feedbacks from the trial of project based on the simple technical manual made and distributed for the technical training to the participating farmers in the 'Input 4'.

The manual consisted of 2 volumes; one is for farmers and the other is for extension workers. The farmer's version contained basic information on agriculture and technical points necessary by the step of the horticultural practices. The latter one contained more detail of technical information and the notes when extension agents assist farmers to promote coconut intercropping in accordance with the contents of the former one.

(2) Achievement of the Project

Achievement 1：Creation of Organization Awareness

There was no particular input for organizing farmers' group, but participated farmers recognized the advantages of organizing through the activities in group during the project as a result.

The agricultural activities such as coconut farming are practiced generally by individual farmers in the target area, and the farmers are used to work together in a field. However, the horticultural trial was implemented in a common field and practiced by farmers group. Thus the assistance of inputs and materials as well as cultivation techniques were provided for each farmers group formed by barangay.

The participating farmers realized the advantages of the group work in particular for the agricultural practices such as weeding, training and procurement of input materials. As a result, farmers groups decided to continue working together for the second round of intercropping. Moreover, the farmers groups started having a communication with the LGU under favorable condition by group, and are to receive an administrative support to the continued activities.

Additionally, the farmers began to recognize an advantage of group work on developing and securing sales channels in the case of the increased harvest. Thus it is said that a foundation of the voluntary organizational activity was established through the project.

Achievement 2: Understanding and Practice of the Coconut Intercropping Model

According to the participating farmers, they were skeptical about horticultural production in the coconut field under the local condition, but become understood that the advantages and main points of the intercropping through the trial. They have become more ambitious for intercropping practice because they understand more about the characteristic of each crops and cultivation techniques. Moreover the officers of DA in region 8 and of an agricultural extension officer in Mercedes who had been skeptical with horticultural production in coconut fields due to the local environment such as climate and soil condition become more supportive to work continuously for the coconut intercropping with PCA.

The reasons why the farmers and officers changed their negative idea on the horticultural production was because the project showed adequate feasibility on the horticultural production for the local environmental condition. They realized that it is possible to practice it by using appropriate input materials and cultivation techniques which can manage those adverse environmental conditions. They learned the character of crops different by soil condition and good crop combination for rotation according to them.

The PCA developed and started to introduce a new planting method of coconut trees which can resist more from storm, and more adoptable to introduce intercropping from the experience of Yolanda. Recently, the PCA is started to distribute the coconut seedlings, and teach farmers the planting method. And they are also promoting coconut intercropping collaborates with the DA and LGU.

Achievement 3: Procurement of Input and Materials with Understanding of Cost Efficiency

The participating farmers participated properly learned and understood the importance of input materials for the efficient horticultural production through the project even though they had barely used materials in their backyard garden. As a result, the farmers started to procure the input materials autonomously.

Some input materials used in the horticultural production such as bamboo or wood stakes and used fishing nets were obtainable at free of cost from the area. Others such as compound fertilizers (14-14-14), compost and plastic mulch can be procured from the local markets or dealers. Farmers were unwilling to use inputs materials with cost since they were skeptical about the cost efficiency. With implementing the project, the farmers become to realize the high efficiency of the inputs by seeing the plant growth and harvest through the trial of the

horticultural production and become willing to use necessary input materials.

Nevertheless farmers cannot continue their horticultural production if the cost of input materials is too expensive to use. The cost spent in the horticultural production is shown in the following table.

Table 2.2-60 Price of input procured for the pilot

Input	Spec	Unit price	Quantity and Price / 10m^2							
			Bitter gourd		String bean		Okra		Sweet potatoes	
Vermi-compost	30kg	260	10kg	86.7	10kg	86.7	10kg	86.7	10kg	86.7
Chicken manure	25kg	230	2.5kg	23	3kg	27.6	3kg	27.6	2kg	18.4
Complete (14-14-14)	50kg	1400	1.3kg	36.4	0.7kg	19.6	0.7kg	19.6	0	0
Urea	50kg	1400	0.25kg	7	0.1kg	2.8	0.1kg	2.8	0	0
Coco-ash	Own	0	1.3kg	0	0.5kg	0	0.5kg	0	0.7kg	0
Micro nutrients	1kg	200	-	10	-	10	-	10	-	10
Silver mulch	400m	2400	10m	12	10m	12	10m	12	0	0
Training material	-	-	-	10	-	10	-	0	0	0
Pesticide	1L	400	-	10	-	10	-	10	-	10
Total cost / 10m^2	-	≒		P195		P180		P170		P125

Source: JICA Study Team

As shown in the above table, the costs of input materials per 10 m^2 by crop are 170-195 pesos for the fruiting crops; Bitter gourd, String bean, and Okura and 125 pesos for Sweet potatoes. The sales were 425 pesos for Bitter gourd, 750 pesos for string bean and 400 pesos for Okura only during 1/3 to 1/5 of total period of general harvest. The sales result indicates that the horticultural production can cover the cost of input materials even with short harvest period. Sales for sweet potatoes was not estimated the sales because the tubers were not grown in some reason and arrived at harvest during this trial.

Although the participating farmers understood the cost efficiency of inputs, but they are not quite ready to procure input materials by themselves because they have not been used to practice agriculture with certain cost. At the present, the participating farmers asked the PCA and the LGU to provide necessary inputs and materials as a subsidy to continue practicing horticultural production.

If the farmers continue to practice horticultural production by utilizing the techniques learned in the project hereafter, it is expected that the harvest and sales can be increased. The increase of the agricultural profit leads the farmers to procure the input materials by themselves in future. In fact, horticultural farmers in Leyte are procuring necessary inputs to practice commercial horticulture. The farmers in Mercedes are also expected to follow the good practice by realizing the profitability for more sustainability.

Achievement 4: Establishment of Agricultural Techniques Suitable for the Local Environment

Participating farmers are willing to practice techniques suitable for the environmental

condition which were introduced through the implementation of the project because they saw the improvement in terms of the growth condition, yield, and quality of the plant by comparison with their small horticultural production in backyard garden. In addition, the farmers are trying to modify the introduced techniques according to their own conditions by themselves. Adoptability of introduced techniques is evaluated by participated farmers along with the profitability and sustainability evaluated by study team is listed in the following table.

Table 2.2-61 Evaluation of Adoptability, Profitability and Sustainability of Introduced Techniques

Introduced techniques	Adoptability	Profitability	Sustainability
Field preparation: weeding and cultivation	○	◎	○
Nursery: nursery rearing with long period	Δ	◎	Δ
Fertilization: Basal and top dressing	◎	◎	○
Mulching: Using silver mulch	NE	NE	NE
Transplanting: planting at appropriate time	○	◎	○
Pant management: training, trimming, pruning	◎	◎	◎
Pest control: weeding and proper management	○	◎	Δ
Harvest method: harvest at appropriate time	NE	NE	NE
Cleaning after harvest	Δ	◎	Δ
Crop rotation: crop combination, order	○	◎	○

* NE: Not Evaluated: Activities which could not be evaluated.

Source: JICA Study Team

Among the introduced technology, fertilization and plant management is highly regarded in the participating farmers because it led increase of harvest and high profitability. Especially, the plant management techniques such as training were newly practiced by the farmers and Plant management, such as training, many of the farmers for the first time practiced and had a higher rating because they could get a visible effect in terms of appearance and harvest of crops. On the other hand, the nursery method and cleaning after harvest were considered as labor consuming by comparison with conventional way, the farmers had low appreciation.

Meanwhile, it should be noted that the silver multi, which had been expected to keep soil moisture, was not attainted to estimate its adaptability. Although certain of the water retention effects were observed, the initial investment cost was high and several seedlings were dead because of raising the soil temperature during hot and dry season.

Not all introduced techniques may be adapted in the future. However, practices such as fertilization and training methods indicate significant improvement in quality and productivity for the farmers. These techniques are expected to be established as profitability is realized by the farmers. It was an only one trial of the horticultural production this time, positive reputation

was disseminated to near-by area, and several farmers groups from Guiuan have visited these trial farms of the project. Thus it is expected to be extended to other regions hereafter.

Achievement 5： Effort to Attain Profitable Cultivation

Participating farmers recognized the economic efficiencies of coconut intercropping by the actual figure from the pilot and observation visit of the advanced area. The fact led them continue to practice the intercropping with horticultural crops hereafter.

As above mentioned, the harvest period ended shorter than what it should be due to drought and lack of management. On the other hand, farmers observed a longer and higher harvest at the field where farmers managed plants properly. Harvest at that farm was significantly higher than the conventional practice in the pilot trial. The following tables show the actual figure and profit which should have been obtained from the above good practice.

Table 2.2-62 Computation of Profit in Mercedes and Comparison with Actual Figures

Expected profit computed based on QIP results and growth period

Commodity	Area (m^2)	Input cost	Sales amount		Harvest period		Profit	
			Actual	Possible	Actual	Possible	Actual	Possible
Amparaya	10	195	425	2125	4	20	230	1930
String bean	10	180	750	2500	6	20	570	2320
Okra	10	170	450	900	5	10	280	730

Actual figure of a farmer in Barangay Sung-an (Mercedes) as a good practice

Commodity	Area (m^2)	Input cost	Sales amount	Harvest period	Profit
			Actual	Actual	Actual
Amparaya	100～150	Own supply	20,000～30,000	20～25	20,000～30,000
String bean	100～150		20,000～30,000	20～25	20,000～30,000

Source: JICA Study Team

As shown in the above tables, farmers at Sang-an, as a good practice, have been practicing a training when growing string beans and bitter gourd. They gain the sales of 20,000 to 30,000 pesos from the field of 100 to 150 square meters where they can manage satisfactory by two of them (husband and wife). Based on this figure with two times cultivation per year, this farmers household gains;

25,000 pesos / 1 cultivation period (in 100 to 150 square meters) x 2 crops / product x 2 cultivations / year = 100,000 pesos / year

It indicates 100,000 pesos a year can be earned by just two farmers in a family working. This figure indicates it is quite possible to earn about 90,000 pesos even after deduction of the input cost by just utilizing their own assets of land and labor.

The figure gave an incentive to try for intercropping with horticultural crops. However, it is going to be an issue if the production volume is expected to increase. It is necessary to perform additional market survey the capacity of demand in the neighborhood market.

Achievement 6: Fixation of the Coconut Intercropping and Construction of a Farming Model

Understanding concerning the importance of coconut intercropping was promoted through the activities of this project for all related local people such as participated farmers and the surrounding ones, including DA, LGU and PCA. Coconut intercropping promotion manual was prepared and distributed to concerned personnel to disseminate the idea of appropriate intercropping (Appendix-8 and Appendix-9).

The manual is based on the experiences compiled from pilot trial with the idea of original version that was prepared for the above input 4. It includes the useful information from all results of above mentioned achievements. It is also including feedbacks from participated farmers, opinions and technical advice from the DA of the region 8 and LGU.

In addition, newly developed planting-methods to withstand natural disasters which were established by the PCA is presented along with the knowledge of cultivation techniques for the promotion of intercropping with horticultural crops.

The manual was prepared for 2 types for different targets since the knowledge and cultivation techniques are different by users, farmers and extension officers. Those are expected that the manual is used extensively by the famers and governmental or international assistant bodies. This manual is expected to be utilized to promote coconut intercropping model which will extended and contributed to improve livelihood in areas with frequent natural disasters.

(3) Objective Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-63 Objectively Verifiable Indicators

Objectively Verifiable Indicators	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Participant farmers are provided with training (Number of farm households)	20 farm households	0	0	27	27
2) A technical manual for intercropping ins prepared	Prepared	Not prepared	Not prepared	Not prepared	Prepared

Source: JICA Study Team

With a general tendency of farmers being rather conservative, it is usually difficult to newly introduce farming technologies or cropping systems that they are not aware of. Removal of fallen trees through charcoal production and obtaining certain degrees of cash benefit from it may have been a factor that induced the participation of more farmers than initially expected. The experience of farmers in being able to shift from monoculture to mixed culture by adopting a cropping cycle of crops that they regularly consume is considered to be valuable for local agricultural practices. A cropping manual was also formulated through the project,

and through continuous revisions of the manual to fit local needs, it is expected that intercropping will further become popularized.

2.2.15 Integrated Culture of Oyster and Milk Fish Improvement for Sustainable Aquaculture and Livelihood (QIP-15)

(1) Inputs

Input 1: Cash for Work

The first input in this QIP was "Cash for Work" for clearing out debris, broken bamboos, torn nets, fallen coconut trunks, etc. caused by Typhoon Yolanda in the tidal flat where milkfish farming was carried out. A week long work by the typhoon victims successfully removed majority of the debris and returned the tidal flat water body to be passable safely by boats for the fisherfolk and other barangay people.

Input 2: Bathymetrical Survey and Planning Farm Layout

The Project in cooperation with BFAR-8 carried out a bathymetry study to obtain data on physical condition of the site for milkfish and oyster farming. It was found that the water body has limited area where sufficient depth remains for culturing fish during the low tide periods. Based on the study, the Municipal Agricultural Office determined to reduce the number of permits for fish farming to around 40 as well as the area for each permit to 1,000 m^2. Currently a total of 42 permits were issued. No permit is required for oyster farming as it is considered that the operation does not pollute water quality but cleans it by consuming plankton in water as food. There are currently 25 units of oyster racks of 100 m^2 each established in the tidal flat. The design of fish pen farming facilities and oyster growing racks are shown in Figure 2.2-14.

Input 3: Layout Fish Pens and Oyster Rack according to the Plan

The Project pegged out for every one of milkfish pens and oyster racks in the tidal flat water to make certain that each facility does not exceed the allowed size by the permits. There was at least 15 m distance between the adjacent milkfish pens to allow flow of tidal current and keep navigation passage for fisherfolk's boats. The finalized layout of milkfish pens and oyster racks is shown in Figure 2.2-15.

Input 4: Supply of Materials for Constructing Fish Pens

The materials required for construction of farming facilities were distributed to the owners who were members of Sta. Cruz Fish and Oyster Farmers Association and who lost their facilities by Typhoon Yolanda. Nomination for the beneficiaries were made by the association and approved by the Municipal Agriculture Office of Tanauan which subsequently issued the permits after scrutinizing the applications against pre-typhoon operation history and other records.

The Project also requested to each licensee to provide a proof of financial capability for supply of fingerlings and feeds as the Project will not provide any financial support for the operational cost (fingerling and feeds). All beneficiaries provided this before receiving the materials.

Input 5: Supply of Materials for Construction of Oyster Seed Collection Facilities in Leyte Bay in cooperation with Leyte Municipal Government

The Project provided materials (bamboo poles, nylon monofilament thread, and empty oyster shells) for construction of oyster seed collection racks and seed collection cultures to the fisherfolk in 8 barangays selected by the Municipal Government of Leyte in Leyte Province (Figure 2.2-16). The barangay chairmen selected the fisherfolk who then constructed the oyster seed collection facilities.

A total of 3.8 million oyster spats collected by these collection facilities were purchased at 0.05 peso each by the Project in two different collection times in October 2014 and in January 2015. The purchased oyster spats were transported to Sta. Cruz and hanged on the oyster growing racks by the owners.

Input 6: Visit to Higashi Matsushima Town in Japan for Exchange of Experiences and Series of Training

The Project funded four persons working in this QIP project a trip to Higashi Matsushima City of Tohoku region in Japan where oyster farming industry is established. Series of training including this travel to Japan are conducted in QIP-15.

Input 7: Support for Developing Pressure Cooked Milkfish Product

The Project in cooperation with the Leyte Provincial Agriculture Office developed a product of pressure cooked milkfish with the members of Sta. Cruz Women Fisherfolk Association (SCWFA).

The Project funded the construction of temporary processing hut in the barangay and provided necessary equipment for production of the processed product.

The Project arranged for the members of SCWFA, a series of training on production of pressure cooked milkfish, sanitary and hygiene of processing, and simple bookkeeping and accounting.

Input 8: Support for Developing Aquaculture Insurance

An arrangement was made for a meeting with Philippines Crop Insurance Corporation (PCIC) for possible development of aquaculture insurance to cover the fish farming operation and facility.

Input 9: Supply of Laboratory Equipment to Leyte Marine Biotoxins Testing Center and Commencement of Plankton and Water Quality Monitoring

The Project provided laboratory equipment to Leyte Marine Biotoxins Testing Center (Red Tide Center) for re-activation of the Center. The activity will benefit this QIP project in detecting presence of toxic plankton and accumulation of them in oyster so that safe product distribution of oyster from the project site is assured.

Leyte Marine Biotoxins Testing Center started conducting monitoring of plankton from December 2014. BFAR Region-8 also started water quality analysis from the same time. These institutions will continue monitoring to the end of project period.

Input 10 (Extension period): Supply of aeration system

The Project provided one set each of aerator system to every pen (total 42 units) for emergency aeration to cope with the oxygen depletion which had caused mass mortality in 2012. The system was based on the existing equipment used by some of the fish farmers before the Yolanda Typhoon. The necessary materials (compressor, air tank and air hose) are provided to the fisherfolk who then assembled them into the aeration systems. The engine for driving the compressor was not included in the supplied component but was prepared by the fisherfolk by themselves.

Input 11 (Extension period): Cost for completion of printed package for softbone bangus

The project completed production of printed package for softbone bangus during the extension period following the recommendations and advices from retail shops who actually sold the product and supporting government agencies. The analyses for nutrition contents and the shelf life period were conducted to print the mandatory information on the packages. Table 2.2-64 shows the cost provided for these analysis and printing of the package.

Table 2.2-64 Activities carried out for completion of printed package for softbone bangus

Item	Cost (Php)	Remarks
Package design	2,000.00	DOST, Package Designing Division, Manila
Nutrition analysis	15,480.00	DOST-7 (Cebu)
Shelf life determination analysis	31,833.00	Php23,233.00 (Real test), Php8,600.00 (Pre-test), DOSR-7
Production of printed vacuum package	355,680.00	50,000 pcs (Minimum order), iPak (Cebu)
Total	454,306.00	

Source: JICA Study Team

Input 12 (Extension Period)：Sales Promotion of Produced Pressure Cooked Milkfish Products

On the Job Trainings on sales activities of the product developed in “Input 7” were provided to the members of SCWFA through monitoring of production and sales activities and providing guidance and suggestions for efficient business operation. In addition, the members

participated in trade fairs and sales missions held by DTI to introduce and promote their products. Target sales, markets and sales strategies were identified based the lessons learned through this process and feedback from the buyers.

Input 13 (Extension Period) : Preparation of Business Plan based on experiences obtained during QIP period

The target sales, markets and sales strategies identified in "Input 12" were further incorporated into a business plan, which is expected to function as a guideline for the activities of SCWFA in the near future.

Input 14 (Extended Period) : Participation in the Value Chain Analysis Workshop and Follow-up Meetings

Representatives from SCWFA have also been participating in the milk fish VCA workshop and follow-up meetings (refer to "QIP-1: Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish)") on a regular basis.

(2) Achievement of the Project

Achievement 1: Recovery of Main Livelihood Support Facility for Fisherfolk by Construction of Farming Facilities

Facility construction of 41 units of milkfish pens and 25 units of oyster racks was completed with the material supplied by the Project and labor by the beneficiary fisherfolk. Additional construction materials were also provided for strengthening the structure after some of them suffered partial damages by strong typhoons Ruby and Seniang.

The materials supplied for construction of fish pen materials and oyster racks were 12,000 bamboos poles, 84 bundles each of two type of polyethylene nets, 924 kg of nylon monofilament thread and 210 spools of nylon twine. The fish pen and oyster rack owners borne the cost for construction laborers, mostly employed within the barangay.

List of equipment supplied in QIP-15 is shown in Table 2.2-65.

Table 2.2-65 Materials for construction of Milkfish and oyster racks

Item	Specification	Quantity
Materials for construction of milkfish pen and oyster farming facilities	PE Net 400/9 17k, 200MD, 100m	84 bundles
	GG net, dark, 17k	84 bundles
	Nylon monofilament, #150	840 kg
	Nylon monofilament #100	84 kg
	PE twine 400/12, 200m	210 roll
	Fishing needle	84 pieces
	Bamboo poles	12000 pieces

Source: JICA Study Team

Achievement 2: Technology Acquirement and Improved Project Participation through Training Including Visit to Higashi Matsushima City in Japan

The president of milkfish and oyster farming association, Municipal Agriculturist of Tanauan, and two officers of Leyte Provincial Agricultural Office participated in the trip and learned through observation and discussion with people about oyster and fish farming industries at Higashi Matsushima City of Tohoku region in Japan, post-harvesting technology and seafood marketing system. Some of the participants proposed technical improvements on the culture of milkfish and oyster, seeing from a new point of view based on the observations and discussions made during the trip to Japan, which in general increases the interest of stakeholders in participation of the project activities.

All trainings including this travel to Japan conducted in QIP-15 are shown in Table 2.2-66.

Table 2.2-66 List of training and seminar conducted in QIP-15

	Title	Date	Participants
1	Trail production of pressure cooking of milkfish at Office of Leyte Provincial Agriculture	July. 18, 2014	5
2	Trial production of pressure cooking of milkfish at Sta. Cruz, Tanauan	July. 30, 2014	20
3	Production of pressure cooked milkfish at Sta. Cruz, Tanauan with Basey fisherfolk women	August 13-14, 2014	40
4	QIP-15 Launching Ceremony (First stocking of milkfish and opening of processing hut)	Oct. 3, 2014	150
5	Improvement on Safety of soft bone bangus as food product (1)	Dec. 12, 2014	17
6	Improvement on Safety of soft bone bangus as food product (2)	Dec. 15, 2014	20
7	Aquaculture insurance meeting	Jan. 4, 2015	43
8	Simple accounting and book keeping (1)	Feb. 5, 2015	46
9	Food Safety and Good Manufacturing Practices	Feb. 11-12, 2015	25
10	Simple accounting and book keeping (2)	Feb. 13	45

Source: JICA Study Team

Achievement 3: Recovery of Main Livelihood Means by Harvesting Milkfish from Reconstructed Cages

All 41 owners licensed for milkfish pen operation and owners of 25 additional oyster racks under the Project completed the construction by December 2014. As of the end of February 2015, there were 17 units of milkfish farming pens stocked with fingerlings and feedings are on-going in these pens. Some of earliest pens stocked with fingerlings started harvesting fish from December 2014. Some are already in the second culture cycle, while others are yet to stock the first batch of fingerlings into their pens. The largest income source for most of these families has been or is going to be restored. Oyster farmers have stocked the seed oysters in their bamboo racks and are now taking care of them with the hope to harvest later this year.

Achievement 4: Strengthening Quick Recovery Capacity from Disasters by Development and Subscription of Aquaculture Insurance

An arrangement was made for a meeting with Philippines Crop Insurance Corporation (PCIC) for possible development of aquaculture insurance to cover the fish farming operation and

facility. The fish farmers were provided with free insurance package (only for the year 2015) for the fish stock, applicable and renewable every culture period. PCIC also provided an insurance package for the facility, tailored for the Sta. Cruz milkfish pen farming at 7 % premium charge of the covered value for the facility and 2% premium charge per crop cycle for the fish stock, which are under consideration for subscription by the association.

Achievement 5: Development of Pressure Cooked Milkfish Product as a New and Sustainable Livelihood Means for Fisherfolk Women

The members of SCWFA who learned the production of pressure cooked milkfish with the equipment supplied by the Project are now confident to make profit from sales of the product in and around the barangay. The association was able to distribute a divided of 900 pesos to each of the 14 active members from the accumulated profits before the Christmas holiday in 2014, in addition to the part-time payments for labor contribution for the production and the sales commission for each sale provided previously. The production of pressure cooked milkfish provided a new income source to the members of SCWFA. The pressure cooked milkfish by SCWFA is already an economically viable income generating activity.

Achievement 6: Establishment of Production Base of SCWFA for Pressure Cooked Milkfish through Equipment Supply and Training Implementation

The Project funded the construction of temporary processing hut in the barangay and provided necessary equipment for production of the processed product, including two units of peddling tricycles as listed in Table 2.2-67.

The Project arranged for the members of SCWFA, a series of training on production of pressure cooked milkfish, sanitary and hygiene of processing, and simple bookkeeping and accounting. The members of milkfish and pen farming association also participated in the training on simple bookkeeping and accounting. Resource persons for these training were called from various governmental and educational institutions in the region (Provincial and Municipal Agricultural offices, Department of Science and Technology (DOST), and Visayas State University (VSU)).

Table 2.2-67 Temporary hut for milkfish pressure cooking and cooking equipment

	Item	Specification	Quantity
1	Temporary hut for pressure cooking processing	4x4.5m concrete floor, bamboo mesh (amakan) and plywood wall, wooden poles, nipa thatched roof, tiled cooking table	1 building
2	Pressure cooker	All American® Pressure Cooker 941	2 units
3	Refrigerator	LG® GN-B201SLZ	1 units
4	Cooking utensils	Various small utensils	1 set
5	Peddling tricycle	Tricycle with steamer	2 units

Source: JICA Study Team

Achievement 7: Technical Improvement in Production of Pressure Cooked Milkfish

The Project submitted the pressure cooked milkfish product to DOST for microbial testing (Aerobic Total Counts) for determination of shelf life. The microbial counts for the sample products produced after the series of training on sanitary and hygiene for pressure cooking for the SCWFA resulted far below the reference value set by the laboratory, showing the product safety objectively in the standard method. Through repeated examinations, the Project also found wrapping the product in banana leaves provided consistently lower bacterial counts. Leaning the similar natural antibacterial effects were observed and scientifically proven in international journals, banana leaf wrapping is now included in the standard processing flow for production of pressure cooked milkfish by SCWFA.

Achievement 8: Reduction of Mass Mortality Risk of Overcrowding by Laying out Fish Farming Facilities based on Licenses Issued

Milkfish farming pens and oyster racks were constructed according to the layout strictly monitored by the Project with limited area per pen (1000 m^2) and minimum space between the adjacent pens (15 m). Monitoring of their operation together with the water quality and plankton analysis will ensure environmental loading from the culture activity to be within allowable limit to reduce the risk of mass mortality although a clear guideline and operational warning system still needs to be developed in order to link systematically the scientific data collection and the production practices.

Achievement 9: Collection of Oyster Seeds and Transplantation for Expansion of Livelihood Potential by Oyster Farming

The fisherfolk in eight barangays who constructed bamboo racks for oyster seed collection in Leyte Bay in Leyte sold more than 3.5 million oyster spats at 0.05 peso to the Project. The oyster seeds were transported to Sta. Cruz in Tanauan to be hung on the bamboo racks of the oyster growers who expect its harvest in 8 months. The Project activity of collecting seed oysters in Leyte Bay to transplant them to Tanauan provided possibilities of new income generation for the fisherfolk at both ends of oyster seed transportation.

Achievement 10: Improvement in Monitoring Function with Commencements of Plankgon Analysis by Leyte Marine Biotoxins Testing Center with Supply of Laboratory Equipment and Water Quality Analysis by BFAR Region-VIII

The Project provided laboratory equipment to Leyte Marine Biotoxins Testing Center (Red Tide Center) for re-activation of the Center which had stopped the operation since the laboratory hit by Typhoon Yolanda as shown in Table 2.2-68. The activity will benefit this QIP project in detecting presence of toxic plankton and accumulation of them in oyster so that safe product distribution of oyster from the project site is assured. BFAR Region-8 also started monitoring of water quality in the tidal flat water body where oyster and milkfish oyster

farming are conducted.

Table 2.2-68 List of equipment supplied to Leyte Biotoxins Testing Center

No	Name of Equipment	Quantity		No	Name of Equipment	Quantity
1	Microscope	1		14	Sedgwick Rafter Count. Cells	10
2	pH meter	1		15	Counter	2
3	Distilling apparatus	1		16	Rubber aspirator	3
4	Blender Machine	2		17	Glass stirring rod	12
5	Refrigerator	1		18	Graduated cylinder, 1L	3
6	Upright freezer	1		19	Mouse laboratory cage	35
7	Digital Balance	1		20	Plastic reagent bottle, 50 ml	500
8	Hot plate/stirrer	1		21	Desktop computer	1
9	Centrifuge	1		22	Printer/scanner/copier	1
10	Gas Stove	1		23	Auto voltage regulator	4
11	Biological Safety Cabinet	1		24	Portable diesel generator	1
12	Plankton net	16		25	Ventilator/Exhaust fan	2
13	Alcohol thermometer	16		26	Air conditioner	2

Source: JICA Study Team

Achievement 11: (Extension period): Progress on Milkfish Pen Farming

The project of QIP-15 provided materials for construction of fish farming facilities (pens) and the fisherfolk constructed the facilities using the provided materials. As explained earlier, the project did not support the funding for operation of fish farming but left that responsibility to each beneficiary fisherfolk. Those who found a funding partner for the operational cost (namely for the costs of purchasing fingerlings and feeds) started the farming activity as early as October 2014.

The summary of fish farming production as of January 15, 2016 is presented in Table 2.2-69. There are 31 units of fish farming pen facilities activated (stocked with fingerlings at least once) to date. As all the owners of these pen facilities with exception of one unit continue operating the fish farming using the same fish pens, there are 30 units of fish pens currently under operation. There were 69 times of harvests made by these 31 fish pen owners, or average production cycle per pen to date is 2.2 cycles/pen.

Table 2.2-69 Production and operation summary of milkfish from fish pens in QIP-15 at Sta. Cruz, Tanauan (as of Jan. 15, 2015)

Total fish pen constructed	No of operating and not-operating fish pens	Total no. of fingerlings stocking	Total no. of harvests	Total gross sales (Php)	Total net operational profit (Php)
42	31 - 11	69	47	11,774,934.40	2,841,088.00
Average fish rearing period	**Average no. of fingerlings stocked**	**Average weight of fish harvested (kg/cycle)**	**Average gross fish sale (Php/cycle) (a)**	**Average operational expense (Php/cycle) (b)**	**Average net income (Php/cycle) (a-b)**
125	6,918	2421	273,835.68	207,763.87	66,071.81

Source: JICA Study Team

Those who started earlier are already in the fourth cycle of fish production in January 2016. The total number of harvests completed was 47 from the 31 units of fish pens. The total gross

revenue in the 47 harvests amounted to Php 11,774,934.40. The average gross revenue per harvest was Php 273,835.68/harvest and the net profit for the operation was Php 66,071.40/cycle. The average amount of the share received by each pen owner per production cycle was half of this net operational profit, or Php 33,035.91/cycle/fisherfolk. The average rearing period was 125 days (about 4 months), therefore, the expected total net income from the operation of 3 production cycles for a year would be about Php 100,000.00/year.

Achievement 12 (Extension period): Reduction of Mass Mortality Risk by Aeration Systems

The milkfish pen farming at the site of Sta. Cruz, Tanauan, is conducted in a tidal flat water which is fairly enclosed and shallow, providing limited water volume for fish farming and the environmental condition varies considerably daily as well as seasonally. As the number of fish pens increased and the congestion of rearing pens in the limited water volume of tidal water progresses, the risk of mortality of fish reared inside increases. In fact, the fish farmers at Sta. Cruz experienced an incident of mass mortality which caused high mortality in most pens in 2012, the year before the Typhoon Yolanda hit due to excessive density of fish reared in the water according to the investigation concluded by BFAR RO-8. As the number of fish farmers restarting the fish farming activities increased during the extension period, there were reports on mortality observed by the fish farmers despite the measures taken at the time of project commencement.

The milkfish pen farming at QIP-15 used the same method of fish production in principle as it had been used before the Typhoon Yolanda. But in order to avoid the similar mass mortality problems observed in 2012, the project introduced several management mechanism at the time of project commencement: (i) limit the permitted water surface area for aquaculture production to 1,000 m^2 per unit of fish pen facility, (ii) reduce the total number of fish pens facility from over 50 before the Yolanda time to 42, (iii) layout the fish pen facility with more than 10m of space between adjacent units, and (iv) recommend to reduce the number of fingerlings stocked per unit of facility.

All these mechanisms were placed in the operation by the association under the Municipal Agriculture Office's supervision. As a result, for example, most fish pen operators now stock 7,000 pieces of fish per stocking and it is becoming the standard stocking density for Sta. Cruz pen farming after the recovery from Typhoon Yolanda. The number of fingerlings stocked before Yolanda was sometimes over 10,000 pieces per facility. Despite these measures, there were reports that fish mortality started showing in pens in the second quarter of 2015. During a monitoring visit in July 2015, mortalities of few fish per night were reported in the records of many fish pens. The fish farmers informed their observation that all fish in a pen were on the water surface, gasping for air which is a typical symptom of dissolved oxygen deficiency in the water. Those fish were suffocating of the respiration problem. According to the residents

at the village, the tidal flat water got shallower after the Yolanda super typhoon hit the village. It was caused by an extremely large amount of sand carried from the Leyte Gulf together with the storm surge waves that flooded the tidal flat. Sand filled the tidal flat to make the depth even shallower than before and reduced the effective water volume for rearing of fish.

If the dissolved oxygen level in the rearing water gets very low, it is possible that all fish famers would lose all the fish at the same time in one day. To avoid this catastrophic situation, the Project decided to provide aeration systems to increase the oxygen level at the time of emergency. The system designed for the provision was made of the components available in the local market. The compressor for a car air conditioning unit was used for pumping air. The stainless steel container for carbonated soda water drinks was used as the air reserve tank. The porous air hose sold for tube irrigation system is used as the air diffuser. The engine for driving fishing boat was used for driving the compressor. The engine was not included in the list of supplied materials but asked the beneficiary fisherfolk to supply by themselves. One set of aeration system was given to each fish pen owner of the association.

Operation of the aerator requires gasoline or diesel for driving the engine and increases the operation cost. But the fuel cost would not be high because the frequency of use is low and the duration of each time of use is short for this emergency aeration which is used only when the dissolved oxygen level in the water reaches to the very low critical level, which appears only in early morning just before the sun rise and only when the three conditional factors (season, weather and tide) coincidentally match at the worst timing in the early morning. The operation time would be a few times in a growing cycle. But when such dissolved oxygen depleted condition happens, it would affect all the fish in the same water and potentially result in mass mortality. The provision of aeration system reduced the chance of having mortality for the QIP-15 fisherfolk. The mortality of Sta. Cruz milkfish pen farming per operation cycle on average was 12.5% while that of Basey milkfish cage farming was 44.2%, respectively. The attainment of this higher survival at Sta. Cruz is considered to have been a result of the aerator supply.

Achievement 13 (Extension period): Milkfish Pen Farming as an Alternative Livelihood Source for Capture Fishing

The milkfish farming at Sta. Cruz produced on average a net profit of Php 66,071.81 per cycle and each fish famer's share received after harvest was 50% of that profit, or about Php 33,000.00 per production cycle. The daily income was then Php 275/day as the rearing period for one culture cycle was 125 days on average. This is comparative to the minimum daily wage and considered to be a fairly good income for fisherfolk who are generally at a lower income category in the Philippines society.

Milkfish farming in pens is a work wherein the fisherfolk can use the special knowledge on fish and their habits obtained through the generation's working experiences in capture fisheries. It requires relatively light labor except during the times of installation and

maintenance of facility, and it is possible for the women to participate in the daily activities such as feeding. Due to these characteristics, it is also possible to do the fish farming as an additional family business while the male members continue doing capture fisheries works. Compared to the cage culture at sea, the milkfish farming at a shallow tidal flat which is well protected from the open sea with surrounding mangroves and a sand bar separating the waters is in a favorable condition for participation by women members in the village. In fact, there are 7 women members in the Sta. Cruz fish farming associations while all members of five Basey fish farming associations of QIP-1 are males only, and no female member actually going to sea for daily works. Because of these characteristics, the milkfish pen culture looks like a realistic alternative family business for the traditional capture fisheries at Brgy. Sta. Cruz, Tanauan although this potential contribution to the fisherfolk's livelihood improvement has not realized yet as discussed in the following section.

Achievement 14 (Extension period): Management Reform of Milkfish Pen Farming in QIP-15 for Improvement of Livelihood Condition of Fisherfolk

Milkfish farming is a highly profitable business. Table 2.2-70 presents an economic analysis for typical pen fish farming operation. This is a hypothetical situation where the fish farmer obtained enough money for the operation (fingerings and feed costs). It is an analysis when a fish farmer performs as an owner-manager for the operation. Based on the result, the fish farmer would get Php 39,000.00 per cycle of the 120-day operation or Php 327/day, and the farmer would get all the profit of course. It is 5.6 times (=Php 39,293/Php 7009) more than the time when it was operating as a partner of the investor. The return on investment (ROI), however, will lower slightly from 15% to 13%. The reduction in ROI is small because majority of the operational cost was covered by the investor's responsibility for fingerings and feeds (86.8% of the total operational cost) and the addition of the farmer's responsibility in the other components (costs for hire labor, repair and maintenance, and depreciations) are small.

Table 2.2-70 Analysis of milkfish pen farming operation at Sta. Cruz, Tanauan

FISHERFOLK = INVESTOR			
Revenue		Investment indicators	
Revenue from fish sales	277,200	Net profit	39,293
Expenses		Total Asset	66,640
Fingerlings	49,000	Total operational cost	237,907
Feeds	157,470	Return on Asset	59%
Registration fee to LGU	1,000	Return on operational cost	17%
Employed labor cost	7,600	ROI	13%
Overhead expenses	2,700		
Maintenance Expenses	636	Livelihood indicators	
Insurance premium	8,494	Net profit/work period	39,293
Depreciation	11,008	Working period (days)	120
Total Expenses	237,907	Daily net income	327
Net profit	39,293		

Source: JICA Study Team

As shown in Table 2.2-70, the profit of fisherfolk will increase greatly if the fisherfolk-investor partnership is dissolved and the former become a sole owner and manager for the operation. However, the total operational cost for a cycle of operation will be Php 237,000 which is not an amount expected to be prepared by the small scale fisherfolk.

A practical option for the fisherfolk to improve the profitability is for the fish farming association to take the investor's function. In fact, the fish farming association managed the financial requirement in the actual operations of milkfish farming during the project's extension period.

An international NGO, OXFAM, assisted the fish farming association of Sta. Cruz Milkfish and Oyster Farmer's Association in March 2015 with 1.5 million pesos for the operation of milkfish pen farming using the facility which were constructed by the JICA QIP. The association used the funds for the operation of five fisherfolk members who did not find the investment partner yet for the supply of fingerlings and feeds. The condition of this milkfish farming management was the same as that with the investor, that is, the association and the fisherfolk divide the net operational profit at 50% - 50% equal shares after the harvest. The other 50% of net operational profit was not given to the farmer but remitted to the association. Nevertheless, as the association works for the sake of members, it can be considered that the profit of the fisherfolk virtually increases with the increase in the share of each fish famer in the association. For example, the profit accumulated in the association's account can be distributed to the members as dividend at the end of year.

The association did not distribute the 50% profit deposited to its account to the members but used the money for supporting the operation of additional fish pen which did not have the investment partner. The combined amount from the operations by five fish farmers was enough to support a new operation. The total number of fish farmers supported by the association with the OXFAM funds became six after four months of operation. There were 10 fish farmers who did not find investment partners by the end of December 2105. If all the revenue from the OXFAM funds' supported operations were used for financing the other fish farmers without investors, on the assumptions that the operational costs and net profit are equal to the averages obtained in the actual operations, about a bit longer than one year is sufficient for the association to become the investment partner for the 10 non-partner members.

The association is actually intending to continue funding the other members who have already investment partners so that it would replace the investment partners with the association or removing all the outside investors from the management so that all members' operation would be financed by the association. It will take additional 50 months or 4.2 years to complete supporting financially for the 42 fish pen operations[9].

[9] Simulation for the association to be sole financial partner for all the fish owners for milkfish pen farming at Sta. Cruz,

Out of the 47 harvests, there was only one operation which resulted in operational loss (or 2% of 47 times of harvests). All the other 46 harvests generated net profits from the operations and the average profit for the 46 harvests was Php 68,659.00. The milkfish farming operation at Sta. Cruz, Tanauan, is very safe and high profit generating business. Therefore, it is reasonable to think that the association would get loans from commercial banks to increase the capital for acceleration of the process of internalizing the funding sources for all the farming operations.

The fish farming association is trying to find grant assistance partners for the capital injection, but commercial loans are also another option for the transformation of management system of the current partnership with investor to the new management with the association to be the funding sources for all the members' fish farming operations. If this can be realized, the members' living status could increase substantially in a short time. In line with this strategy, this project supported the preparation for applying to a NGO association, Save the Children, for the purpose described above which unfortunately was not accepted successfully. The idea in the proposal would be useful for the similar opportunity to the other potential funding sources.

Achievement 15 (Extension period): Progress on Milkfish Processing Activities

The project had been supporting the women groups in milkfish processing before the extension period. The work involved women in the fishing villages initially in QIP-15 at Sta. Cruz, Tanauan and later spread to the four fishing villages in QIP-1 at Basey, Tanauan. There are a total of five women processing associations involved in the activity. They processed the milkfish harvested by the fish farming operations of the same villages into pressure-cooked whole milkfish "softbone bangus", and sold not only in/around their villages but also in Tacloban and other nearby towns. The project and the cooperating government institutions (BFAR, DTI and DOST, and municipal governments) also provided marketing occasions such as trade fair and exhibits during celebrations or special occasions.

The five women associations processing softbone bangus were producing and marketing the

Tanauan

Months	Prod.cycle	Initial cash amount	Cost of operation /pen	No of pen supported	50% share to assoc.	Total profit to assoc.	Balance after harvest	Pens supported	Total operational pen
4	1	1,500,000	210,320	5 pens	34,330	171,648	620,047	2	7
8	2	1,671,648	210,320	7 pens	34,330	240,307	439,714	2	9
12	3	1,911,954	210,320	9 pens	34,330	308,966	328,039	1	10
16	4	2,220,920	210,320	10 pens	34,330	343,295	461,014	2	12
20	5	2,564,215	210,320	12 pens	34,330	411,954	452,328	2	14
24	6	2,976,169	210,320	14 pens	34,330	480,613	512,301	2	16
28	7	3,456,782	210,320	16 pens	34,330	549,272	640,933	3	19
32	8	4,006,054	210,320	19 pens	34,330	652,261	662,233	3	22
36	9	4,658,314	210,320	22 pens	34,330	755,249	786,522	3	25
40	10	5,413,563	210,320	25 pens	34,330	858,238	1,013,800	4	29
44	11	6,271,801	210,320	29 pens	34,330	995,556	1,168,075	5	34
48	12	7,267,356	210,320	34 pens	34,330	1,167,203	1,283,678	6	40
52	13	8,434,559	210,320	40 pens	34,330	1,373,180	1,394,938	6	46

Source: JICA Study Team

product but one of the issues for them to expand the activity further was the lack of proper processing places. Each organization was processing in temporary working places such as a part of barangay hall, member's house, or temporary hut. These temporary places were not appropriate for processing of food products and cannot be approved by government authorities. The softbone bangus produced in these places cannot be registered to the authority as a commercial product for sale. This made access impossible to those markets which do not accept products bearing no government certificates for commercial sales.
Through these experiences before the extension period, it became apparent that the softbone bangus needs to be improved to a higher quality product standard which can be certified by the government authorities. And for this to be realized, it is necessary to have a place which can be certified for safe food processing.

Under these conditions, the JICA Yolanda Rehabilitation and Recovery Project approved in May 2015 the construction of five processing plants in the barangays where five women processing associations (one in Tanauan and four in Basey) were working for production of softbone bangus. These processing plants were designed and are under construction to be certified for the government standards for processing practices (Good Manufacturing Practice: GMP) and for business operation (License to Operate: LTO). The completion of the buildings is expected to be in the middle of 2016.

The project with the expected completion of the processing plants worked on preparing the women associations to be able to utilize the facility immediately after the completion of construction and to take the maximum benefits from its establishment. This involved the activities for attaining higher product quality and uplifting of the associations' management capacity as discussed in the following sections.

Achievement 16 (Extension period): Obtaining a Patent for Softbone Bangus and Registration of Trademark

The pressure cooked milkfish is a unique product in the Philippines. There is no similar product in the market yet as far as the project knows. The cooking principle is the same as for canning and the pressure cooker used in the project is an ordinary pressure cooker (made in USA) for home canning which is available in household appliance shops of relatively large scale. But softbone bangus is unique in using whole fish to be processed and its special local seasoning of the producing villages. The material fish are cut from the dorsal side to pull entrails out but retains the shape of the whole fish.

The reason for good acceptance of softbone bangus in the market is its novelty or uniqueness. The method is simple and requires only ordinary household utensils. Therefore, anyone who learned the production method can duplicate the product. When the project sought the possibility of marketing the product through the largest supermarket in the town, the

possibility of obtaining a patent for the product was explored for protection of intellectual property for attaining some degree of security and prevention against possible product duplication by the others. Enquiries from the relevant government services found that intellectual property in general is not well recognized yet in the country, and therefore, there was little actual registrations of patent to the authority (Intellectual Property Office of the Philippines, Bureau of Trademarks: IPOPhil). There was no registered product of pressure cooked milkfish yet. Thus it was decided to try for obtaining a utility patent for the cooking process with assistance of a licensed agent for registration of patent recommended by the person providing services on intellectual property at the regional DTI office in Tacloban. The draft patent application was prepared by Ms. Imelda Sievert, whose office contributed for development of the product. Because of the well prepared draft, the application was accepted in the first trial and registered on August 29, 2015 with the patent number (2-2015-000251) at IPOPhill. The patent is registered with the ownership belonging to Sta. Cruz Women Fisherfolk Association (SCWFA), and the inventor as Ms. Imelda Sievert.

Together with the application for the patent, the project assisted SCWFA in the registration of the trademark. The applied trademark sought at this time was “softbone bangus”. Unfortunately, this name was rejected by IPOPhil by the reason the first part, “softbone”, was too general which might unnecessary exclude the right of other potential producers. When the alternative name was sought, the project was working for the establishment of a processing women’s federation as explained later and the new trademark “JALEYSA” was nominated and approved for the re-registration in one of the preparatory meetings for the federation by all five associations. The second application was successful and registered. The name JALEYSA is made of the initial syllables of Japan-Leyte-Samar and it signifies the cooperation between the Japan and the two provinces where the five women associations are based. The trademark includes the design with waves and a fish.

Achievement 17 (Extension period): Completion of Printed Vacuum Bag

To sell a processed food product to general public in the Philippines, the product officially requires to be registered at Food and Drug Administration (FDA) and the package needs to bear a certificate (Certificate of Product Registration: CPR). The package also needs to show the product’s nutrition analysis table and the product expiration date. The product registration is applicable for the product produced in a plant approved for Good Management Practice (GMP) and License to Operate (LTO) as prerequisites. Although the associations have to start the actual application processes after the completion of the processing plant constructions, they can prepare for the applications. The project assisted them regarding the works for completion of printed vacuum bag for softbone bangus, which included those analyses mentioned, professional designing of the package, and printing on vacuum bags at commercial printers.

The product nutrition analysis was usually carried out at a laboratory of DOST office of the region. The region 8 laboratory was damaged by Typhoon Yolanda and was not fully recovered yet, so the analysis was carried out at a commercial laboratory located in Manila arranged through the communication and logistic supports by the DOST main office, following the advices from the regional office near the project office in Palo.

The nutritional analysis of softbone bangus included legally required items (calorie, total fat, sodium, total carbohydrate, protein, vitamin A and calcium). As expected, softbone bangus had a high content of calcium and suggested the product was good for kids in the period of growth. A poster for promoting the product's suitability as food for small children was made based on the nutrient analysis.

The product expiration analysis which had to be done as soon as it is produced was carried out at the laboratory of DOST-7 located at Cebu because the project staff can hand-carry the product's samples in a good preserved condition with ice in a short time. A pretest was done to design the real test which set the target expiration days as 45 days. The real test which included sensory test by tasters started on January 5, 2016[10], and will end in the middle of February 2016.

The project also assisted the women's associations for finalizing the design of printed package and printing at a specialized package printer. The design was asked at Packaging Technology Division (PTD) of the main DOST office in Manila, where a JICA technical assistance was on-going. The completed design was used for ordering of printed package at a commercial package printer in Cebu. The project staff made a visit to the company on November 27, 2015, approved the final design on December 15, and gave approval for the wet design (with actual sample) on January 15, 2016. The product will be completed in 45 days and delivered by the end of February 2016.

Achievement 18 (Extension period): Establishment of Processing Women's Federation

If each women's processing association produces softbone bangus independently and sell in the same market, there will be competition among them for the same market. It is also difficult financially for each association to obtain the product registration and carry out the required analyses. For example, the project spent a total of Php 454,306.00 for making the printed package (50,000 minimum lot order) as shown in Table 2.2-64. It is not realistic to expect each association at the current state to be able to obtain this amount before starting operation in full scale.

Cooperation rather than competition among the five women's processing associations with

[10] Expiration date is mainly determined by bacterial count analysis after a set time of experiment. But the actual method varies according to product type. The laboratory determines the experimental design based on the result of preliminary test. In our case, the test included a sensory test by tasters and waited for the commencement of experiment until all tasters coming back from Christmas/new year holiday.

saving of the required costs is a reasonable choice for achieving the production increase and market expansion using the new processing plants.

For this cooperation to be made, integration of five processing women's association into a "federation" is proposed and consented by them in a meeting with representatives from all the associations. The first general meeting for establishment of the federation with all members from the five associations was held on November 22, 2015 and the federation board members were selected. The application to Security and Exchange Commission (SEC) to establishment of "JALEYSA Women's Federation Inc." was made on December 16, 2015 and registered on the same day with the company registration number: CN201535035 Each women's association will continue processing softbone bangus but the member associations agreed to divide among themselves the production of an order that is for more than 200 pieces. Until the processing plants are completed, the federation will start working on the distribution of printed package to each member association on cost. The package has all the associations' names with check boxes so that the responsible association for the product is traced from the check mark. The members agreed also to use the brand name of "JALEYSA" for the products not only softbone bangus but also for other processed products if developed by the member associations.

The total number of individual members for the federation increased to about 130 from 20 to 30 members for each association. Each existing association selected their representative and the board member for the federation was determined by a mutual vote by the five representatives. The management of new federation with the five processing plants is expected to demand more complicated and higher management capacity for the board. The formation of the federation can be said to have provided a practical structural reform of the management organization.

Achievement 19 (Extension period): Supporting Applications for Funding Assistance to Increase the Production Capacity

It is necessary to upgrade equipment accordingly to the increasing production capacity with the new processing plant. There is also a need for a bridging fund for the transitional period for production increase as most sales would be done on credit in which the supplier needs to invest the production cost first and wait for some time before the collection of payments. The project does not have budget to support for the operation of the new processing plants, and therefore, each processing association needs to find a new funding source for the smooth and fast management transition to the increased production capacity. The project made enquiries to the relevant government and non-government organizations for possible funding assistance to the women's associations, and found that Department of Labor and Employment (DOLE) was open for applications for its Kabuhayan (or livelihood) program (Integrated Livelihood and Emergency Employment Program: DILEEP) for the Yolanda typhoon victims in Leyte

province. The project then supported the application of the Sta. Cruz Women Fisherfolk Association (SCWFA) to this program which was submitted in December 2015. The amount of grant approved was Php 764,866 as shown in Table 2.2-71 to be used for: (i) procurement of additional equipment, (ii) bridging funds (up-front) funds for the transitional period of production increase, and (iii) operation cost for pen fish farming by SCWFA

Table 2.2-71 SCWFA's expenditure plan of DOLE Integrated Livelihood and Emergency Employment Program (DILEEP)

ITEM	Quantity	Unit price	Amount (Php)
Equipment			120,000.00
Tools	1 sets	50,000.00	50,000.00
Vacuum sealer	1 unit	40,000.00	40,000.00
Refrigerator	1 unit	10,000.00	10,000.00
Deep freezer	1 unit	10,000.00	10,000.00
Processing of softbone bangus			224,886.00
Fingerlings	14,000 pieces	7.00/pc	98,000.00
Feed, crumbles,	32 sacks	657.25/sack	21,032.00
Material fish	1300 kgs	92.50	120,250.00
Ingredients			57,200.00
Utility Gas	26 tanks	650.00	16,900.00
Utility power	2 months	2000/mo	4,000.00
Utility Water	2 months	1000/mo	2,000.00
Utility Garbage	2 months	1000/mo	2,000.00
Vacuum bag	3250 pcs	6.166	20,004.00
Transportation cost	2 months	1248/mo	2,496.00
Material fish	1300 kgs	92.50	120,250.00
Fish pen operation cost			420,000.00
Fingerlings	14,000 pcs	7.00/pc	98,000.00
Feed, crumbles,	32 sacks	657.25/sack	21,032.00
Starter	158 sacks	651.00/sack	96,348.00
Grower	162 sacks	710.00/sack	115,020.00
Finisher	128 sacks	700.00/sack	89,600.00
			764,886.00

Source: JICA Study Team

The first item of procurement of additional equipment is for upgrading the equipment according to the increasing capacity with the new processing plant to be built by the JICA project. The women's association was processing milkfish twice a month and plans to increase to twice in a week. The production will increase to processing of 7,800 kg/year material milkfish to produce 5,200 kg/year of softbone bangus product.

The second item of bridging funds for the transitional period for production increase is the funds required for the up-front cost to supply softbone bangus to the customers on credit sales which are expected to be majority of the large scale orders. The project expects to wait for two months to receive the sales revenue and the cost for the operation for two months based on the production plan (for 5,200 kg/year) is budgeted for this item.

The third item of operational cost for pen fish farming by SCWFA is the cost of milkfish farming operation for two pens (buying costs for fingerlings and feeds). This means that the women's processing association will perform as an investor for these fish pen operations,

which will enable the association to obtain the 50% profit share from the milkfish farming. The purpose of this activity is to reduce the buying price for the material milkfish for the processing. The expected association's income from the farming operation (Php 66,000/year from two pens) will be used to supplement the association's operational expenses and practically reduces the buying price of milkfish. Assuming the association uses all the profit (Php 66,000) for supplementing the buying cost for the material milkfish required for 6 months operation[11] (2,600kg = 5,200 kg/12×6), the income from the fish pen operation is equivalent to a reduction of Php 25.38/kg (=Php 66,000.00/2,600kg). The current buying price of milkfish by SCWFA is Php 110/kg, same as the other buyers. The reduction of this amount means the buying price will become Php 84.62/kg or equivalent to about 23% reduction in the material fish buying cost, and also means increase of profit as much. Inclusion of this activity in the women's processing association also allows diversity in income sources and contributes for management stability. This activity does not increase any labor requirement for the association and does not interfere with the labor management for the processing activity.

One of the reasons which limited market expansion for softbone bangus was the higher price compared to other milkfish processed products like deboned or marinated fish. By including the fish farming operation in the women's processing association's activity, it is possible to reduce the buying price of fish at a large amount and possible to reduce the selling price without reducing the profitability. When all five associations include the fish farming operation in their activities, the new federation can decide to make a reduction of selling price for the possible market expansion.

The project was able to support only SCWFA in Tanauan for the DOLE Kabuhayan grant. The women's processing association at San Antonio obtained the same grant from the Samar provincial DOLE for about Php 800,000. The other three women's associations were not able to obtain the similar grant but could possibly get a loan if the fisheries cooperative is established for the Basey Mariculture Park by Basey LGU as discussed in the section of QIP-1 earlier.

Achievement 20 (Extension period): Soliciting Government Supports for Improvement of Product Quality and Product Development

This JICA Yolanda Rehabilitation and Recovery Project has been implementing the activities in cooperation with various stakeholder institutions. The three fisheries QIPs kept good working relationship with BFAR RO-8 and LGUs which are the counterpart institutions defined in the MOUs for rendering the specified responsibilities.

For the implementation of the processing activities in QIP-15, BFAR RO-8 kindly supplied two units of vacuum packaging machines and one unit of chest freezer to the women's

[11] The required period for milkfish production is four months only and thus it is possible to operate three production cycles in a year. In this calculation, only two operation cycles/year are assumed with two-month rest period for repair and maintenance as well as for non-operation period for avoiding typhoon.

associations in addition to various technical services provided to them. A significant support in regards to the processing activities was the support from Department of Science and Technology Regional Office 8 (DOST RO-8). Before the extension period, DOST RO-8 supported SCWFA by conducting training for safety processing operation and advices for setting up a temporary processing hut and proper equipment. The office also assisted in providing the preliminary designs with appropriate work flow patterns for the processing plants at Sta. Cruz and Basey. The achievements in completing the printed vacuum bag designing and the conduct of the nutrient and shelf life analyses were also assisted by the same office.

Among the activities which were supported by DOST RO-8, the most significant work was through Eastern Visayas Food Innovation Center (EVFIC) on the product development for processed milkfish and oysters. The center has three processing machines currently (water retort machine, vacuum fryer, and spray drier) and will be equipped with freeze drier soon. It provides service to process the materials brought by small scale groups (associations, companies, and public offices) into test products. It also provides advices on various analysis, labeling, marketing, safety processing training, intellectual property protection through the network of the university and the DOST. The activities on product development by this QIP were also supported by EVFIC.

EVFIC was established by DOST in 2015 and transferred the management to Eastern Visayas University after the facility completion in the same year. This project was one of the most significant customers supported by the new institution. EVFIC had proposed to make a MOU with the JICA project and DOST RO-8 in December 2015 to continue the cooperative relationship in accordance to the operation manual for the new institution that was recently completed. As the QIP-15 was terminating the activities in December 2015, it was not possible to make such a MOU although it was a very welcome offer which supports the future product development for the newly organized JALEYSA Women's Federation using the five new processing plants.

Achievement 21 (Extension period): Progress on Oyster Farming and Processing Activities

The project collected oyster seeds from Leyte Bay three times between December 2014 and March 2015, and transplanted them to Sta. Cruz, Tanauan. A part of these oysters grew to the marketable size in July 2015, and the project carried out experimental sales.

While waiting for the oysters to grow, the project started working on processing of oyster using available material oysters from the Leyte Bay and Golden River Bay area in Basey in Samar province. Various oyster processed products were made at the Leyte provincial agriculture office in cooperation with the fisheries staff and later at the Eastern Visayas Food Innovation Center (EVFIC) for product development.

Oysters are usually sold in a shucked raw form similar to the other shell fish products in the region. Sometimes producers or retailers shuck the meat from the shell, but the final form that the consumers buy is usually in a shucked form. The price of oyster in a glass cup in the size slightly larger than whiskey glass (25 ml) is about 25 pesos at Sta. Cruz and generally the same level of price prevails in local markets in the region. The price for a piece of shucked oyster varies according to the size of oyster but is about 1 peso/pc based on the average number of oyster in the glass counted by the project.

The first oyster sale from the grower supported by the QIP project was carried out on July 28 for the larger sized oyster grown among those transplanted from Leyte-Leyte. The project tried to sell the oyster in a different form at a higher price than the traditional locally sold shucked oysters to increase profitability for the growers. The oysters that grew in clumps around the cultch line were separated into single shells and selected only those that were larger than 7cm in shell height. The oyster growers removed the biofouling materials on the shells carefully without damaging the shell. The cleaned single shell oysters were brought to seafood restaurants. One among them accepted to buy at Php 100.00 for 15 pieces on July 28, 2015. The price of single shell oyster is Php 6.67/piece which was about 6.67 times higher than the shucked oyster (Php 1.00/pc). The oyster sold well at the restaurant which has kept ordering the same until the time of this report writing. The record contains some oyster sales in shucked form, sold to the project for oyster processing as product development.

The summary of oyster records is shown by forms of marketing (single shell or shucked oyster) in Table 2.2-72. The total gross sales for the two forms were Php 39,488.00. There were 13 oyster farmers who participated in these sales, and therefore, the average income per farmer was Php 3,037.53/person for the sales in the period of 5.3 months. The sales record for the oyster sold through the traditional fisherfolk's network was not collected by the project. But it is expected that this form of sales is much more in volume and the total sale revenue is larger than the value shown in the table.

Table 2.2-72 Oyster sales from Brgy. Sta. Cruz supported by QIP-15 between July 28, 2015 and January 3, 2016

Product type	Total number of sales	Total quantity sold		Total number of pieces sold	Unit price (Php)	Amount (Php)
Single shell sales	52	5612	pieces	5,612	6.67	37,413.00
Shucked oyster sale	6	83	glasses	2,075	1.00	2,075.00
Total	58			7,687		39,488.00

Source: JICA Study Team

Only a few oyster farmers were operating before the Yolanda typhoon at Brgy. Sta. Cruz, Tanauan, because the milkfish farming which was considered to be much more profitable, replaced oyster farming that previously occupied the area. The recovery of oyster farming by the support from this project, therefore, added a new income source to most of the beneficiary oyster farmers.

When oyster spats were transported from Leyte-Leyte to Sta. Cruz, Tanauan, about 1,000 pieces of cultch were packed on a truck load. There were about 500 pieces of spats per cultch, the total number of oyster spats transported per time was then about 500,000. The price of spats was Php 0.05/pc and the charge for truck transportation was Php 5,000.00. The cost for oyster transplantation based on these real values obtained during the project implementation is calculated as shown below:

The cost for oyster transplantation from Leyte-Leyte to Tanauan
= (Price of spat × transported no. + transportation charge) / (Transported no.)
= (Php 0.05×50,000＋Php 5,000) / 50,0000 = Php 0.06/pc

It is not reasonable to expect that all transplanted oyster survives to grow at Sta. Cruz, but the majority should have died due to the difference in the environmental conditions between the sites taken from and transplanted to. This mortality, however, makes possible to select naturally the strong seeds which expect to grow well at the new site. As of the time of writing this report, the majority of oyster transported was still growing to the market size and not harvested yet. Therefore, it is not possible to make an estimate for survival for all the oysters transplanted to Brgy. Sta. Cruz. However, because of the very low cost for the oyster spat transported from Leyte-Leyte (Php 0.06/pc) and also because oysters do not need to be fed by the farmers, the oyster farming is expected to be profitable even if it was sold as shucked oyster at a low price. The cost for making the bamboo racks for the materials and cost for the marketing are the main expenses for the oyster farming operation.

Simple economic analyses for oyster farming using the same production system as the project constructed at Sta. Cruz with seed procurements from Leyte-Leyte for the case of marketing as a single shell oyster and as shucked oyster were presented in Table 2.2-73. The analyses were based on the actual values obtained in the experimental sales, production costs in this project, and market price in the region. A conservative survival value of 10% was assumed for the single shell oyster. For the case of shucked oyster sale, two survival rates were assumed at 10% and a more optimistic value of 20%.

Table 2.2-73 Economic Analyses for Oyster Farming Based on the Experience in QIP-15

Product form:	Single shell	Shucked	Shucked	Mixed
Survival:	10%	10%	20%	10%
Revenue				
Quantity, single shell in pc	33,600			6,720
Quantity, shucked in glass	0	1,344	2,688	1,075
Unit price, single shell/pc	6.67			6.67
Unit price, shucked /glass		25.00	25.00	25.00
Total	224,000.00	33,600.00	67,200.00	71,680.00
Cost of operation				
Oyster seeds (pieces)	16,800.00	16,800.00	16,800.00	16,800.00
Transportation of oyster	3,360.00	3,360.00	3,360.00	3,360.00
Maintenance of rack	2,000.00	2,000.00	2,000.00	2,000.00
Depreciation	3,600.00	3,600.00	3,600.00	3,600.00
Ice	2,800.00	224.00	448.00	649.60
Delivery	10,080.00	2,016.00	4,032.00	3,628.80
Total	38,640.00	28,000.00	30,240.00	30,038.40

Net profit	185,360.00	5,600.00	36,960.00	41,641.60
/day	507.84	15.34	101.26	114.09

Source: JICA Study Team

The result for the single shell oyster sale showed a very high profitability of the oyster farming with the gross income of Php 224,000/cycle of operation and the net income of Php 185,360/cycle due to the small total expenses without feed cost of Php 38,640/cycle.

When the oyster is assumed to be sold as shucked oysters as it is done in the traditional sales at local market at the selling price of Php 1.00/pc, the analysis for 10 % survival still shows profitability but the net profit is small, Php 5,600/cycle equivalent to Php 15.34/day only. This analysis does not count the fish pen owner's own labor as opportunity cost, therefore the "profit" of Php 15.34/day can be considered as the compensation for the labor. The amount is not sufficient for his/her labor as he/she can make more money by doing other jobs like fishing on the sea, vending fish in towns or work as a casual labor. This low profitability might be the reason for being replaced by milkfish farming when it was introduced to the village.

If the survival is assumed to be 20% instead of 10% as shown in the last column of Table 2.2-73, however, the profit increases about 7 folds to be Php 37,000/cycle or Php101/day, which could be attractive as a sideline business.

The assumed total number of oyster sold by an oyster grower in a year in the analysis for the single shell oyster sales is 33,600 pieces per year or 92 pieces per day. The frequency of current sale to the restaurant which actually keeps giving orders is about every 3 days for 107 pieces at a time, or 35.7 pieces per day. This means that the market necessary for one oyster farm operation to be able to make the profit of Php 507/day is equivalent to 2.6 restaurants (=92 pcs/35.7 pcs) that makes the same frequency of orders as the existing restaurant which is currently making order to the growers at Brgy. Sta. Cruz. In other words, the restaurant currently making orders is able to provide 38% of the market capacity to support one oyster farmer. For the 25 oyster farms, then 25 times or 65.7 restaurants (=25/0.38) of the similar size are required. So, the condition which makes the economic analysis to exist is not realistic.

Then, on the next analysis it is assumed that each oyster farmer sold in a mixed market condition in which 20% of total sales (on number of sold oyster) were sold as single shell oysters and the remaining 80% were sold as shucked oysters. The analysis resulted in a total net profit of Php 41,641.60/year, or daily profit of Php 114.09/day, which would be sufficiently attractive for the fisherfolk to think as a sideline business. On this assumption, the market requirement for the single shell oyster at high priced restaurants is accordingly reduced to 20% of the first case. One restaurant making the orders at the same frequency and volume as the current customer restaurant can support 2 oyster farmers (≈1.92 = 0.38/0.2). For the 25 oyster growers to be supported, there are 13 of similar sized restaurants (=25/1.92) required. It is a drastic market expansion but not impossible depending on the market expansion strategy.

Based on the above analyses, the traditional oyster sales as shucked oysters generates a small profit (Php 15.34/day) to the oyster farmers and would not generate sufficient profit for the operators to make any investment in expansion and improvement of the oyster farming. This would have been the reason that the oyster farming at Sta. Cruz, Tanauan, has remained in the low profitable traditional method which needs only small facility cost for the operation. This project showed that the better oyster farming method can be achieved technically with separation of seed collection stage from the grow-out stage in an actual example carried out at Sta. Cruz in cooperation with the fisherfolk at Leyte Bay in Leyte municipality. This technically demonstrated method improves the farming efficiency and increases the oyster production but its operation requires an additional investment in procurement and transportation of oyster seeds, which was not necessary in the traditional farming system. In order to implement this type of oyster farming, therefore, the farmers need to obtain higher profit with a higher market price. The sales as single shell oyster are one way to increase the profit. Another is to add value by processing as shown in the next section.

Achievement 22 (Extension period): Test Production of Processed Oysters by Vacuum Frying

While waiting for the transplanted oysters to grow at Sta. Cruz in the early half of 2015, the project, which realized that value addition to the produced oyster is the dividing factor for the transition from the current low efficiency farming system to the improved system with separation of seed collection and grow-out phases for production expansion and thereby for livelihood improvement for the growers, started working intensively on processing of oyster for value addition.

The material required for the processing trials were collected from Leyte-Leyte where the project collected seed oysters. It was a place well known for oyster production in Leyte province. The other site where material oysters were collected was the Golden River area near the town proper of Basey in Samar province, which was introduced by the fisheries officer of the municipal agricultural office. The project asked the fisheries section of the provincial agricultural office of Leyte province for the processing trials, which had worked for development of softbone bangus earlier. Various processed products of oyster were produced by the office. The examples produced for evaluation include: oyster cookie, cupcake, oyster ball, kroepek. These test products were tasty but similar products using other seafood materials were already in the market at cheaper prices than oyster product. Some other oyster products which were sold commonly in supermarkets such as oyster sauce and smoked oyster were also produced but it was found that the quality and packaging standard of the small-scale women with the equipment and facilities which they could have in the limited financial capacity cannot be competitive with the existing products

While continually trying to find a feasible processed product which could give a higher sale

revenue to the producers, the office of DOST RO-8 recommended the project to approach the newly established Eastern Visayas Food Innovation Center (FIC) for product development. One of the products developed using the vacuum fryer, vacuum fried oyster, showed a potential for market sales. The center had processed various raw materials such vegetables, fruits and crustaceans and even shellfish, but had never tried oyster. The vacuum fried oyster has not been developed by any producer and sold commercially. The taste was unique and good. The problem was the high price of material oyster to make the finished product affordable to customers. So, cheaper materials were tried to be mixed with the vacuum fried oyster so that the total volume of the package increases without much affecting the cost of vacuum fried oyster. After hearing from various stakeholders in tasting events to determine the materials to be mixed, a product composed of a mixture of vacuum fried oyster and peanut was produced and named as "Oyster Peanut Mix".

The cost calculation for the oyster peanut mix resulted in Php36/packet of 50 g (40g peanuts and 10g vacuum fries oyster) at the market price of material oysters with 35% of net profit. At a hypothetical buying price of the material oyster at Php1.47/pc (or 47% higher than the market price), the product selling price with the same 35% net profit becomes Php40.00/packet. The market evaluation for this product has not been done yet so it is not yet proven if this processed product can provide a higher income to the oyster grower. However, the preliminary test sales to limited customers and other stakeholders including BFAR RO-8 which placed an order of 1,000 packets were encouraging. A large portion of the production cost is occupied by the high costs of packaging and for the vacuum frying fee at FIC. The cost can be drastically reduced if these two costly items are reduced by internalizing the activities (vacuum frying and sealing by themselves using their own equipment). If the product is marketable above Php50.00/packet, the profit of oyster growers' increases, so that they can invest the profit for buying seed oysters to transplant them to the growing racks. This would further improve the productivity of farming and increase the product volume. The marketability of this processed oyster would allow the oyster farming business on an upward spin.

Achievement 23 (Extension Period): Continued Production and Sales towards Stable Business Operation

SCWFA of the Municipality of Tanauan is one of the first groups to be actively engaged in food processing and sales activities supported under the QIPs implemented under this Study. With the pressure cooked milkfish products produced by the association being a unique product in the Philippines, the support under the QIP is implemented with the view of selling the product to the national markets in the future. However, the association is a group that was established under the course of QIP implementation and is not necessarily an entity that has due experience in business operation. Therefore, On the Job Trainings (OJT) were provided for the association with the aim of achieving stable production and sales, together with

development of their abilities in market development. Upon OJT activities, preliminary targets were set by analyzing the costs for production and by determining the amount of income that the members expected from the activity.

Table 2.2-74 Preliminary Targets for Production and Sales by SCWFA

	Target
Frequency of Production	3time / month
Amount of Product to be Produced	60kg / month
Amount of Sales	PhP 26,400 / month
Labor Cost (Income of members)	PhP 6,450 / month
Balance (Sales-Production Cost)	PhP 258 / month

Source: JICA Study Team

Taking into consideration the relatively high price of the product (PhP 440/kg), major super markets, restaurants and souvenir shops, which were considered to be used by consumers with relatively high income, were determined as the target markets. Sales promotion activities were carried out in the same way as in "QIP-1: Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish)", where the Study Team members accompanied the association in actual sales promotion activities. As a result, deals were closed with several restaurants and super markets, including those of Tacloban, for regular purchase of the product. In addition, the association also actively participated in trade fairs and sales missions held by DTI in the same manner with "QIP-03: Regenerating Local Livelihood through Processing of Agriculture and Fishery Products by Small-Scale Community Groups".

The situation of sales of SCWFA is shown in the following table.

Table 2.2-75 Situation of Income and Expenditures of SCWFA

	Apr.	May	Jun.	Jul	Aug.	Sep.	Oct.	Nov.	Dec.
Expenditure	11,936	0	8,181	12,670	9,392	10,772	0	0	0
Income	12,060	2,766	3,644	9,71	14,394	22,115	0	0	0
Balance	124	2,766	-4,537	-2,960	5,002	11,343	0	0	0
Accumulated Balance	124	2,890	-1,647	-4,607	395	11,738	11,738	11,738	11,738

Source: JICA Study Team

It can be said that SCWFA was able to obtain considerable amount of experience actual in production and sales activities. However, there are still numerous issues that were observed during the extension period.

a) Improper Use of Operation Fund

In August 2015, it was found out that the book keeper of the association was allocating the operation fund as cash loans to the Barangay residents without informing the members. A meeting was held to discuss this issue and as a result, a decision was made to replace the book keeper. However, the former book keeper refused to hand over the cash records, which lead to a temporary lack of information on the exact figure of cash balance and operation fund. The Study Team suggested the association to maintain its cash in a bank

account with multiple signers so that no individual can mobilize the cash on her own. However, the association members decided to maintain their fund in cash because they do not have good access to banks from their Barangay. After this incident, there have been no inappropriate incidents on cash management.

b) Unclear Criteria for Distribution of Benefit

At the time when the women's association was established, there were no detailed discussions on how the benefit should be distributed among the members. Due to this, many of the members expected their share even if they were not active in participating in the activities. This caused confusion when discussions on benefit distributions were held. This was later solved through a series of meetings among the members.

c) Disputes Among Members

There were cases observed where some members tended to oppressively order other members on what to do at times of production activities. Such attitude often leads to personal disputes, which sometimes resulted in stagnation of group activities. During the extension period, the association was not able to solve such issues on their own, and the Study Team usually had to mediate the situation.

d) Strong Dependency on the Study Team

In General, the association was seen to be very active under the presence of the Study Team. However, they were usually reluctant to plan and carry out their activities on their own. This was especially apparent when it came to activities for market development. Autonomous activities on market development were seldom seen throughout the entire period of the QIP. Though the question on why the association was not active in such activities was raised to the association many times, the reply was usually the lack of time, which was not found very convincing. It could be assumed that the reason was similar to that noted in "QIP-1: Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish)", where women fisherfolk were frightened that they might get turned away by the shop owners if they visited the shops only by themselves. The Study Team had made many efforts to have the association experience good outcomes from their sales activities, just to avoid them feeling powerless. However, it must be admitted that such experiences were not necessarily enough to empower the association in term of their mindset.

Achievement 24 (Extension Period) : Preparation of a Business Plan

A Business Plan, which is expected to function as a guideline for the activities of SCWFA in the near future, was developed based on the results of "Achievement 23". The basic composition of the contents of the Business Plan is the same as that described in "QIP-01: Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage

(Milk Fish)".

Achievement 25 (Extension Period) : Participation in the Value Chain Analysis Workshop and Follow-up Meetings

The representative of the association has been participating in the VCA workshop and follow-up meetings. As described earlier in "QIP-01: Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish)", these meetings are expected to benefit the association by connecting them to different stakeholders, which can become potential vendors for ingredients or buyers of products

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-76 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Milkfish farmed with environment-friendly and sustainable integrated aquaculture system is harvested (kg/m^2/cycle)*	3.2	2.9	0	1.9	2.4
2) Farming families gain stable income by milk fish production system (thousand Php/farmer/ year)*	114	130	0	164	274
3) Oyster farmed with environment-friendly and sustainable integrated aquaculture system is harvested (ton/rack)*	2.4	0.9	0	0	7.5
4) Farming families gain stable income by oyster aquaculture system (thousand Php/farmer/year)*	36	9	0	0	75
5) Farmers gain the capacity for management and farming technology for oyster and milkfish (number of farmers)	Oys: 25 Mlk: 42	Oys: 10 Mlk: 50	Oys: 0 Mlk: 0	Oys: 0 Mlk: 2	Oys:25 Mlk:42
6) Processing members start the processing fish from submersible fish cage (number of members)	20	0	0	14	20
7) BFAR and Municipal officers master the technology for procurement, management and operation of integrated aquaculture system. (number of Municipal officers)	2	0	0	0	2

* harvest and income upon completion is calculated based on the average price: Php 100/kg.

Source: JICA Study Team

Although the milk fish production of 2.4kg/m^2/cycle is less than the initial target of 3.2 kg/m^2/cycle, the income from the harvest is PhP 274 thousand/farmer/year, which is more than twice of the initially expected 114 thousand/farmer/year. This suggests the economic sustainability of the integrated farming of milk fish and oyster introduced through this project. The women engaged in processing activities have also reached the initial target, and with the good reputation of the product in the market, the completion of the processing facility constructed under QIP 21 is expected to further open the door for the products to access larger markets.

2.2.16 Training on Disaster Resilient Construction Technologies through Reconstruction of Elementary School (QIP-16)

(1) Inputs

Input 1: Design for Reconstruction of Camire Elementary School

The two-Classroom building damaged by Typhoon Yolanda at Camire Elementary School was reconstructed. Since the site was located at a low elevation area which was prone to flooding during heavy rains, a two-storied building with four classrooms was designed so that the second floor can be utilized as an evacuation center during disasters, especially flooding.

DepED submitted a standard plan of the school building, and JICA Study Team reviewed it. In preparation of the drawing for the reconstruction of the building, the structural frame of the building (i.e., foundation, column, and beam) was reinforced and improved, and modifications were made on the truss and roofing system in the same way as PHO (see section 2.2.2) to have a disaster resilient roofing system. The completion figure is shown in Figure 2.2-17.

Input 2: Bidding/Contract of Reconstruction of Camire Elementary School

The bidding procedure for the procurement of the project was done among the contractors who experienced the first batch of the QIPs in the same way as PHO (see section 2.2.2).

Open competitive bidding system was adopted in the selection of contractor and two-way envelope system was used in the submission and opening of bids in the same way as PHO. Likewise, BOQ or Fixed Unit Cost system was used for the contract.

In the payment process, adjustments were made in the same way as PHO, where the percentage of advance payment and progress payment were adjusted based on the experience through QIPs first Batch to avoid any delay caused by financial deficit for the contractor.

Input 3: Reconstruction of Camire Elementary School

In the same manner as PHO (see section 2.2.2), JICA Study Team inspection team supervised and monitored the implementation of the project to ensure the quality of construction. Regular site meetings were held with the contractor to monitor the progress of construction and to discuss technical issues encountered in the project, quality and schedule.

Input 4: Training of Construction Technology

JICA Study Team provided a training program of the Japanese construction knowledge to TESDA carpentry graduates (certificate holders) through the reconstruction of the Elementary School. Japanese expert workmen conducted practical trainings on the basic technology and construction methodology for the local people to learn the secure construction techniques specifically on formworks, rebar and concrete works.

Likewise, site orientations were also widely conducted targeting technical staff of the neighboring LGUs and the contractors of QIPs.

JICA Study Team also incorporated the import of the training activities in the instructional video furnished to TESDA to be utilized as a training material for skills training curriculums.

(2) Achievement of the Project

Achievement 1: Revising the Design of Camire Elementary School

The result of the soil bowling test conducted by the contractor after the construction contract indicated that there was a low bearing capacity layer at 2 m or below from the natural ground line, and it was predicted that the ground surface would be settled about 10cm in long term. Therefore, JICA Study Team discussed with DepED and LGU regarding this issue, and changed the original design to a two-units, one-storied, four -classroom building.

DepEd submitted the standard plan for the school building. Accordingly, JICA Study Team reviewed the strengthening measures for the critical sections of the structure in the same manner as PHO (see section 2.2.2), such as the structural frame of the building (i.e., foundation, column, and beam) to ensure the strength and stability of the structure. Taking into consideration the low load bearing capacity of the soil, the design of the foundation was revised into a stronger structure. Upon revision of the design, the following Japanese-Style reinforcement measures were applied:

a) The foundation was re-designed to a continuous-footing type with tie-beams to ensure stability of the structure suitable for the soil bearing capacity;
b) The floor line was elevated to 1 m height above the ground line to prevent flood waters, which usually reaches up to 0.8 m when floods occur;
c) The truss and roof were designed as a disaster resilient system in the same way as 2.2.4.

The design of the structural frames (i.e. columns and roof beams) including steel reinforcement were revised for additional strength of the structure.

Achievement 2: Bidding/Contract of Reconstruction of Camire Elementary School

In the selection of prospective bidders, JICA Study Team invited three QIP experienced Contractors.

JICA Study Team adopted the open/competitive bidding system and two-envelope system.

The bid opening was done at the presence of the bidders. Only two bidders were able to submit their bid proposals on time. During the preliminary opening of bid proposals, the technical proposals of both bidders were qualified for the next round of evaluation. The opening of the financial proposals followed, and both of the bids were above Approved Budget of the Contract (ABC). Detailed bid and arithmetical evaluation was done on both

technical and financial proposals for I.D.A. JR BUILDERS AND CONSTRUCTION SUPPLY, having the lower bid was first priority, but the calculated bid amount was still above the ABC. However, with the bid variance of less than 5%, the contract cost negotiation to be below the ABC, and awarding of contract was proceeded.

BOQ/Fixed Unit Cost system was adopted to address settlement of working quantity variation together with the amendment of contract amount for the project.

Payment condition was adjusted in the same way as PHO (see section 2.2.2) to avoid any delay caused by financial deficit for the contractor. Price escalation was not applied since the contract was only for seven months. Three months defects liability period was also adopted for the project in the same way as PHO.

During the project implementation, the contractor had requested for time extension for the following reasons: 1) revision of design of building from two-Stories to one-Story, 2) revision of various scope of works, 3) Scarcity of Portland Cement and roofing materials. JICA Study Team and DepED together evaluated the reasons for extension, and found it was valid and 60 calendar days was granted as time extension to complete the project.

Achievement 3 Reconstruction of Camire Elementary School

JICA Study Team and DepED together inspected all of the construction materials in the same way as PHO (see section 2.2.2). JICA Study Team prepared on-site inspection plans based on the construction plan and schedule submitted by the contractor in the same way as PHO.

For the inspection the foundation, alignment, depth and bearing capacity were the main items. Since installation of re bars cannot be inspected visually, it was conducted before formworks closure.

Concrete works was inspected through trial mixing, mixing ratios, skills of mixer operator, placing method and operation of vibrator.

In case of any failure or default in the works, inspectors issued site instructions to the contractor with the appropriate corrections, demolition and re-work instructions if necessary.

The following are the main site instructions given to the contractor during the reconstruction of Elementary School:

- Damaged concrete hollow blocks were not allowed for installation and must be replaced;
- Main re-bar splice at incorrect positions should be relocated properly;
- Check and correct horizontal level of slab forms;
- Replace undersized gusset plates;
- Provide additional bracing of formworks to prevent deformation during concreting of sloping column at building with stage;
- Plug holes or gaps on welded joints of some tubular purlins at stage canopy;

- Provide purlin cleat as additional support on tubular purlin with pipe truss connection at stage canopy;
- Correct welding joints gap of pipe railings (vertical and horizontal);

Provide putty on uneven concrete surface prior to first or second paint coating.

Achievement 4: Technology Transfer of Construction Technology

a) Technology Transfer though Actual Construction Works

Two Japanese expert workmen, Mr. Noel Watanabe (welding expert) and Mr. Katsuya Usui (roofing expert) conducted practical trainings at the construction site to TESDA carpentry course graduates employed through the contractor and TESDA carpentry trainers depending on the progress of the construction (June 17-July 27, 2015 and August 21-September 28, 2015). Hands-on training on formworks, re-bar works and concrete works were conducted through the reconstruction of the Elementary school, with the following contents.

1) Formworks

- To ensure security and safety in the work environment
- To layout building lines and boundary at site correctly
- To draw layout line on formwork board for proper cutting and nailing
- To install formworks with the correct vertical alignment with the use of plumb bob
- To install formworks support with proper pitch
- To study removal procedure

2) Reinforcing Steel Bar (RSB)

- To ensure correct bending of rebar and hook end
- To install rebar with the proper spacing interval
- To properly fasten rebar using tie wires
- To keep the minimum length of splices
- To install splices without any overlap

3) Concrete

- To study the structural theory of reinforced concrete
- To study the relation of concrete mixing ratio and strength
- To mix concrete properly using concrete mixer
- To control quality of concrete through site mixing and mixing ratio during slump test
- To pour concrete uniformly using vibrator

Major training participants are shown below:

Table 2.2-77 Major Training Participants

	TESDA Graduates	Non-TESDA Graduates
Participants	4	7

Source: JICA Study Team

Training Program by Japanese expert workmen was as below:

Table 2.2-78 Training Program

No	Date		Subject	Participant
1	2015/6/30	Tue	Training overview on Formworks, RSB and Concrete (Footing and Column)	9
2	2015/7/15		Formworks on Footing and Column	11
3	2015/7/16		Formworks on Footing and Column	11
4	2015/7/21		Rebar works on Footing and Column	11
5	2015/7/22		Rebar works on Footing and Column	11
6	2015/7/27		Concrete works on Footing and Column	11
7	2015/8/24		Concrete works on Footing and Column	11
8	2015/9/2		Training Overview on Concrete Works (Column and Beams)	11
9	2015/9/3		Concrete Works on Column and Beams	11
10	2015/9/4		Concrete Works on Column and Beams	11
11	2015/9/7		Concrete Works on Column and Beams	11
12	2015/9/8		Concrete Works on Column and Beams	11
13	2015/9/9		Concrete Works on Column and Beams	11
14	2015/9/10		Concrete Works on Column and Beams	11
15	2015/9/22		Concrete Works on Column and Beams	11
16	2015/9/23		Concrete Works on Column and Beams	11
17	2015/9/24		Concrete Works on Column and Beams	11
18	2015/9/25		Concrete Works on Column and Beams	11
19	2015/9/28		Concrete Works on Column and Beams	11

Source: JICA Study Team

b) Site Orientation

In order to introduce the contents of technology transfer by the Japanese experts to Local Engineers, site orientations on the basic knowledge and skills on formworks, reinforcing steel bars and concrete works were also organized through the invitation of Municipal Engineers, contractors recommended by LGU together with the TESDA carpentry graduates (certificate holder). Two orientation programs had been held; 1) Formworks and Reinforcing Steel Bars (RSB), and 2) Concrete with the summary of training content mentioned the above.

Detailed subject and participants are shown below:

Table 2.2-79 Site Orientation Program

No	Date		Title	Subject	Participants		
					Total	From	No.
1	July 24, 2015	Fri	Formworks and Reinforcing Steel Bar Works on Footings and Columns	Fabrication, Installation and Removal of Formworks	17	Trainee	6
				Bar bending, cutting, splicing, hook and installation		LGU	2
				Material testing and quality control		TESDA Trainer	7
				Basic Practice		DepED Teachers	2

No	Date		Title	Subject	Participants		
					Total	From	No.
2	Sept. 11, 2015	Fri	Concrete Works on Columns and Beams	General Knowledge	16	Trainee	11
				Material Testing and Quality Control		Contractor's Workers	5
				Basic Practice		TESDA Trainer	0
						Contractor	0
Total							**33**

Source: JICA Study Team

c) Training material:

The contents of training activities conducted during the reconstruction of Camire Elementary school and QIP-17: Reconstruction of NAS – Phase 2 was compiled into technical manuals for formwork, re-bar installation and concrete works (Appendix-10, 11 and 12). Training instructional videos were also edited with TESDA based on training activities, and facilitated to TESDA Region 8 office. The enhanced training manuals and videos are intended for use in TESDA Institutes and TESDA accredited Technical-Vocational schools offering carpentry and masonry courses within Region 8. Moreover, TESDA Region 8 will be forwarding the Training Manuals to their central office for evaluation and approval of the added competencies in the manuals so it can be utilized in all TESDA Schools nationwide.

The content of training manual was named "technology of formworks, re-bars and concrete" as the new training material of TESDA. It is composed of; 1) cut, fabricate and install Formworks as indicated in the drawing, 2) cut, bend and install Re-bars as indicated in the drawing, 3) install Concrete with dimension and required strength as indicated in the drawing. The prepared video covers actual training activities on formworks, re-bars and concrete works through reconstruction works, as well as training instructions. Editing of the video was done through regular discussion with TESDA trainers in charge of carpentry, re-bar installation and concrete works so that it would be suitable for use in TESDA curriculum.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-80 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) TESDA's graduates and trainers obtain disaster resilient construction technologies through the construction of building. (number of TESDA's graduates and trainer)	6 persons	0	0	13	24
2) Engineers/technicians of LGU and contractors trained in disaster resilient construction technologies and techniques. (number of engineer/technicians trained)	10 persons	0	0	4	9

3) Pupils return to high school. (Persons/ year)	108 persons	108	126	126	141 (Next Year)
4) Lessons in elementary are normally conducted (Hours of lessons in total/ year)	1,600 Hours	1,600	1,600	1,600	1,600

Source: JICA Study Team

The number of skilled workers trained through the QIP has significantly exceeded initial expectations. When combined with the construction skills on roofing and truss fabrication taught through Phase 1 of the QIP, trainings on construction skills for the building frames provided through this Phase will provide a comprehensive set of skills for the construction of the whole building to the trainees. Furthermore, the handbook and video prepared through this QIP is expected to further contribute to the trainings of skilled workers by TESDA.

2.2.17 Training on Disaster Resilient Construction Technologies through Reconstruction of Balangiga National Agricultural School – Phase 2 (QIP-17)

(1) Inputs

Input 1: Design for Reconstruction of National Agriculture School (NAS) – Phase 2

As a continued support for the Reconstruction of NAS, JICA Study Team reconstructed two buildings, for Food and Beverage services curriculum, and Construction Technology Workshop, that were completely damaged during Typhoon Yolanda.

TESDA submitted the plan and design for the two buildings. The JICA Study Team reviewed the drawings and necessary modifications were made for the foundation, pillars and beams which were found that the strength was insufficient. The roofing system was also revised in the same manner as the PHO (see section 2.2.2) in order to reinforce its structure. A completion figure is shown in Figure 2.2-18.

Input 2: Bidding/Contract of Reconstruction of NAS-Phase 2

The bidding procedure for the procurement of the project was done among the contractors who experienced QIPs first Batch in the same way as PHO (see section 2.2.2).

Open competitive bidding system was adopted in the selection of contractor and two-way envelope system was used in the submission and opening of bids in the same way as PHO. Likewise, BOQ or Fixed Unit Cost system was used for the contract.

In the payment process, adjustments were made in the same way as PHO, where the percentage of advance payment and progress payment were adjusted to avoid any delay caused by financial deficit for the contractor.

Input 3: Reconstruction of NAS-Phase 2

In the same manner as PHO (see section 2.2.2), the inspection team of JICA Study Team

supervised and monitored the implementation of the project to ensure the quality of construction. Regular site meetings were held with the contractor to monitor the progress of construction and to discuss technical issues encountered in the project, quality and schedule.

Input 4: Equipment for Food and Beverage services curriculum and Construction Technology Workshop

Since equipment in the two buildings were also damaged by Typhoon Yolanda and were unusable, necessary equipment to resume training activities in the two buildings (electrical installation and maintenance, plumbing, carpentry, shielded metal arc welding, food and beverage services) were also procured through the QIP.

Input 5: Training on Construction Technology

JICA Study Team provided a training program on Japanese construction knowledge to TESDA carpentry graduates (certificate holders) through the reconstruction of the Elementary School. Japanese expert workmen conducted practical trainings on the basic technology and construction methodology for the local people to learn the secure construction techniques specifically on formworks, re-bar and concrete works.

Likewise, site orientations were also widely conducted targeting technical staff of the neighboring LGUs and the contractors of QIPs.

JICA Study Team also documented the training activities and incorporated in the instructional video furnished to TESDA to be utilized as a training material for skills training curriculums.

(2) Achievement of the Project

Achievement 1: Revising the Design of NAS-Phase 2

TESDA submitted the basic design drawing for the workshop buildings. Accordingly, JICA Study Team reviewed the strengthening measures for the critical sections of the structure in the same manner as 2.2.2 PHO, such as the structural frame of the building (i.e., foundation, column, and beam) to ensure the strength and stability of the structure. Taking into consideration the low load bearing capacity of the soil, the design of the foundation was revised into a stronger structure. Upon revision of the design, the following Japanese-Style reinforcement measures were applied:

a) Building height was adjusted for the stability of the structural building;
b) Structural design of beams and columns were revised to stabilize and strengthen the concrete frame structures;
c) In the same way as PHO (see section 2.2.2), stable and solid connections were employed by: 1) embedding anchor bolts in the concrete column, and 2) mounting truss welded and resting on base plate.

d) In the same way as PHO, a gusset plate was placed at the connecting portion of the member of truss, to secure the right position, which required welding length and connection of truss members.
e) In the same way as PHO, 0.5 mm thickness, pre-coated galvanized sheet was adopted for roofing material.
f) In the same way as PHO, steel C-Channel (2-mm thickness) was used for purlin to assure the transfer of load from roof to truss.
g) The foundation design was modified using footing tie beams in order to increase the stability of the foundation.
h) During foundation excavation, it was found that the groundwater level was high with sandy soil. Therefore, the foundation design was modified to gravel bedding of 20 cm thickness instead of concrete pile to transfer the building load through gravel to sandy layer.

Achievement 2: Bidding/Contract of Reconstruction of NAS-Phase 2

In the selection of prospective bidders, JICA Study Team invited three QIP experienced Contractors.

JICA Study Team adopted the open/competitive bidding system and two-envelope system for the technical proposal financial proposals, as mentioned above in the opening of bids.

The bid opening was done at the presence of the bidders. Three companies participated in the bidding and only one technical proposal from ESPERAS CONSTRUCTION AND DEVELOPMENT CORPORATION (ECDC) passed through the technical evaluation. Evaluation of financial proposal of ECDC followed and was found to be sufficient and responsive, hence, the said company was determined as the lone qualified bidder. And as part of the bidding procedure, both the technical and financial proposal of the qualified bidder has undergone for detailed bid and arithmetical evaluation. After the detailed evaluation, the bid proposal was found to be complying and in order, so, the contract was awarded to the said bidder.

BOQ/Fixed Unit Cost system was adopted for the Contract since additional quantities or change order, were expected.

Considerations were made for payment conditions to avoid any delay caused by financial deficit. In the same way as PHO (see section 2.2.2), price escalation was not applied as the contract is only for a short period as six months. A three months defects liability period was also adopted.

During the project implementation, the contractor issued a request for time extension with the following reasons: 1) the delays caused by excessive groundwater ponding during foundation works; and 2) shortage in the supply of construction materials such as cement and angle bars.

JICA Study Team together with the LGU discussed and evaluated the validity of stated reasons of delay, and 60 calendar days extension was approved with the agreement of both parties.

Achievement 3: Reconstruction of NAS-Phase 2

JICA Study Team and TESDA together inspected all of the construction materials in the same way as PHO (see section 2.2.2). JICA Study Team prepared on-site inspection plans based on the construction plan and schedule submitted by the contractor in the same way as 2.2.2 PHO.

For the inspection of foundation, alignment, depth and bearing capacity were the main items. Since installation of re-bars cannot be inspected visually, it was conducted before formworks closure.

Concrete works was inspected through trial mixing, mixing ratios, skills of mixer operator, placing method and operation of vibrator.

In case of any failure or default in the works, inspectors issued site instructions to the contractor with the appropriate corrections, demolition and re-work instructions if necessary.

The following are the main site instructions given to the contractor during the reconstruction of NAS-Phase 2:

- Application of rust converter/remover solution on all rusted reinforcement steel bars prior to concreting.
- Vertical angle bar connector should be fully-welded where it coincides with the gusset plates and bolted, if otherwise.
- Wire mesh tape should be provided and easy-tite should be applied on noted cracks at ceiling board joints.

Achievement 4: Support for Resuming Operation through Procurement of Equipment for Construction Technology, Food and Beverage Services

The list of necessary equipment for conducting trainings on food and beverage service, and construction technology has been prepared and submitted by TESDA. These are shown in the following table.

Table 2.2-81 Equipment for Construction Technology, Food and Beverage Services

Equipment	set	Usage for
Kitchen and bar utensils, tools and furniture	1	Food and beverages handling and services
Computers, Overhead Projectors and printers	2	Communication, documentation and multi-media instructions
Welding	1	Welding works instructions and practices
Carpentry	1	Carpentry works instructions and practices
Electrical Installation and Maintenance	1	Electrical works and maintenance instructions and practices
Plumbing	1	Plumbing works instructions and practices

Source: JICA Study Team

Achievement 5: Technology Transfer on Construction Technology

a) Technology Transfer though Actual Construction Works

Two Japanese expert workmen, Mr. Noel Watanabe (welding expert) and Mr. Katsuya Usui (roofing expert) conducted the practical trainings at site to TESDA carpentry course graduates employed through the contractor and TESDA carpentry trainers during the same period (June 17-July 27, 2015 and August 21-September 28, 2015). Hands-on training on formworks, rebar works and concrete works were conducted through the reconstruction of NAS, with the following contents.

1) Formworks
- To ensure security and safety in the work environment
- To layout building lines and boundary at site correctly
- To draw layout line on formwork board for proper cutting and nailing
- To install formworks with the correct vertical alignment with the use of plumb bob
- To install formworks support with proper pitch
- To study removal procedure

2) Reinforcing Steel Bar (RSB)
- To ensure correct bending of rebar and hook end
- To install rebar with the proper spacing interval
- To properly fasten rebar using tie wires
- To keep the minimum length of splices
- To install splices without any overlap
- To secure required minimum thickness of head concrete

3) Concrete
- To study the structural theory of reinforced concrete
- To study the relation of concrete mixing ratio and strength
- To mix concrete properly using concrete mixer
- To control quality of concrete through site mixing and mixing ratio during slump test
- To pour concrete uniformly using vibrator

Major Training Participants were as below:

Table 2.2-82 Major Training Participants

	TESDA Graduates	Non-TESDA Graduates	TESDA Trainers
Participants	15	3	1

Source: JICA Study Team

Training Program by Japanese expert workmen was as below:

Table 2.2-83 Training Program

No	Date		Subject	Participant
1	2015/6/17	Wed	Training overview on Formworks, Rebar and Concrete Works (Footing and Column)	10
2	2015/6/18	Thu	Formworks on Footing and Column	10
3	2015/6/19	Fri	Formworks on Footing and Column	10
4	2015/6/22	Mon	Formworks on Footing and Column	10
5	2015/6/23	Tue	Formworks on Footing and Column	10
6	2015/6/24	Wed	Formworks on Footing and Column	10
7	2015/6/25	Thu	Rebar works on Footing and Column	10
8	2015/6/26	Fri	Rebar works on Footing and Column	10
9	2015/7/8	Wed	Rebar works on Footing and Column	10
10	2015/7/9	Thu	Rebar works on Footing and Column	10
11	2015/7/13	Mon	Concrete works on Footing and Column	10
12	2015/7/14	Tue	Concrete works on Footing and Column	10
13	2015/7/17	Fri	Concrete works on Footing and Column	10
14	2015/7/20	Mon	Concrete works on Footing and Column	10
15	2015/7/23	Thu	Concrete works on Footing and Column	10
16	2015/8/21	Fri	Concrete works on Footing and Column	10
17	2015/8/25	Tue	Training Overview on Concrete Works (Column and Beams)	10
18	2015/8/26	Wed	Concrete Works on Column and Beams	10
19	2015/8/27	Thu	Concrete Works on Column and Beams	10
20	2015/8/28	Fri	Concrete Works on Column and Beams	10
21	2015/8/31	Mon	Concrete Works on Column and Beams	10
22	2015/9/1	Tue	Concrete Works on Column and Beams	10
23	2015/9/14	Mon	Concrete Works on Column and Beams	10
24	2015/9/15	Tue	Concrete Works on Column and Beams	10
25	2015/9/16	Wed	Concrete Works on Column and Beams	10
26	2015/9/17	Thu	Concrete Works on Column and Beams	10
27	2015/9/18	Fri	Concrete Works on Column and Beams	10
28	2015/9/21	Mon	Concrete Works on Column and Beams	10

Source: JICA Study Team

b) Site Orientation

In order to introduce the contents of technology transfer by the Japanese experts to local engineers, site orientations on the basic knowledge and skills on formworks, reinforcing steel bar and concrete works were organized through the invitation of municipal engineers, contractors recommended by LGU together with the TESDA carpentry graduates (certificate holder) and trainers. The orientation program was prepared by summarizing the contents of the trainings conducted through the reconstruction works, and were divided into two parts, namely; Formworks and Reinforcing Steel Bars (RSB) on Footings and Columns and Concrete Works on Columns and Beams. Detailed subject and participants are shown below:

Table 2.2-84 Site Orientation Program

No	Date		Title	Subject	Participants		
					Total	From	No.
1	July 10, 2015	Fri	Formworks and Reinforcing Steel Bars Works (RSB) on Footings and Columns	Fabrication, Installation and Removal of Formworks	29	Trainee	11
				Bar bending, cutting, splicing, hook and installation		LGU	3
				Material testing and quality control		TESDA Trainer	1
				Basic Practice		TESDA Students	15

No	Date		Title	Subject	Participants		
					Total	From	No.
2	Sept. 10, 2015	Thu	Concrete Works on Columns and Beams	General Knowledge	26	Trainee	10
				Material Testing and Quality Control		LGU	2
				Basic Practice		TESDA Trainer	1
						Contractor	22
							65

Source: JICA Study Team

c) Training Materials

The contents of training activities conducted during the reconstruction of NAS-Phase 2 and QIP-16: Reconstruction of Camire Elementary school were compiled into technical manuals for formwork, re-bar installation and concrete works (Appendix-10, 11 and 12). Training instructional videos were also edited with TESDA based on training activities, and facilitated to TESDA Region 8 office. Moreover, TESDA Region 8 will be forwarding the Training Manuals to their central office for evaluation and approval of the added competencies in the manuals so it can be utilized in all TESDA Schools nationwide.

The content of training manual was named "technology of formworks, re-bars and concrete" as the new training material of TESDA. It is composed with; 1) cut, fabricate and install formworks as indicated in the drawing, 2) cut, bend and install re-bars as indicated in the drawing, and 3) install concrete with dimension and required strength as indicated in the drawing. The prepared video covers actual training activities on formworks, re-bars and concrete works through reconstruction works, as well as training instructions. Editing of the video was done through regular discussion with TESDA trainers in charge of carpentry, re-bar installation and concrete works so that it would be suitable for use in TESDA curriculum.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-85 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) TESDA's graduates and trainers obtain disaster resilient construction technologies through the construction of building. (number of TESDA's graduates and trainer)	6 persons	0	0	8	8
2) Engineers/technicians of LGU and contractors trained in disaster resilient construction technologies and techniques. (number of engineer/technicians trained)	26 persons	0	0	86	86
3) Students are trained normally in Agricultural School. (Persons in total/ year)	1,000 persons	1,028	526	1,531	2,010
4) Curriculums in Agricultural School are restarted. (Number of curriculums / year)	12 course	12	8	10	10

Source: JICA Study Team

The number of skilled workers trained through the QIP has significantly exceeded initial expectations. When combined with the construction skills on roofing and truss fabrication taught through Phase 1 of the QIP, trainings on construction skills for the building frames provided through this Phase will provide a comprehensive set of skills for the construction of the whole building to the trainees. Furthermore, the handbook and video prepared through this QIP is expected to further contribute to the trainings of skilled workers by TESDA.

2.2.18 Recovery of Rural Health Service through Reconstruction of Rural Health Unit (Abuyog - RHU) (QIP-19)

(1) Inputs

Input 1: Design for Reconstruction of RHU in Abuyog

The RHU building of Abuyog, which was damaged by the typhoon is reconstructed under this QIP. Since the area of the construction site prone to floods, the floor line of the building was elevated to a height of 80 cm above from the road elevation.

The LGU submitted the standard design for the RHU. The JICA Study Team reviewed the drawings and necessary modifications were made for the foundation, pillars and beams which were found with insufficient strength. The roofing system was also revised in the same manner with the PHO (see section 2.2.2) in order to reinforce its structure. A completion figure is shown in Figure 2.2-19.

Input 2: Bidding/Contract of Reconstruction of RHU in Abuyog

The bidding procedure for the procurement of the project was done among contractors who experienced the QIPs first Batch and in the same way as PHO (see section 2.2.2).

Open competitive bidding system was adopted in the selection of the contractor and two-way envelope system was used in the submission and opening of bids in the same way as PHO. Likewise, BOQ or Fixed Unit Cost system was used for the contract.

In the payment process, adjustments were made in the same way as PHO, where the percentage of advance payment and progress payment were adjusted to avoid any delay caused by financial deficit for the contractor.

Input 3: Reconstruction of RHU in Abuyog

In the same manner as PHO (see section 2.2.2), the inspection team of JICA Study Team supervised and monitored the implementation of the project to ensure the quality of construction. Regular site meetings were held with the contractor to monitor the progress of construction and to discuss technical issues encountered in the project, quality and schedule.

(2) Achievement of the Project

Achievement 1: Design for Reconstruction of RHU in Abuyog

Based on the standard design of RHU building submitted by the LGU, JICA Study Team reviewed and included strengthening measures on the critical sections of the structure such as the foundation, column, trusses and roof design applying Japanese–style reinforcing measures as follows:

a) Building Floor was designed 0.80 m higher above the natural grade line as the flood level usually reached 0.50 m during bad weather;
b) Truss and roof were designed as typhoon resilient as described in section 2.2.4 (QIPs first batch).

Achievement 2: Bidding/Contract of Reconstruction of RHU in Abuyog

In the selection of prospective bidders, JICA Study Team invited four contractors with experience in QIPs.

JICA Study Team adopted the open/competitive bidding system and two-envelope system.

The bid opening was done at the presence of the bidders. Four companies participated in the bidding and all submitted technical proposal passed the evaluation. For the financial proposal, it was found that COLLERA CONSTRUCTION's was the lowest and below the Approved Budget for Construction (ABC), hence passed and given first priority for final evaluation. And as part of the bidding procedure, both the technical and financial proposal of the qualified bidder has undergone detailed bid and arithmetical evaluation. After the detailed evaluation, the bid proposal was found to be complying and in order, so, the contract was awarded to the said bidder.

BOQ/Fixed Unit Cost system was adopted for the Contract since additional quantities or change order, were expected.

Considerations were made for payment conditions to avoid any delay caused by financial deficit. In the same way as PHO (see section 2.2.2), price escalation was not applied as the contract is only for a short period as seven months. A three-month defects liability period was also adopted in the same way as PHO.

During the project implementation, the contractor issued a request for time extension with the following reasons: 1) changes in design; and 2) shortage in the supply of construction materials such as cement and angle bars. JICA Study Team together with the LGU discussed and evaluated the validity of stated reasons of delay and with the agreement of both parties 30 calendar days extension was approved.

Achievement 3: Reconstruction of RHU in Abuyog

JICA Study Team inspected all of the construction materials in the same way as PHO (see section 2.2.2).

JICA Study Team prepared on-site inspection plans based on the construction plan and schedule submitted by the contractor, also in the same way as PHO.

For the inspection of foundation, alignment, depth and bearing capacity were the main items. Since installation of re bars can't be inspected well visually, it was conducted before formworks closure.

Concrete works was inspected through trial mixing, mixing ratios, skills of mixer operator, placing method and operation of vibrator.

In case of any failure or default in the works, inspectors issued site instructions to the contractor with the appropriate corrections, demolition and re-work instructions if necessary.

The following are the main site instructions given to the contractor during the reconstruction of the RHU Building:

- Strict compliance of slump test prior to concrete pouring,
- Checking of steel reinforcements during forms preparation to ensure proper placement,
- Correct welding procedures in fabricating steel trusses,
- Proper installation of roofing material.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-86 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Recovery of Health Guidance. (the number of under/Month)	300 persons	300	500	500	500 (Expected)
2) Resuming of Health educational Program (number of Program)	12 persons	12	12	12	12
3) Resuming of Educational Activity. (Kinds of distributed material)	12 persons	12	12	12	12
4) Recovery of Health Administrative Capability. (Number of issued certificate /Month) Birth Certificate(BR) Forensic Related(ML) Medical Certificate(MC)	Total 115 Nos	72(BR); 4(ML); 20(MC)	84(BR); 6(ML); 25(MC)	84(BR); 6(ML); 25(MC)	84(BR); 6(ML); 25(MC)

Source: JICA Study Team

As described in (3) of section 2.2.2, the functions of the PHO is supporting RHUs has almost recovered, and reconstruction of the RHU in a more disaster resilient form under this project is expected to enable the RHU to function even more efficiently.

2.2.19 Recovery of Rural Health Service through Reconstruction of Rural Health Unit (Dulag RHU) (QIP-19)

(1) Inputs

Input 1: Design of Reconstruction of RHU in Dulag

The roof and truss of the RHU building of Dulag, which were damaged by the typhoon are being reconstructed under this QIP. Though there was prior information that the site is prone to floods, it was found that this was due to clogging of the drainage along the road in front of the building, and that there will be no flooding if this is properly cleaned. It was suggested that the LGU will be responsible for the proper cleaning of the drainage.

The LGU submitted the standard design for the RHU and the JICA Study Team reviewed the drawings and made necessary modifications as done for the PHO (see section 2.2.2). Particular attention was attached to the strengthening of the roof and trusses. A completion figure is shown in Figure 2.2-20.

Input 2: Bidding/Contract of Reconstruction of RHU in Dulag

The bidding procedure for the procurement of the project was done among contractors who experienced the QIPs first Batch and in the same way as PHO (see section 2.2.2).

Open competitive bidding system was adopted in the selection of the contractor and two-way envelope system was used in the submission and opening of bids in the same way as PHO. Likewise, BOQ or Fixed Unit Cost system was used for the contract.

In the payment process, adjustments were made in the same way as PHO, where the percentage of advance payment and progress payment were adjusted based on the experience through QIPs first Batch to avoid any delay caused by financial deficit for the contractor.

Input 3: Reconstruction of RHU in Dulag

In the same manner as PHO (see section 2.2.2), the inspection team of JICA Study Team supervised and monitored the implementation of the project to ensure the quality of construction. Regular site meetings were held with the contractor to monitor the progress of construction periodically and to discuss technical issues encountered in the project, quality and schedule.

(2) Achievement of the Project

Achievement 1: Design for Reconstruction of RHU in Dulag

Based on the standard design of RHU building submitted by the LGU, JICA Study Team reviewed and included strengthening measures on the critical sections of the structure such as the foundation, column, trusses and roof design, in the same manner as those done for PHO

(see section 2.2.2). Also taking into consideration the low load bearing capacity of the soil, the design of the foundation was revised into a stronger structure. Upon revision of the design, the following Japanese-Style reinforcement measures were applied:

a) Truss and roof were designed as typhoon resilient like that of QIPs first batch (see section 2.2.4).

Achievement 2: Bidding/Contract of Reconstruction of RHU in Dulag

In the selection of prospective bidders, JICA Study Team invited the four contractors who experienced the QIP activities.

JICA Study Team adopted the open/competitive bidding system and two-envelope system.

The four invited companies participated in the bidding and all passed in the preliminary evaluation, the opening of technical proposals. Evaluation of financial proposal followed, with NSDS CONSTRUCTION SUPPLY found to be the lowest bid and below ABC. Hence, the said bidder was determined as first priority for detailed bid and arithmetical evaluation. After conducting the final bid evaluation for both the technical and financial proposal, bid proposal was found as the lowest calculated responsive bid. Consequently, BAC then awarded the contract to NSDS CONSTRUCTION AND SUPPLY.

BOQ/Fixed Unit Cost system was adopted for the contract since additional quantities or change of order were expected.

Considerations were made for payment conditions to avoid any delay caused by financial deficit. In the same way as PHO (see section 2.2.2), price escalation was not applied as the contract is only for a short period as seven months. A three-month defects liability period was also adopted in the same way as PHO.

During the project implementation, the contractor issued a request for time extension with the following reasons: 1) changes in design, and 2) shortage in the supply of construction materials. JICA Study Team together with the LGU discussed and evaluated the validity of stated reasons of delay and with the agreement of both parties 30 calendar days extension was approved.

Achievement 3: Reconstruction of RHU in Dulag

JICA Study Team inspected all of the construction materials in the same way with PHO (see section 2.2.2). JICA Study Team prepared on-site inspection plans based on the construction plan and schedule submitted by the contractor, also in the same way with PHO (see section 2.2.2).

For the inspection of the foundation, alignment, depth and bearing capacity were the main items. Since installation of re bars can’t be inspected visually, it was conducted before

formworks closure.

Concrete works was inspected through trial mixing, mixing ratios, skills of mixer operator, placing method and operation of vibrator.

In case of any failure or default in the works, inspectors issued site instructions to the contractor with the appropriate corrections, demolition and re-work instructions if necessary.

The following are the main site instructions given to the contractor during the reconstruction of RHU Building:

- An inventory of wood material that comes out from demolition of RHU building should be made.
- The height of the existing foundation, floor, and roof beam should be checked.
- Spacers for the re-bars of the roof beam should be added.
- Instructed that Splice position of re-bar should not be at same position of the upper and lower sides
- Instructed to postpone concreting due to concrete mixer's problem.
- Rejected the concrete for the for roof beam based on the results of the slump test. The 2nd concrete passed the test.
- Instructed to reduce water in the concrete mixture because aggregate was already wet.
- Instructed the replacement of concrete blocks because of their low quality.
- Instructed that national column should be installed to support the beam.
- Instructed that welding of gusset plate and angle should be strictly applied.

In terms of documentation, the contractor's technical experience in documentation was not enough to prepare the necessary documents in an adequate manner. The situation was similar to that of PHO (section 2.2.2), and the JICA Study Team had to provide technical assistance in the preparation of documents. The contractor could not sufficiently acquire the knowledge for these documentations through Reconstruction of RHU, and they need to learn more in order to be able to effectively manage their construction schedules.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-87 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Recovery of Health Guidance. (number of user/Month)	200 persons	180	200	200	300 (Expected)
2) Resuming of Health educational Program (number of Program)	20 persons	20	20	20	20

3) Resuming of Educational Activity. (Kinds of distributed material)	7 persons	7	7	7	7
4) Recovery of Health Administrative Capability. (Number of issued certificate /Month) Birth Certificate(BR) Forensic Related(ML) Medical Certificate(MC)	Total 118 Nos	65(BR); 6(ML); 13(MC)	77(BR); 11(ML); 30(MC)	77(BR); 11(ML); 30(MC)	90(BR); 15(ML); 40(MC) (Expected)

Source: JICA Study Team

As described in (3) of section 2.2.2, the functions of the PHO is supporting RHUs has almost recovered, and reconstruction of the RHU in a more disaster resilient form under this project is expected to enable the RHU to function even more efficiently.

2.2.20 Construction of Processing Plant for integrated Aquaculture and Processing Development in Tanauan (QIP-20)

(1) Inputs

Input 1: Design for Processing Plant in Tanauan

Under the support of QIP-15 the Sta. Cruz Women Fosherfolk Association has obtained skills in producing softbone bangus, which is a pressure cooked milk fish product. Under this QIP, a processing plant will be constructed to so that the Association can produce the product in a stable manner and in a safe environment.

The basic design of the processing plant was made by the Department of Science and Technology (DOST). JICA Study Team reviewed the drawing and made modifications in the structural frame of the building (i.e., foundation, column, and beam) to attain sufficient strength. Also, in the same way with the PHO (see section 2.2.2), roofing and trusses were further modified to have a disaster resilient roofing system. Furthermore, JICA Study Team also consulted with Bureau of Fisheries and Aquatic Resources (BFAR) to incorporate HACCP requirements for the construction of fish processing facility. A completion figure is shown in Figure 2.2-21.

Input 2: Bidding/Contract of Processing Plant in Tanauan

The bidding procedure for the procurement of the project was done among the experienced contractors in QIPs first Batch in the same way with PHO (see section 2.2.2).

Open competitive bidding system was adopted in the selection of contractor and two-way envelope system was used in the submission and opening of bids in the same way with PHO (see section 2.2.2). Likewise, BOQ or Fixed Unit Cost system was used for the contract.

In the payment process, adjustments were made in the same way with PHO (see section 2.2.2), where the percentage of advance payment and progress payment were adjusted based on the experience through QIPs first Batch to avoid any delay caused by financial deficit for the contractor.

Input 3: Construction of Processing Plant in Tanauan

In the same manner with PHO (see section 2.2.2), JICA Study Team inspection team supervised and monitored the implementation of the project to ensure the quality of construction. Regular site meetings were held with the contractor to monitor the progress of construction periodically and to discuss technical issues encountered in the project, quality and schedule.

(2) Achievement of the Project

Achievement 1: Design of Processing Plant in Tanauan

Based on the basic design from DOST, JICA Study Team reviewed the strengthening measures for the critical sections of the structure in the same manner with PHO (see section 2.2.2), such as the structural frame of the building (i.e., foundation, column, and beam) to ensure the strength and stability of the structure. Also taking into consideration the low load bearing capacity of the soil, the design of the foundation was revised into a stronger structure. Upon revision of the design the following Japanese-Style reinforcement measures were applied:

a) Building design was revised into a piloti-type, 2-Storey building in consideration of its location and to reduce the horizontal pressure from wave in case of storm surge;
b) Elevation of the top floor level was designed based on the highest water level during storm surge as reflected in JICA Study Team Hazard Map;
c) Continuous footing was adopted for added stability of the building foundation;
d) Mega-Rib roofing and steel truss design was adopted in the same manner with the first batch of QIPs (see section 2.2.4);
e) Thickness of gravel bedding was modified from 200mm to 100mm thick while the remaining 100mm was replace with lean concrete to prevent sea water penetration during concrete pouring due to high water level at foundation;
f) Provision of polyethylene membrane sheet to protect the concrete footing and steel reinforcement from penetration of seawater.

Achievement 2: Bidding/Contract for Construction of Processing Plant in Tanauan

In the selection of prospective bidders, JICA Study Team invited the four contractors experienced in QIPs first Batch.

As mentioned in “Input 2”, open/competitive bidding system and two-way envelope system were adopted in the opening of bids.

The bid opening was done at the presence of the bidders. All the four invited companies participated in the bidding and all passed in the preliminary evaluation, the opening of

technical proposals. Evaluation of financial proposal followed, DAYBREAK ENTERPRISES – ENGINEERING & CONSTRUCTION was found to be the lowest bid and below ABC. Hence, said bidder was determined as first priority for detailed bid and arithmetical evaluation. After conduct of final bid evaluation for both the technical and financial proposal, bid proposal was found as the lowest calculated responsive Bid. Consequently, BAC then awarded the contract to DAYBREAK ENTERPRISES – ENGINEERING & CONSTRUCTION.

BOQ/Fixed Unit Cost system was adopted for the Contract since additional quantities or change order, were expected.

Considerations were made for payment conditions to avoid any delay caused by financial deficit in the same manner with PHO (see section 2.2.2). The same with the previous projects, price escalation was not applied as the contract is only for a short period as seven months. A three month "Defects Liability Period" was also adopted in the same manner with PHO (see section 2.2.2).

During the project implementation, the contractor issued the request for time extension with the following reasons: 1) Penetration of sea water; 2) Additional Land Protection work and 3) Rejection of connection to their electric system by Barangays. JICA Study Team discussed with LGU and evaluated the validity of stated reasons of the extension. As a result, 60 calendar days extension was agreed among both parties.

Achievement 3: Construction of Processing Plant

JICA Study Team inspected all of the construction materials in the same way with PHO (see section 2.2.2). JICA Study Team prepared on-site inspection plans based on the construction plan and schedule submitted by the contractor, also in the same way with PHO (see section 2.2.2).

For the inspection of foundation, alignment, depth and bearing capacity were the main items. Since installation of re bars can't be inspected well visually, it was conducted before formworks closure. Due to the land conditions of the site; where the site is a reclaimed piece of land that used to be a mangrove forest, seawater was seen to be gushing out from excavated pits. Thus, in order to avoid the concrete to be affected, the foundation was covered by plastic sheets.

Concrete works was inspected through trial mixing, mixing ratios, skills of mixer operator, placing method and operation of vibrator.

In case of any failure or default in the works, inspectors issued site instructions to contractor with the appropriate corrections, demolition and re-work instructions if necessary.

The following are the main site instructions given to the contractor during the construction:

- During foundation works, it was instructed to the contractor to use submersible pump and buckets for dewatering of underground water
- Casted concrete should not be submerged in underground water at least 24 hours.
- The suppler of angle bars was instructed to be changed because the supplied bars did not pass tensile testing.
- Proper use of vibrators was instructed because honeycombs were seen on the surface of the concrete. The honey combs were instructed to be repaired with epoxy resin.
- Proper compaction of back filling was instructed.
- Concrete spacer was instructed to place properly.
- Instructed that spacer should be installed in the right position.
- Fabricated truss was inspected.

This Project is currently under construction with its completion scheduled at the end of June 2016.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-88 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Participant in Livelihood activity at Processing Plant (Numbers)	20 persons	0	0	0	-
2) Resuming of Livelihood activity at Processing Plant(Numbers of livelihood activities/month)	8 times	0	0	0	-
3) steady income by Livelihood activity at Processing Plant (Numbers of person)	20 persons	0	0	20	20
4) group member receive training of food processing (Numbers of participant)	20 persons	0	0	20	20

Source: JICA Study Team

As described in (3) of section 2.2.15, the women engaged in processing activities have reached more than initially expected, and the products are receiving good reputations in the market. In consideration that the facility constructed under this project will obtain necessary permission from BFAR as a facility for fishery product processing, it is further expected that with the support of relevant agencies, the product will continue to expand its markets.

2.2.21 Construction of Processing Plant for Integrated Aquaculture and Processing Development in Basey (QIP-21)

(1) Inputs

Input 1: Design for Construction of Processing Plant in Basey

Under the support of QIP-1, four women's associations in Basey have obtained skills in producing softbone bangus, which is a pressure cooked milk fish product. Under this QIP, four

processing plants will be constructed to so that the associations can produce the product in a stable manner.

The basic design of the processing plant was made by the Department of Science and Technology (DOST). JICA Study Team reviewed the drawing and made modifications in the structural frame of the building (i.e., foundation, column, and beam) to attain sufficient strength. Also, in the same way with the PHO (see section 2.2.2), roofing and trusses were further modified to have a disaster resilient roofing system. Furthermore, JICA Study Team also consulted with Bureau of Fisheries and Aquatic Resources (BFAR) to incorporate HACCP requirements for the construction of fish processing facility. A completion figure is shown in Figure 2.2-22.

Input 2: Bidding/Contract of Construction of Processing Plant in Basey

The bidding procedure for the procurement of the project was done among the experienced contractors in QIPs first Batch in the same way with PHO (see section 2.2.2).

Open competitive bidding system was adopted in the selection of contractor and two-way envelope system was used in the submission and opening of bids in the same way with PHO (see section 2.2.2). Likewise, BOQ or Fixed Unit Cost system was used for the contract.

In the payment process, adjustments were made in the same way with PHO (see section 2.2.2), where the percentage of advance payment and progress payment were adjusted based on the experience through QIPs first Batch to avoid any delay caused by financial deficit for the contractor.

Input 3: Construction of Processing Plant in Basey

In the same manner with PHO (see section 2.2.2), JICA Study Team inspection team supervised and monitored the implementation of the project to ensure the quality of construction. Regular site meetings were held with the contractor to monitor the progress of construction periodically and to discuss technical issues encountered in the project, quality and schedule.

(2) Achievement of the Project

Achievement 1: Design of Reconstruction of Processing Plant in Basey

Based on the basic design from DOST, JICA Study Team reviewed the strengthening measures for the critical sections of the structure in the same manner with PHO (see section 2.2.2), such as the structural frame of the building (i.e., foundation, column, and beam) to ensure the strength and stability of the structure. Also taking into consideration the low load bearing capacity of the soil, the design of the foundation was revised into a stronger structure. Upon revision of the design the following reinforcement measures were applied:

a) Mega-Rib roofing and steel truss design was adopted in the same manner with the first batch of QIPs (see section 2.2.4) for all four processing plants;
b) Floor elevation of processing plant at Amandayehan was elevated to 0.5m because the site is located in a paddy field.

Achievement 2: Bidding/Contract of Reconstruction of Processing Plant in Basey

In the selection of prospective bidders, JICA Study Team invited the four contractors experienced in the first batch of QIPs.

As mentioned in "Input 2", open/competitive bidding system and two-way envelope system were adopted in the opening of bids.

The bid opening was done at the presence of the bidders. All the four invited companies participated in the bidding and all passed in the preliminary evaluation, the opening of technical proposals. Evaluation of financial proposal followed, PABLO S. LABASBAS CONSTRUCTION was found to be the lowest bid and below ABC. And as part of the bidding procedure, both the technical and financial proposal of the lowest bidder has undergone for detailed bid and arithmetical evaluation. After the detailed evaluation, the bid proposal was found to be complying and in order, so, the contract was awarded to the said bidder.

BOQ/Fixed Unit Cost system was adopted for the Contract since additional quantities or change order, were expected.

Considerations were made for payment conditions to avoid any delay caused by financial deficit in the same manner with PHO (see section 2.2.2). The same with the previous projects, price escalation was not applied as the contract is only for a short period as seven months. A three month "Defects Liability Period" was also adopted in the same manner with PHO (see section 2.2.2).

During the project implementation, the contractor issued the request for time extension with the following reasons: 1) Delay of handover of the site; 2) Additional embankment. JICA Study Team discussed with LGU and evaluated the validity of stated reasons of delay. As a result, 30 calendar days extension was agreed among both parties.

Achievement 3: Reconstruction of Processing Plant in Basey

JICA Study Team inspected all of the construction materials in the same way with PHO (see section 2.2.2). JICA Study Team prepared on-site inspection plans based on the construction plan and schedule submitted by the contractor in the same way with 2.2.2 PHO.

For the inspection of foundation, alignment, depth and bearing capacity were the main items. Since installation of re bars can't be inspected well visually, it was conducted before formworks closure.

Concrete works was inspected through trial mixing, mixing ratios, skills of mixer operator, placing method and operation of vibrator.

In case of any failure or default in the works, inspectors issued site instructions to contractor with the appropriate corrections, demolition and re-work instructions if necessary.

The following are the main site instructions given to the contractor during the construction:

- Inspected the excavation depth.
- Proper compaction of base foundation was instructed.
- Inspected rebar placement before form works closure of column.
- Inspected slump test of concrete for roof beam
- Instructed that leveling of concrete so that surface will be horizontal.

This Project is currently under construction with its completion scheduled at the end of June 2016.

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-89 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) Participant in Livelihood activity at Processing Plant (Numbers)	116 persons	0	0	0	-
2) Resuming of Livelihood activity at Processing Plant (Numbers of livelihood activities/month)	32 times	0	0	0	-
3) steady income by Livelihood activity at Processing Plant (Numbers of person)	116 persons	0	0	116	116
4) group member receive training of food processing (Numbers of participant)	116 persons	0	0	116	116

Source: JICA Study Team

As described in (3) of section 2.2.15, the women engaged in processing activities have reached more than initially expected, and the products are receiving good reputations in the market. In consideration that the facility constructed under this project will obtain necessary permission from BFAR as a facility for fishery product processing, it is further expected that with the support of relevant agencies, the product will continue to expand its markets.

2.2.22 Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Slaughter House (QIP-22)

(1) Inputs

Input 1：Design of Access Road to Slaughter House

Following the reconstruction of the Slaughterhouse, the access road was reconstructed from the national highway to the Slaughterhouse, with the aim of enabling easy and safe transport of livestock and meat products. The concreting of the access road was originally included in the reconstruction of the Slaughterhouse, but later deleted from the scope of work due to budget constraints.

The LGU of Dulag prepared the initial layout, plan and profile of the road segments to be improved. JICA Study Team reviewed the submitted road plan and made the necessary revisions on the road components. A completed picture is shown in Figure 2.2-23.

Input 2: Bidding/Contract of Concreting of Access Road to Slaughter House

The bidding procedure for the procurement of the project was done among the experienced contractors in QIPs first Batch in the same way with PHO (see section 2.2.2).

Open competitive bidding system was adopted in the selection of contractor and two-way envelope system was used in the submission and opening of bids in the same way with PHO. Likewise, BOQ or Fixed Unit Cost system was used for the contract.

In the payment process, adjustments were made in the same way with PHO, where the percentage of advance payment and progress payment were adjusted based on the experience through QIPs first batch to avoid any delay caused by financial deficit for the contractor.

Input 3: Concreting of Access Road to Slaughter House

In the same manner with PHO (see section 2.2.2), JICA Study Team inspection team supervised and monitored the implementation of the project to ensure the quality of construction. Regular site meetings were held with the contractor to monitor the progress of construction periodically and to discuss technical issues encountered in the project, quality and schedule.

Input 4: Technical Transfer to LGU Engineer

Collaborative works on road design, cost estimation, bidding, contract, and construction supervision were done with the relevant staff of the Municipality in order to transfer knowledge and skills with the purpose of enabling them to handle recovery projects by themselves in the future focusing on road construction.

(2) Achievement of the Project

Achievement 1: Design of the paving of the access road to to the Slaughter House

Based on the submitted road layout and design of the Municipality, JICA Study Team revised the layout and design for the critical sections of the road. Project was implemented taking into consideration the security of traffic, the minimum number of blocks for concreting and adding the fundamental reinforcements as follows:

a) Grading of existing gravel road and properly compact to strengthen the foundation of concrete pavement;
b) Provision of steel reinforcements at contraction and construction joints;
c) Provide 50mm aggregate base correction and properly compact prior to construction of concrete pavement;
d) Use 40% water cement ratio to strengthen concrete;
e) Maximum road length (one-lane) for contraction joints should be four blocks (18m concrete pavement) for concreting;
f) Provide asphalt epoxy sealer at contraction joints and construction joints of concrete pavement to avoid infiltration of rain water at times of concrete shrinkage.

Achievement 2: Bidding/Contract of Concreting of Access Road to Slaughter House

In the selection of prospective bidders, JICA Study Team invited the four Contractors experienced in QIPs first Batch.

As mentioned in "Input 2", open/competitive bidding system and two-way envelope system were adopted in the opening of bids.

The bid opening was done at the presence of the bidders. All four invited companies participated in the bidding and all passed in the preliminary evaluation, the opening of technical proposals. Evaluation of financial proposal followed, and NSDS CONSTRUCTION SUPPLY was found to be the lowest bid and below ABC. Hence, said bidder was determined as first priority for detailed bid and arithmetical evaluation. After conduct of final bid evaluation for both the technical and financial proposal, bid proposal was found as the lowest calculated responsive Bid. Consequently, BAC then awarded the contract to NSDS CONSTRUCTION AND SUPPLY.

BOQ/Fixed Unit Cost system was still adopted for the Contract since additional quantities or change order, were expected.

Considerations were made for payment conditions to avoid any delay caused by financial deficit in the same manner with PHO (see section 2.2.2). The same with the previous projects, price escalation was not applied as the contract is only for a short period as three months. A

three month "Defects Liability Period" was also adopted in the same manner with PHO (see section 2.2.2).

During the project implementation, the contractor issued the request for time extension with the following reasons: 1) prolonged schedule in deciding elevation of concrete pavement; 2) shortage in the supply of gravel, and 3) long time required for adjusting schedules with barangay officials for discussion of some relevant matters. JICA Study Team together with the LGU discussed and evaluated the validity of stated reasons of delay and with the agreement of both parties 60 calendar days extension was approved.

Input 3: Concreting of Access Road to Slaughter House

JICA Study Team inspected all of the construction materials in the same way with PHO (see section 2.2.2).

JICA Study Team prepared on-site inspection plans based on the construction plan and schedule submitted by the contractor, also in the same way with PHO (see section 2.2.2).

Major items for inspection were road alignment and checking the base layer. Concrete works was inspected through trial mixing, mixing ratios, skills of mixer operator, placing method and operation of vibrator.

In case of any failure or default in the works, inspectors issued site instructions to contractor with the appropriate corrections, demolition and re-work instructions if necessary.

The following are the main site instructions given to the contractor during the construction:

- Perform proper and sufficient compaction on loose aggregate base layer;
- Properly compact loose gravel prior to concrete pouring;
- Follow cement water ratio of concrete at 40% to ensure strength of concrete pavement;
- Since there were two consecutive failures in slump test, instructed foreman to control the water content and check the volume of gravel for every concrete mix to attain the required slump;
- Reinforcing steel bars at contraction and construction joints should be properly embedded and fixed prior to concrete pouring;
- Use the required Portland Cement Type 1 for the concrete mix.
- Instructed contractor to comply the standard quality material for the road shoulder, compact and consider camber of 1.5% to 3%;

In terms of documentation, the contractor's technical experience in documentation was not enough to prepare the necessary documents in an adequate manner. The situation was similar to that of PHO (section 2.2.2), and the JICA Study Team had to provide technical assistance in the preparation of documents. The contractor could not sufficiently acquire the knowledge for

these documentations through concreting of the access road, and they need to learn more in order to be able to effectively manage their construction schedules.

Input 4: Technical Transfer to LGU Engineer

In the same manner with multipurpose livelihood center (see section 2.2.3), through the collaborative works with the LGU, JICA Study Team transferred knowledge and skills to engineers of the Municipality of Dulag through the series of project activities with the purpose that they would be capable to handle future recovery projects by themselves and improve access to their facilities. Among the technology transferred to the LGU in field of road construction is as follows.

- Checking of base layer before compaction
- Placement of reinforcement bars
- Management of concrete slumps

(3) Objectively Verifiable Indicators for Project Evaluation

For monitoring and evaluation of the Project, objectively verifiable indicators will be adopted as follows.

Table 2.2-90 Objectively Verifiable Indicators

Objectively Verifiable Indicator	Goal	Before Yolanda	Before the Project	Interim	Upon Completion
1) access to slaughterhouse is reconstructed by good design and schedule	Improved	Not Enough	Not Enough	Under const ruction	Improved

Source: JICA Study Team

As described in (3) of section 2.2.10, the revenue of the municipality from the reconstructed slaughter house has already significantly increased. The improved access to the slaughter house will also accommodate the increased traffic without affecting the traffic capacity, thus increasing the distribution of dressed meat without influencing transportation for the local residents.

Table 2.1-1 Activities and Task Allocation of QIP-1

Activity	Study Team	BFAR / Basey Local Government Unit
1) Review of the damages caused by typhoon	• To conduct literature review and interviews	• To provide necessary information to study team
2) Bathymetrical survey	• To study environment such as water depth, bottom characteristics, current speed, etc. to examine the suitability of the sites for typhoon resistant Japanese mariculture technology	• To assist bathymetrical survey conducted by study team
3) Designing typhoon resistant fish cages	• To design typhoon resistant fish cages based on the results of bathymetrical survey and the availability of equipment • To finance for transfer of technology from Japan on submersible cage designing and construction	
4) Procurement of equipment, feeds and fingerlings	• To purchase equipment needed for the project • To supervise procurement activities of BFAR / Basey Local Government Unit	• To purchase feeds and fingerlings
5) Establishment of the fish cages	• To install the fish cages in the selected sites • To transfer technologies on construction and installation of fish cages from Japan to the Philippine side	• To participate in the establishment of the fish cages
6) Training for fisherfolk households on the new technology	• To demonstrate new technology, in particular submersible cages by using compressor	• To coordinate training • To prepare manual for future extensions
7) Stocking / culture / management of the fish stocks	• To supervise cage culture operation managed by BFAR / Municipal Government of Basey	• To do day-to-day management of cage culture
8) Harvesting of fish	• To monitor harvesting of fish	• To provide necessary support to fisherfolk
9) Marketing, processing and value-adding of fish	• To provide necessary equipment for small scale processing for the harvested fish from fish cages • To conduct a training on fish processing • To support fisherfolk on marketing the produced fish • OJT on production and sales of pressure cooked milkfish products	• To provide every possible cooperation for value-adding of milkfish
10) (Extension period) Maintenance of introduced cages	• To provide technical guidance on operation and maintenance of the cages	• To coordinate with Study Team on technical guidance • To conduct regular monitoring on operation and

Activity	Study Team	BFAR / Basey Local Government Unit
	• To prepare operation and maintenance manual • To provide diving device (SASUBA)	maintenance workers
11) (Extension period) Improvement of cage components	• To improve nozzle (INCA and Nitto Seimo)	
12) (Extension period) Improvement on harvesting technique	• To provide technical guidance on harvesting of milk fish • To provide harvesting raft, chilling box, and material for harvesting net • To provide guidance on preparation of equipment for harvesting	• To coordinate with Study Team on technical guidance
13) (Extension period) Improvement on institutional management capacity	• To explanation of future view for the mechanism for operation • To participate in the operation committee of the mariculture park	• To support the holding of the operation committee of the mariculture park • To participate in the committee as an executive board member • To support the establishment of the mechanism for future operation
14) Evaluation	• To collect necessary information through interviews and surveys • To complete a joint evaluation report	• To arrange for the evaluation • To complete a joint evaluation report

Source: JICA Study Team

Table 2.1-3 Activities and Task Allocation of QIP-2

Activity	JICA Study Team	PHO
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare School Drawings and BOQ
2) Selection of Contractor	• Conduct Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)	• Monitoring	• Provide Public Infrastructure
4) Coordination with related agencies for Building permission and/or others	• Monitoring	• Coordination with related agencies for Building permission and/or others
5) Technical Seminar	• Conduct Seminar	• Coordination for Seminar
6) Construction work by the Contractor	• Monitoring	• Monitoring
7) Construction Supervision	• Construction Supervision	• Assist Supervision
8) Supply of Equipment	• Checking and Monitoring of installation	• Monitoring
9) Temporary Start of Food Production	• Coordination of activities	• Prepare temporary space for installation of equipment • Support food processing activities
10) Start of Food Production at new Building	• Coordination of activities	• Support food processing activities
11) Final Inspection (at the end of defect liability period)	• Conduct final inspection at the end of defect liability period	• Assist final inspection at the end of defect liability period

Source: JICA Study Team

Table 2.1-5 Activities and Task Allocation of QIP-3

Activity	JICA Study Team	Tolosa Municipality
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare School Drawings and BOQ
2) Selection of Contractor	• Conducting Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)	• Monitoring	• Provide Public Utilities
4) Coordination with related agencies for Building permission and/or others	• Monitoring	• Coordination with related agencies for Building permission and/or others
5) Technical Seminar	• Conduct Seminar	• Coordination for Seminar
6) Construction work by the Contractor	• Monitoring	• Monitoring
7) Construction Supervision	• Construction Supervision	• Assist Supervision
8) Supply of Equipment	• Checking and Monitoring of installation	• Monitoring
9) Temporary Start of Food Production	• Coordination of activities	• Prepare temporary space for installation of equipment • Support food processing activities
10) Start of Food Production at new Building	• Coordination of activities	• Support food processing activities
11) Final Inspection (at the end of defect liability period)	• Conduct final inspection at the end of defect liability period	• Assist final inspection at the end of defect liability period
12) Identification of Target Sales, Market and Sales Strategies	• Holding of workshops, organizing the outcomes	• Participation in workshops, determination of targets for sales, markets and sales strategies
13) Continued Promotion Activities based on identified Strategies	• Continue support for production and sales activities	• Continue production and sales activities
14) Preparation of Business Plans based on experiences obtained during QIP Period	• Holding of workshops, organizing the outcomes	• Analyze results of past activities, determine future directions for sales promotion
15) Support for Package Improvement and acquisition of LTO for Future Market Development	• Support package improvement (Burak), coordination with DTI (Tanghas)	• Participate in package improvement activities, provide ideas on improvement and layout

Source: JICA Study Team

Table 2.1-7 Activities and Task Allocation of QIP-4

Activity	JICA Study Tam	TESDA
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare School Drawings and BOQ
2) Selection of Contractor	• Conduct Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)	• Monitoring	• Provide Public Utilities
4) Coordination with related agencies for Building permission and/or others	• Monitoring	• Coordination with related agencies for Building permission and/or others
5) Technical Seminar	• Conduct Seminar	• Coordination for Seminar
6) Construction work by the Contractor	• Monitoring	• Monitoring
7) Construction Supervision	• Construction Supervision	• Assist Supervision
8) Provide List of TESDA Trainees	• Monitoring	• Provide the List of Trainees
9) Dispatch of Skilled Workers from Japan as Trainers	• Dispatch Skilled Workers from Japan as Trainers	• Monitoring
10) Technical Training	• Conduct Technical Training	• Assist Technical Training
11) Preparation of training video and text	• Preparation of training video and text	• Provide existing curriculum
12) Implementation of new and/or revised curriculum using prepared video and text in TESDA	• Monitoring	• Implementation of new and/or revised curriculum using prepared video and text
13) Final Inspection (at the end of defect liability period)	• Conduct final inspection at the end of defect liability period	• Assist final inspection at the end of defect liability period

Source: JICA Study Team

Table 2.1-9 Activities and Task Allocation of QIP-5

Activity	JICA Study Tam	DepED	TESDA
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare School Drawings and BOQ	• Assist design and BOQ
2) Selection of Contractor	• Conduct Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)	• Monitoring	• Provide Public Utilities	• Monitoring
4) Coordination with related agencies for Building permission and/or others	• Monitoring	• Coordination with related agencies for Building permission and/or others	• Monitoring
5) Technical Seminar	• Conduct Seminar	• Coordination for Seminar	• Coordination for Seminar
6) Construction work by the Contractor	• Monitoring	• Monitoring	• Monitoring
7) Construction Supervision	• Construction Supervision	• Assist Supervision	• Assist Supervision
8) Provide List of TESDA Trainees	• Monitoring	• Monitoring	• Provide the List of Trainees
9) Dispatch of Skilled Workers from Japan as Trainers	• Dispatch of Skilled Workers from Japan as Trainers	• Monitoring	• Monitoring
10) Technical Training	• Conduct technical training	• Assist Technical Training	• Assist Technical Training
11) Preparation of training video and text	• Preparation of training video and text	• Monitoring	• Provide existing curriculum
12) Implementation of new and/or revised curriculum using prepared video and text in TESDA	• Monitoring	• Monitoring	• Implementation of new and/or revised curriculum using prepared video and text
13) Final Inspection (at the end of defect liability period)	• Conduct final inspection at the end of defect liability period	• Assist final inspection at the end of defect liability period	• Assist final inspection at the end of defect liability period

Source: JICA Study Team

Table 2.1-11 Activities and Task Allocation of QIP-6

Activity	JICA Study Tam	Salcedo Municipality
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare Drawings and BOQ
2) Selection of Contractor	• Conduct Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)	• Monitoring	• Provide Public Utilities
4) Coordination with related agencies for Building permission and/or others	• Monitoring	• Coordination with related agencies for Building permission and/or others
5) Technical Seminar	• Conduct Seminar	• Coordination for Seminar
6) Construction work by the Contractor	• Monitoring	• Monitoring
7) Construction Supervision	• Construction Supervision	• Assist Supervision
8) Site Visits to observe construction of Prefab-system	• Conduct site visits	• Participate in site visits
9) Activity of Day Care Center	• Monitoring	• Activity of Day Care Center
10) Final Inspection (at the end of defect liability period)	• Conduct final inspection at the end of defect liability period	• Assist final inspection at the end of defect liability period

Source: JICA Study Team

Table 2.1-13 Activities and Task Allocation of QIP-7

Activity	JICA Study Tam	Guiuan Municipality
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare Drawings and BOQ
2) Selection of Contractor	• Conduct Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)	• Monitoring	• Provide Public Utilities
4) Coordination with related agencies for Building permission and/or others	• Monitoring	• Coordination with related agencies for Building permission and/or others
5) Technical Seminar	• Conduct Seminar	• Coordination for Seminar
6) Construction work by the Contractor	• Monitoring	• Monitoring
7) Construction Supervision	• Construction Supervision	• Assist of Supervision
8) Site visits to observe construction of Prefab-system	• Conduct site visits	• Participate in site visits
9) Activity of Day Care Center	• Monitoring	• Activity of Day Care Center
10) Final Inspection (at the end of defect liability period)	• Conduct final inspection at the end of defect liability period	• Assist final inspection at the end of defect liability period

Source: JICA Study Team

Table 2.1-15 Activities and Task Allocation of QIP-8 (Lapu-Lapu Culture)

Activity	Study Team	BFAR / Guiuan Local Government Unit	Participating Fisherfolk
1) Bathymetrical survey	• To study environment such as water depth, bottom characteristics, current speed, etc. to examine the suitability of the sites for typhoon resistant Japanese mariculture technology	• To assist bathymetrical survey conducted by study team	
2) Designing typhoon resistant fish cages	• Survey of project sites and marine environment • Designing submersed cage • Testing the prototype cage at the sites in Guiuan	• Survey of project sites and marine environment • Testing the prototype cage at the sites in Guiuan	• Providing assistance for survey of project sites and marine environment • To assist testing of the prototype cage at the sites in Guiuan
3) Construction and installation of submersed cages	• Construction of new submersed cage for lapu-lapu farming for live fish market • Delivery of cage to the sites • Installation of new submersible cages	• Installation of new submersible cages	• Installation of new submersible cages
4) Training and monitoring on environmentally sustainable cage fish culture	• Preparation of training materials • Training on environmentally friendly cage fish culture • Baseline survey • Procurement of diving device (SASUBA) and provision of training • Explanation of SASUBA system to Municipal Council of Guiuan • End line survey and evaluation of the Project	• Preparation of training materials • Training on environmentally friendly cage fish culture • Baseline survey • Revision of Munipal Ordinance of Guiuan • Monthly monitoring and OJT for the farmers by BFAR Guiuan • Monthly monitoring for the live fish buying stations by LGU • End line survey and evaluation of the Project	• Participation to the training • Cooperating for the monitoring and evaluation
5) Usage of supplemental pelleted feeds	• Procurement supplemental pelleted feeds • Supply of supplemental pelleted feed	• Storage of supplemental pelleted feeds • Timely supply of supplemental pelleted feeds	
6) Cage culture operation	• Provide guidance on grading of fish • Provide guidance on replacement of net	• Suport guidance on grading of fish • Support guidance on replacement of net • Monitoring and recording for the	• Collection/procurement of fingerlings • Stocking of fingerlings • Feeding and management of fish cage operation

Activity	Study Team	BFAR / Guiuan Local Government Unit	Participating Fisherfolk
		fishermen's operation	• Participate in trainings
7) Harvesting		• Monitoring and recording for the harvesting	• Partial harvesting • Final harvesting
8) Evaluation	• Evaluation of the QIP implementation	• Evaluation of the QIP implementation	• Cooperating for the evaluation

Source: JICA Study Team

Table 2.1-16 Activities and Task Allocation of QIP-8 (Construction of Feed Preparation Center)

Activity	JICA Study Team	Tanauan Municipality
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare Drawing and BOQ
2) Selection of Contractors	• Conducting Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Coordination with related agencies for Building Permission and/or others	• Monitoring	• Coordination with related agencies for Building Permission and/or others
4) Construction work by the Contractor	• Monitoring	• Monitoring
5) Construction Supervision	• Construction Supervision	• Assist Construction Supervision
6) Final Inspection (at the end of defect liability period)	• Conduct Final Inspection at the end of Defect Liability Period	• Assist Final Inspection at the end of defect liability period

Source: JICA Study Team

Table 2.1-19 Activities and Task Allocation of QIP-9

Activity	JICA Study Tam	Guiuan Municipality
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare Drawings and BOQ
2) Selection of Contractor	• Conducting Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)	• Monitoring	• Provide Public Utilities
4) Coordination with related agencies for Building permission and/or others	• Monitoring	• Coordination with related agencies for Building permission and/or others
5) Technical Seminar	• Conduct Seminar	• Coordination for Seminar
6) Construction work by the Contractor	• Monitoring	• Monitoring
7) Construction Supervision	• Construction Supervision	• Assist Supervision
8) Final Inspection (at the end of defect liability period)	• Conduct final inspection at the end of defect liability period	• Assist final inspection at the end of defect liability period

Source: JICA Study Team

Table 2.1-21 Activities and Task Allocation of QIP-10

Activity	JICA Study Tam	Dulag Municipality
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare Drawings and BOQ
2) Selection of Contractor	• Conducting Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)	• Monitoring	• Provide Public Utilities
4) Coordination with related agencies for Building permission and/or others	• Monitoring	• Coordination with related agencies for Building permission and/or others
5) Technical Seminar	• Conduct Seminar	• Coordination for Seminar
6) Construction work by the Contractor	• Monitoring	• Monitoring
7) Construction Supervision	• Construction Supervision	• Assist Supervision
8) Final Inspection (at the end of defect liability period)	• Conduct final inspection at the end of defect liability period	• Assist final inspection at the end of defect liability period

Source: JICA Study Team

Table 2.1-23 Activities and Task Allocation of QIP-11

Activity	JICA Study Team	Mercedes Municipality
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare Drawings and BOQ
2) Selection of Contractor	• Conduct Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)	• Monitoring	• Provide Public Utilities
4) Coordination with related agencies for Building permission and/or others	• Monitoring	• Coordination with related agencies for Building permission and/or others
5) Technical Seminar	• Conduct Seminar	• Coordination for Seminar
6) Construction work by the Contractor	• Monitoring	• Monitoring
7) Construction Supervision	• Construction Supervision	• Assist Supervision
8) Final Inspection (at the end of defect liability period)	• Conduct final inspection at the end of defect liability period	• Assist final inspection at the end of defect liability period

Source: JICA Study Team

Table 2.1-25 Activities and Task Allocation of QIP-12

Activity	JICA Study Tam	Mayorga Municipality
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare Drawings and BOQ
2) Selection of Contractor	• Conducting Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)	• Monitoring	• Provide Public Utilities
4) Coordination with related agencies for Building permission and/or others	• Monitoring	• Coordination with related agencies for Building permission and/or others
5) Technical Seminar	• Conduct Seminar	• Coordination for Seminar
6) Construction work by the Contractor	• Monitoring	• Monitoring
7) Construction Supervision	• Construction Supervision	• Assist Supervision
8) Final Inspection (at the end of defect liability period)	• Conduct final inspection at the end of defect liability period	• Assist final inspection at the end of defect liability period

Source: JICA Study Team

Table 2.1-28 Activities and Task Allocation of QIP-14 (Production of Coco-trunk Charcoal)

Activity	JICA Study Team	Mercedes Municipality	QIP Participants
1) Invitation of Participant Famers and Group Formulation	• Confirm barangays where QIP will be implemented • Explain QIP contents to potential participants • Facilitate participants in formulating their statutes	• Appoint barangays for QIP implementation • Provide necessary information on barangays • Facilitate barangays for participation in QIP activities • Support the barangays in mediation	• Apply for participation in QIP activities • Prepare statutes
2) Provision of Necessary Tools	• Provide necessary tools and material for charcoal production from fallen coconut trees • Provide necessary equipment for charcoal briquette production if production is deemed feasible		• Ensure appropriate storage and use of provided equipment
3) Examine Possibilities for Charcoal Briquetting	• Conduct market survey on charcoal briquettes produced from fallen coconut trees • Examine possibilities of charcoal briquette production	• Facilitate possible sales of charcoal briquettes	• Participate in activities carried out by JICA Study Team
4) Provision of Training	• Conduct trial production • Provide necessary training and guidance for charcoal production from fallen coconut trees • Provide necessary training for charcoal briquette production if production is deemed feasible		• Participate in training activities
5) Production and Sales of Charcoal	• Conduct joint monitoring on production activities • Facilitate promotion of sales	• Appoint LGU staff for joint monitoring • Conduct joint monitoring of production activities • Secure access of barangays to chainsaws • Secure access of barangays for the use of fallen coconut trees • Facilitate sales of charcoal	• Produce charcoal from fallen coconut trees • Conduct sales of produced charcoal

Source: JICA Study Team

Table 2.1-30 Activities and Task Allocation of QIP-14 (Introduction of Intercropping)

Activity	JICA Study Team	Mercedes Municipality	QIP Participants
1) Selection of participant farmers	• Selection of participant farmers from target Barangays • Explanation of activities to candidate participants • Support preparation of activity schedule of participant groups	• Provide relevant information • Arbitration in case of any problems in the Baranagays	• Participation in the activities • Preparation of general rules for activities
2) Designing of intercropping with horticultural crops and techniques to be introduced	• Market survey, survey on vegetable production in advanced areas • Examination of crop rotation system • Examination of techniques to be introduced in consideration of the technical levels of the participant farmers	• Provide information on commonly cultivated horticultural crops • Provision of information on technical practices of local farmers	• Provide information on horticultural crops regularly consumed by the households
3) Procurement of agricultural inputs and materials	• Procurement of agricultural input and material	• Provide information on availability of agricultural input and material	• Provide seeds produced in their own gardens
4) Implementation of horticultural crop production and sales	• Preparation of simplified manual • Conduct lectures using the simplified manual • Conduct OJT through actual farm work		• Participate in activities
5) Evaluation of economic efficiency of pilot production	• Calculate necessary costs for intercropping and balance with expected income • Explain economic feasibility based on results of the above calculation	• Understand economic feasibility of economic feasibility	• Understand economic feasibility of economic feasibility
6) Preparation of cultivation manual from experience of the pilot production	• Preparation / revision of technical manual for intercropping • Distribution of manual to participant farmers, LGU and DA	• Provision of information that can be useful in preparing the manual • Feedback on the contents of the technical manual for intercropping	• Feedback on the contents of the technical manual for intercropping

Source: JICA Study Team

Table 2.1-32 Activities and Task Allocation of QIP-15

Activity	Study Team	BFAR/Leyte LGU (PLGU)/Tanauan LGU (MLGU)	Fishermen
1) Delineation of area for talabangusan	• Survey of project site • Clearing of project site from debris and other obstruction through "cash for work"	• MLGU through the Brgy. Council will implement the clearing of the project site through "cash for work" • MLGU accept fishermen's application for talabangusan and schedule survey of fisherman's preferred site for his talabangusan after coordinating with BFAR/PLGU • BFAR/PLGU survey site & delineates area if found feasible • MLGU approves application of fisherman based on favorable results from site survey & delineated area • MLGU limits the granting of one talabangusan of 1,000 sq.m. per fisherman, preferably those whose fish pens/talabahan were damaged during typhoon Yolanda and who are members of the association	• Participate in the clearing of the project site • Apply to MLGU for the preferred site of his talabangusan • Assist in the site survey • Accomplish requirements set by the MLGU for the legal operation of the talabangusan
2) Designing of talabangusan	• Collaboration with National Integrated Fisheries Technology Development Center (NIFTDC) on technology transfer of Tala-Isdaan • Approval of design of talabangusan	• PLGU designs talabangusan for review of the Study team • MLGU conforms to the design	• Conform to the design
3) Construction of talabangusan	• Procurement of materials for the construction of talabangusan	• PLGU/MLGU supervise the construction of talabangusan	• Construction of talabangusan
4) Rehabilitation of Leyte Marine Biotoxins Testing Center (Red Tide laboratory)	• Replacement/procurement of equipment and tools	• PLGU re-assigns personnel to work in the laboratory and HAB monitoring and management	• Give oyster shellfish samples for monitoring and analysis
5) Training and Technology Transfer			
a. Training of talabangusan operators on integrated culture of talaba and milkfish	• Collaboration with NIFTDC on technology transfer of Tala-Isdaan • Preparation of training materials • Conduct of the training • OJT on production and sales of pressure cooked milk fish product	• Collaboration with NIFTDC on technology transfer of Tala-Isdaan • Preparation of training materials • Conduct of the training • OJT on production and sales of pressure cooked milk fish product	• Participation in the training • Production and sales of pressure cooked milk fish product

Activity	Study Team	BFAR/Leyte LGU (PLGU)/Tanauan LGU (MLGU)	Fishermen
b. Training on fish processing (including deboned and smoked bangus, smoked oyster)	• Collaboration with NIFTDC on technology transfer of fish processing • Preparation of training materials • Conduct of the training	• Collaboration with NIFTDC on technology transfer of fish processing • Preparation of training materials • Conduct of the training	• Participation in the training
c. Training on mollusk disease diagnosis and health management	• Conduct of the training	• Participation of LMBTC staff	• Participation in the training on mollusk disease diagnosis and health management
d. Transfer of Japanese technology on oyster spat collection	• Collaboration between fishing communities in Leyte Province and oyster farmers of Higashi-Matsushima City, Miyagi Prefecture • Conduct of technology transfer	• Facilitation of the technology transfer • Participation in the technology transfer	• Participation in the technology transfer
6) Talabangusan operation & Monitoring	• Procurement of talaba breeders/spats from Leyte-Leyte	• BFAR gets and analyze sediment sample before operation of the talabangusan • BFAR monitors water quality twice a month and *E. coli* count once a month • PLGU performs plankton analysis (for Harmful Algal Bloom) and talaba shellfish analysis (for Paralytic Shellfish Poisoning toxin) twice a month or according to the protocol for HAB monitoring & management • BFAR gets and analyze sediment sample after harvest	• Installation of talaba breeders and cultch in talabangusan • Procurement of bangus fingerlings and feeds • Stocking of fingerlings • Feeding and management of bangus stock • Assist in the monitoring (e.g., provide boat) of BFAR/PLGU • Sampling of stock prior to harvesting
7) Harvesting	• Support for application to DOLE / Approval by DOLE • Support formulation of Processing Women's Federation	• Monitor and record harvest	• Conduct harvesting • Application to DOLE for support • Formulation of Processing Women's Federation
8) Evaluation	• Conduct evaluation of the project	• Conduct evaluation of the project	• Cooperate in evaluation of the project

Source: JICA Study Team

Table 2.1-34 Activity and Task Allocation of QIP-16

Activity	JICA Study Team	DepED	TESDA
1) Prepare Tender Documents	• Prepare Tender Documents Check BOQ and Drawings	• Prepare School Drawings and BOQ	• Assist Design and BOQ
2) Selection of Contractor	• Conduct Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assistant Tender	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)	• Monitoring	• Provide Public Utilities	• Monitoring
4) Coordination with related agencies for Building Permission and/or others	• Monitoring	• Coordination with related agencies for Building Permission and/or others	• Monitoring
5) Technical Seminar	• Conduct Seminar	• Coordination for Seminar	• Coordination for Seminar
6) Construction Work by the Contractor	• Monitoring	• Monitoring	• Monitoring
7) Construction Supervision	• Construction Supervision	• Assist Supervision	• Assist Supervision
8) Provide List of TESDA Trainees	• Monitoring	• Monitoring	• Provide the List of Trainees
9) Dispatch of Skilled Workers from Japan as Trainers	• Dispatch of Skilled Workers from Japan as Trainers	• Monitoring	• Monitoring
10) Technical Training	• Conduct Technical Training	• Assist Technical Training	• Assist Technical Training
11) Preparation of Training Video and Text	• Preparation of Training Video and Text	• Monitoring	• Provide existing Curriculum
12) Final Inspection (at the end of defect liability period)	• Conduct Final Inspection at the end of Defect Liability Period	• Assist Final Inspection at the end of Defect Liability Period	• Assist Final Inspection at the end of Defect Liability Period

Source: JICA Study Team

Table 2.1-36 Activity and Task Allocation of QIP-17

Activity	JICA Study Team	TESDA
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Assist Drawing and BOQ
2) Selection of Contractor	• Conduct Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc.)	• Monitoring	• Monitoring
4) Coordination with related agencies for Building Permission and/or others	• Monitoring	• Coordination with related agencies for Building Permission and/or others
5) Technical Seminar	• Conduct Seminar	• Coordination for Seminar
6) Construction Work by the Contractor	• Monitoring	• Monitoring
7) Construction Supervision	• Construction Supervision	• Assist Supervision
8) Provide List of TESDA Trainees	• Monitoring	• Provide List of Trainees
9) Dispatch of Skilled Workers from Japan as Trainers	• Dispatch of Skilled Workers from Japan as Trainers	• Monitoring
10) Technical Training	• Conduct Technical Training	• Assist Technical Training
11) Preparation of Training Video and Text	• Preparation of Training Video and Text	• Provide Existing Curriculum
12) Final Inspection (at the end of defect liability period)	• Conduct Final Inspection at the end of Defect Liability Period	• Assist Final Inspection at the end of Defect Liability Period

Source: JICA Study Team

Table 2.1-38 Activity and Task Allocation of QIP-18

Activity	JICA Study Team	Abuyog Municipality
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare Drawing and BOQ
2) Selection of Contractors	• Conducting Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc,)	• Monitoring	• Provide Public Utilities
4) Coordination with related agencies for Building Permission and/or others	• Monitoring	• Coordination with related agencies for Building Permission and/or others
5) Construction work by the Contractor	• Monitoring	• Monitoring
6) Construction Supervision	• Construction Supervision	• Assist Construction Supervision
7) Management of RHU	• Monitoring	• Management of RHU
8) Final Inspection (at the end of defect liability period)	• Conduct Final Inspection at the end of Defect Liability Period	• Assist Final Inspection at the end of Defect Liability Period

Source: JICA Study Team

Table 2.1-40 Activity and Task Allocation of QIP-19

Activity	JICA Study Team	Dulag Municipality
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare Drawing and BOQ
2) Selection of Contractor	• Conducting Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc,)	• Monitoring	• Provide Public Utilities
4) Coordination with related agencies for Building Permission and/or others	• Monitoring	• Coordination with related agencies for Building Permission and/or others
5) Construction work by the Contractor	• Monitoring	• Monitoring
6) Construction Supervision	• Construction Supervision	• Assist Construction Supervision
7) Management of RHU	• Monitoring	• Management of RHU
8) Final Inspection (at the end of defect liability period)	• Conduct Final Inspection at the end of Defect Liability Period	• Assist Final Inspection at the end of Defect Liability Period

Source: JICA Study Team

Table 2.1-42 Activity and Task Allocation of QIP-20

Activity	JICA Study Team	Tanauan Municipality	BFAR、DOST
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings		• Prepare Drawing and BOQ Check if BFAR Criteria is followed.
2) Selection of Contractor	• Conducting Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc,)	• Monitoring	• Provide Public Utilities	• Monitoring
4) Coordination with related agencies for Building Permission and/or others	• Monitoring	• Coordination with related agencies for Building Permission and/or others	• Monitoring
5) Construction work by the Contractor	• Monitoring	• Monitoring	• Monitoring
6) Construction Supervision	• Construction Supervision	• Assist Construction Supervision	• Monitoring
7) Final Inspection (at the end of Defect Liability Period)	• Conduct Final Inspection at the end of Defect Liability Period	• Conduct Final Inspection at the end of Defect Liability Period	• Conduct Final Inspection at the end of Defect Liability Period

Source: JICA Study Team

Table 2.1-44 Activity and Task Allocation of QIP-21

Activity	JICA Study Team	Basey Municipality	BFAR、DOST
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings		• Prepare Drawing and BOQ • Check if BFAR Criteria is followed.
2) Selection of Contractor	• Conducting Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc,)	• Monitoring	• Provide Public Utilities	• Monitoring
4) Coordination with related agencies for Building Permission and/or others	• Monitoring	• Coordination with related agencies for Building Permission and/or others	• Monitoring
5) Construction work by the Contractor	• Monitoring	• Monitoring	• Monitoring
6) Construction Supervision	• Construction Supervision	• Assist Construction Supervision	• Monitoring
7) Final Inspection (at the end of Defect Liability Period)	• Conduct Final Inspection at the end of Defect Liability Period	• Assist Final Inspection	• Assist Final Inspection

Source: JICA Study Team

Table 2.1-46 Activity and Task Allocation of QIP-22

Activity	JICA Study Team	Dulag Municipality
1) Prepare Tender Documents	• Prepare Tender Documents • Check BOQ and Drawings	• Prepare Drawing and BOQ
2) Selection of Contractor	• Conducting Tender • Prepare Evaluation Criteria • Negotiation with Contractor	• Assist Tender
3) Provide Public Utilities (Water Supply, Electric Supply, Drainage etc,)	• Monitoring	• Provide Public Utilities
4) Coordination with related agencies for Building Permission and/or others	• Monitoring	• Coordination with related agencies for Building Permission
5) Construction work by the Contractor	• Monitoring	• Monitoring
6) Construction Supervision	• Construction Supervision	• Construction Supervision
7) Final Inspection (at the end of Defect Liability Period)	• Conduct Final Inspection at the end of Defect Liability Period	• Assist Final Inspection

Source: JICA Study Team

Table 2.2-1 List of Beneficiary Fish Farming Association

Tinaogan Mariculture Operators Association

Date organized: July 26th 2014	
President:	Mariano A. Lar
Vice President:	Edison M. Calirao
Secretary:	Fabian A. Vale
Treasurer:	Ariel P. Royo
Auditor:	Jaime J. Calinao
Peace Officer:	Generoso B. Padoc
P.I.O:	Cerelo Alcaras Jr.

Board members:
- Mariano A. Lar
- Edison M. Calinao
- Febian A. Vale
- Ariel Pl Royo
- Jaime J. Calinao

Members: 30 members

Tinaogan Mariculture Fisherfolk Association

Date organized: July 28th 2014
President: John Jay S. Egonio
Vice President: Leonardo A. Llemos
Secretary: Mario C. Caillo
Treasurer: Randy A. Macalalad
Auditor: Nelson D. Gerallana

Board members:
- John Jay S. Egonio
- Leonardo A. Llemos
- Leonardo A. Llemos
- Randy A. Macalalad
- Nelson D. Gerallana

Members: 30 members

Amandayehan Fisherfolk Cagers Association (AFCA)

Date organized:	July 26th 2014
President:	Monchito A. Lacaba
Vice President:	Fidel R. Gillo
Secretary:	Eugene A. Evardone
Treasurer:	Nestor E. Deloverjes
Auditor:	Kristan T. Cabigon

Board members:
- Monchito A. Lacaba
- Fidel R. Gillo
- Eugene A. Evardone
- Eugene A. Evardone
- Kristan T. Cabigon

Members 30 members

Cambayan Fisherfolk Association

Date organized:	July 28th 2014
President:	Andres O. Dagotdot, Jr
Vice President:	Erwin A. Royo
Secretary:	Marlou R. Deloverjes
Treasurer:	Elorde O. Borja
Auditor:	Benedicto M. Macalalad

Board members:
- Andres O. Dagotdot, Jr
- Erwin A. Royo
- Marlou R. Deloverjes
- Elorde O. Borja
- Benedicto M. Macalalad

Member 20 members

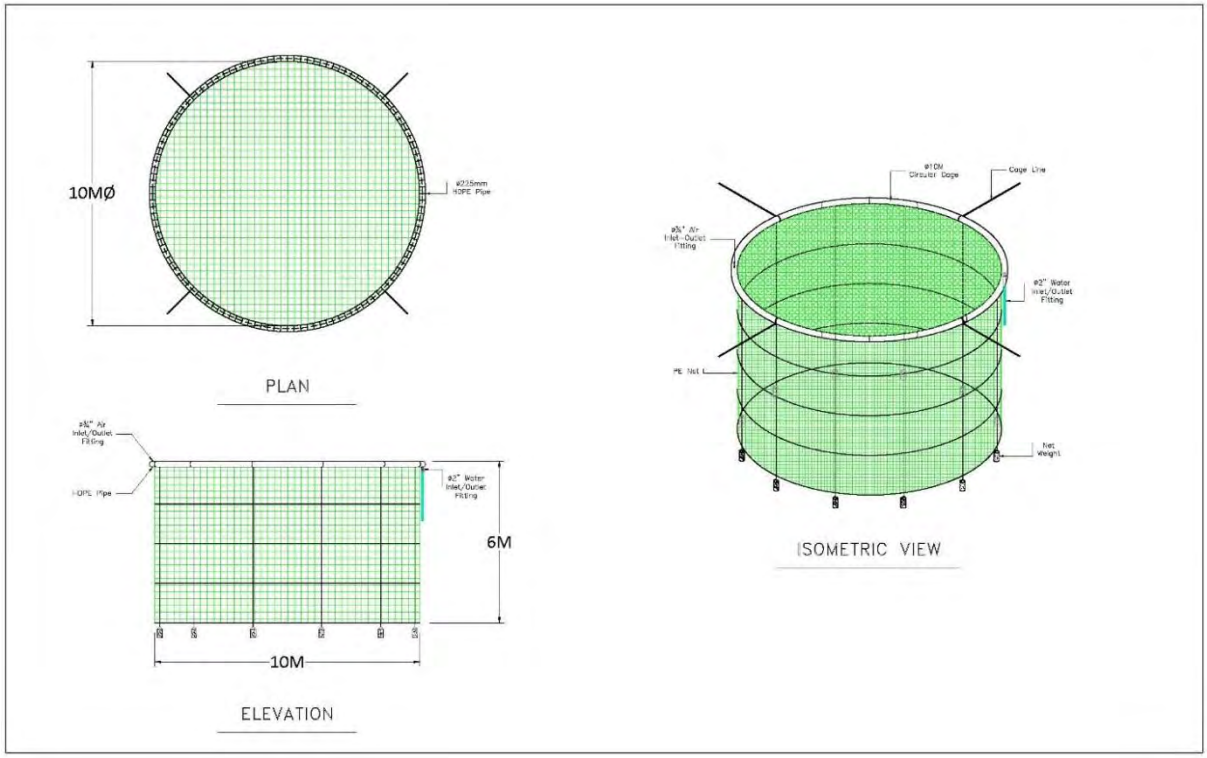
San Antonio Paragbangus Association (SAPBA)

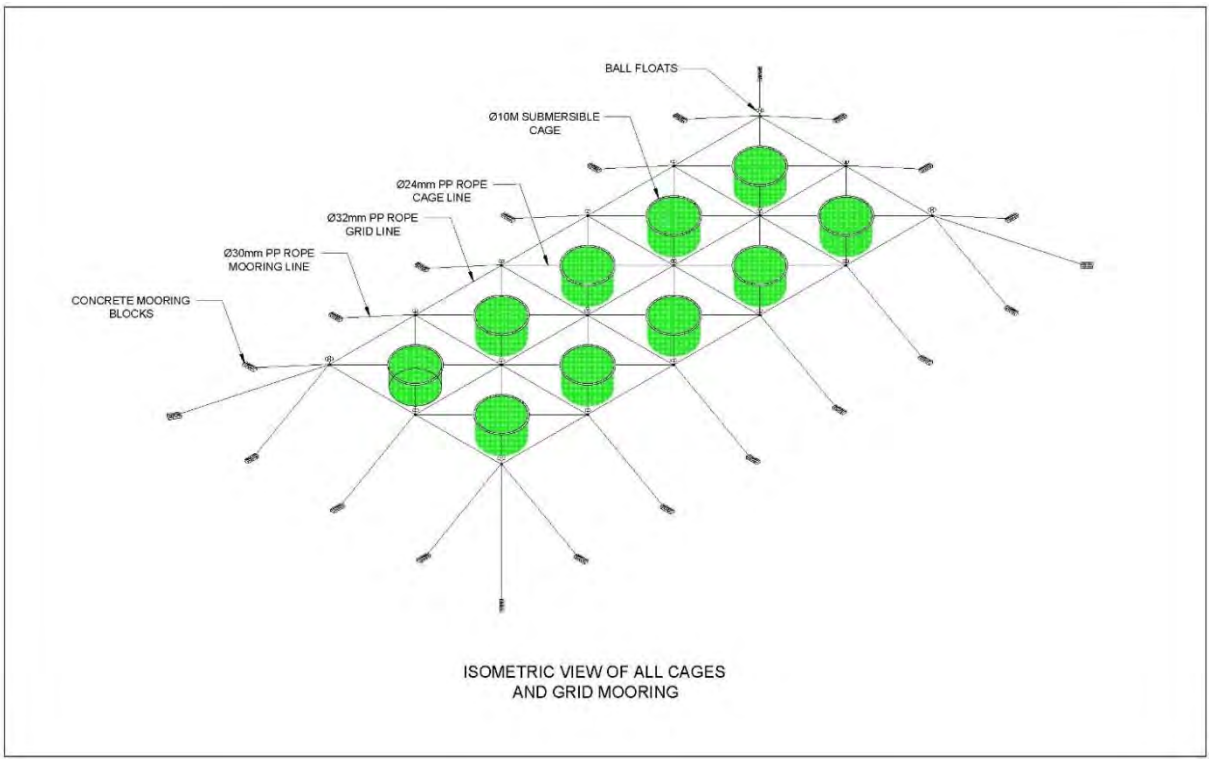
Date organized: July 28th 2014
President: Eugenio D. Jaway, Jr
Vice President: Rolando P. Robin
Secretary: John D. Andrade
Treasurer: Segundino A. Rias
Auditor: Victoriano A. Espina

Board members:
- Eugenio D. Jaway, Jr
- Rolando P. Robin
- John D. Andrade
- Segundino A. Rias
- Victoriano A. Espina

Members: 20 members

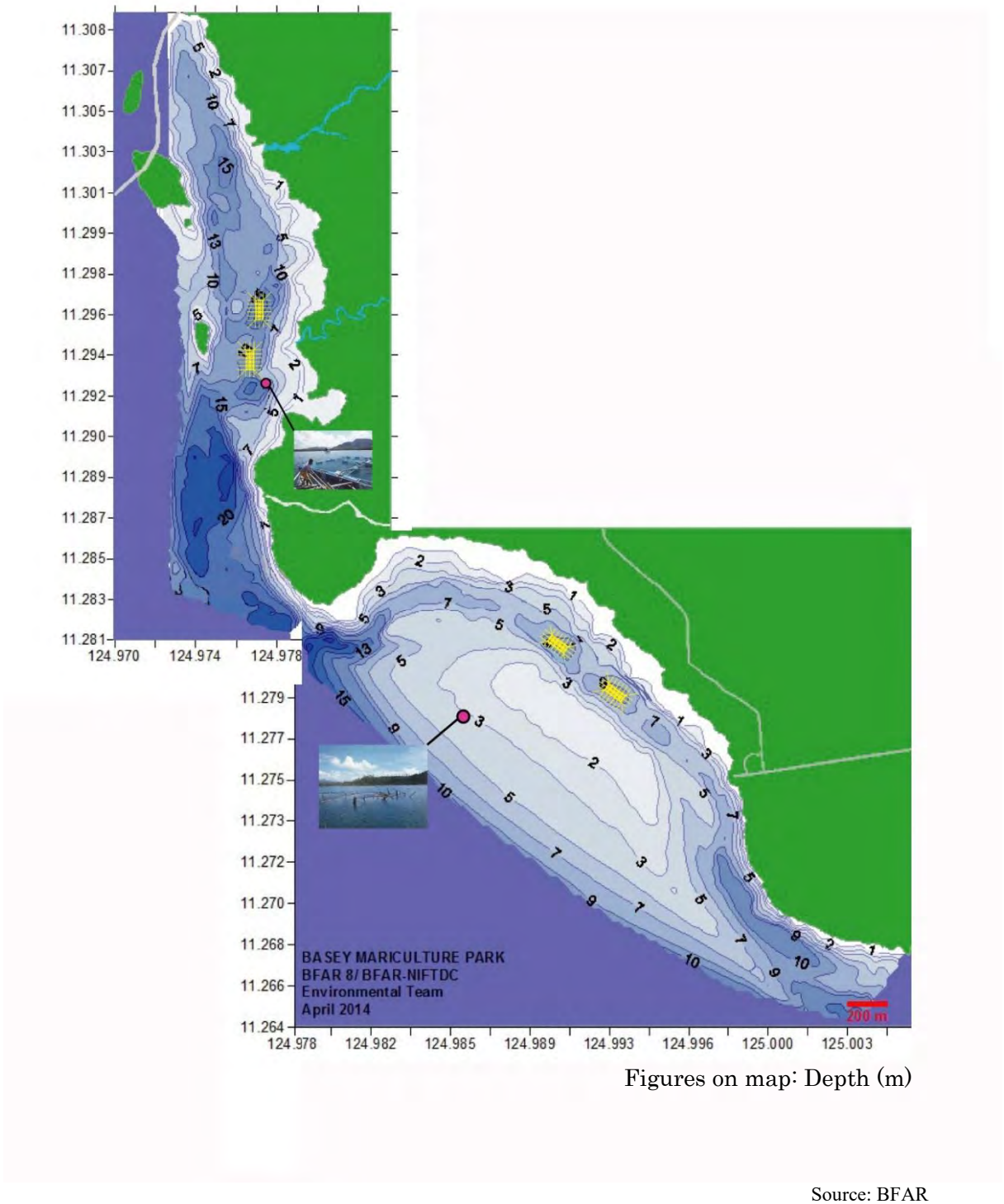
Source: JICA Study Team





Source: JICA Study Team

Figure 2.2-1 Design of Submersible Cage



Source: BFAR

Figure 2.2-2 Bathymetrical Survey

Source: JICA Study Team

Figure 2.2-3 Reconstruction of Provincial Health Office

Source: JICA Study Team

Figure 2.2-4 Reconstruction of Tolosa Multi-purpose Livelihood Building

Source: JICA Study Team

Figure 2.2-5 Reconstruction of Balangiga National Agriculture School
(Above: Food Technology Building, Below: Classroom Building)

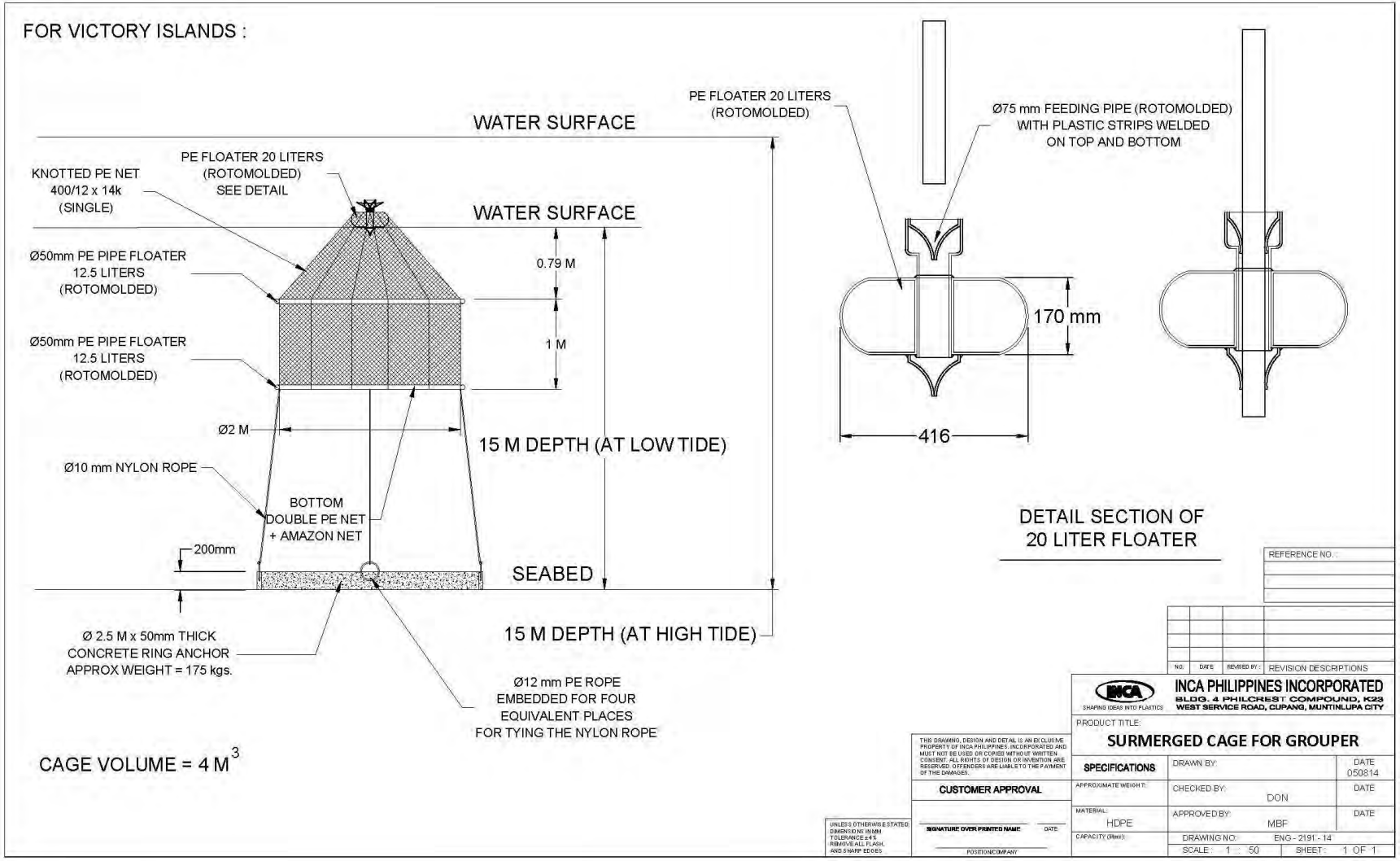
Source: JICA Study Team

Figure 2.2-6 Reconstruction of Cabacungan National High School

(Above: Two-story Classroom, Below: JICA Building)

Source: JICA Study Team

Figure 2.2-7 Reconstruction of Daycare Center (Salcedo: 5 Units, Guiuan: 2 Units)



Source: JICA Study Team

Figure 2.2-8 Design of Grouper Cage

Source: JICA Study Team

Figure 2.2-9 Artificial Feed Preparation Facility in Guiuan Victory Island

Source: JICA Study Team

Figure 2.2-10 Reconstruction of Guiuan Public Market

Source: JICA Study Team

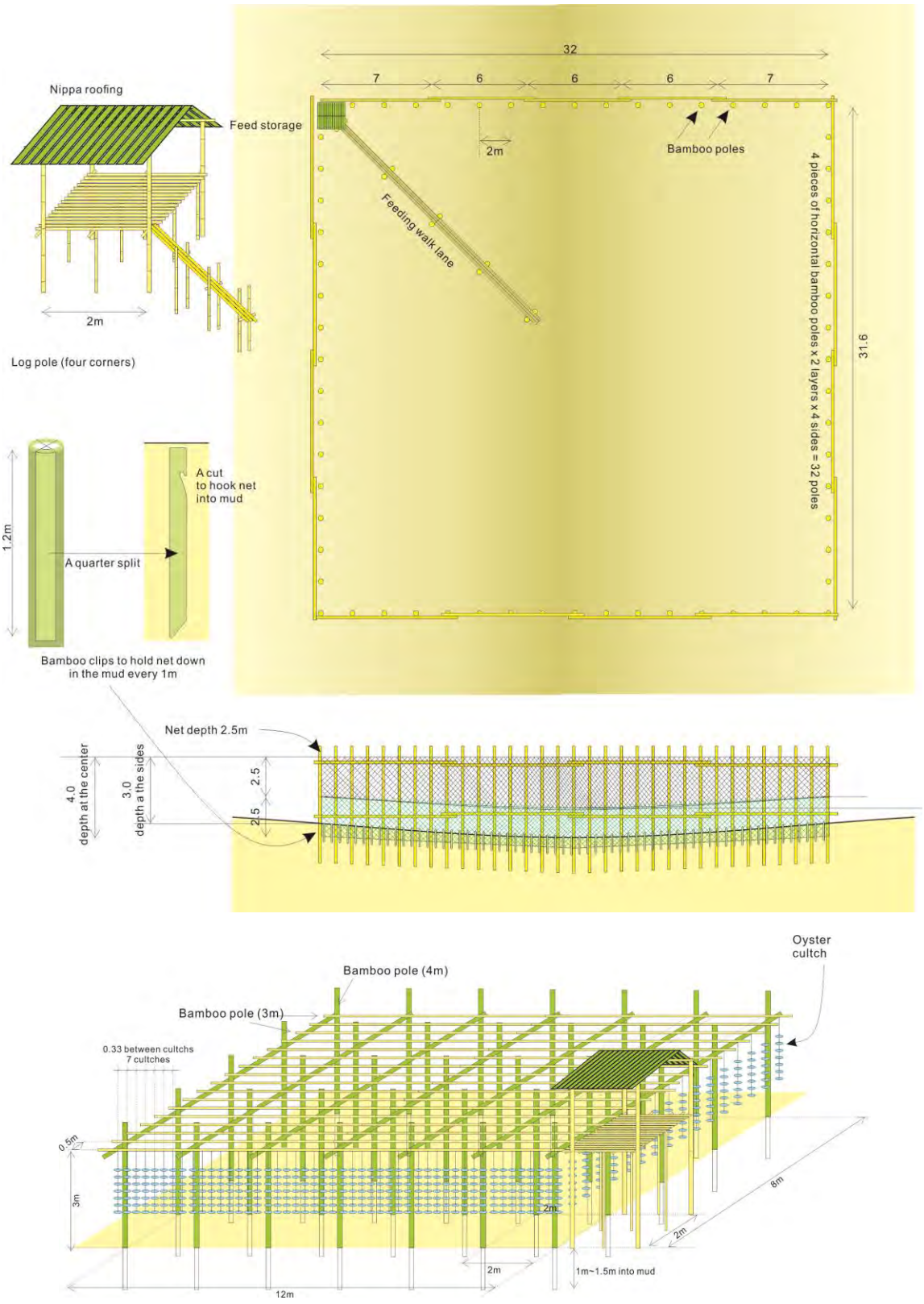
Figure 2.2-11 Reconstruction of Dulag Slaughter House

Source: JICA Study Team

Figure 2.2-12 Reconstruction of Mercedes Public Market

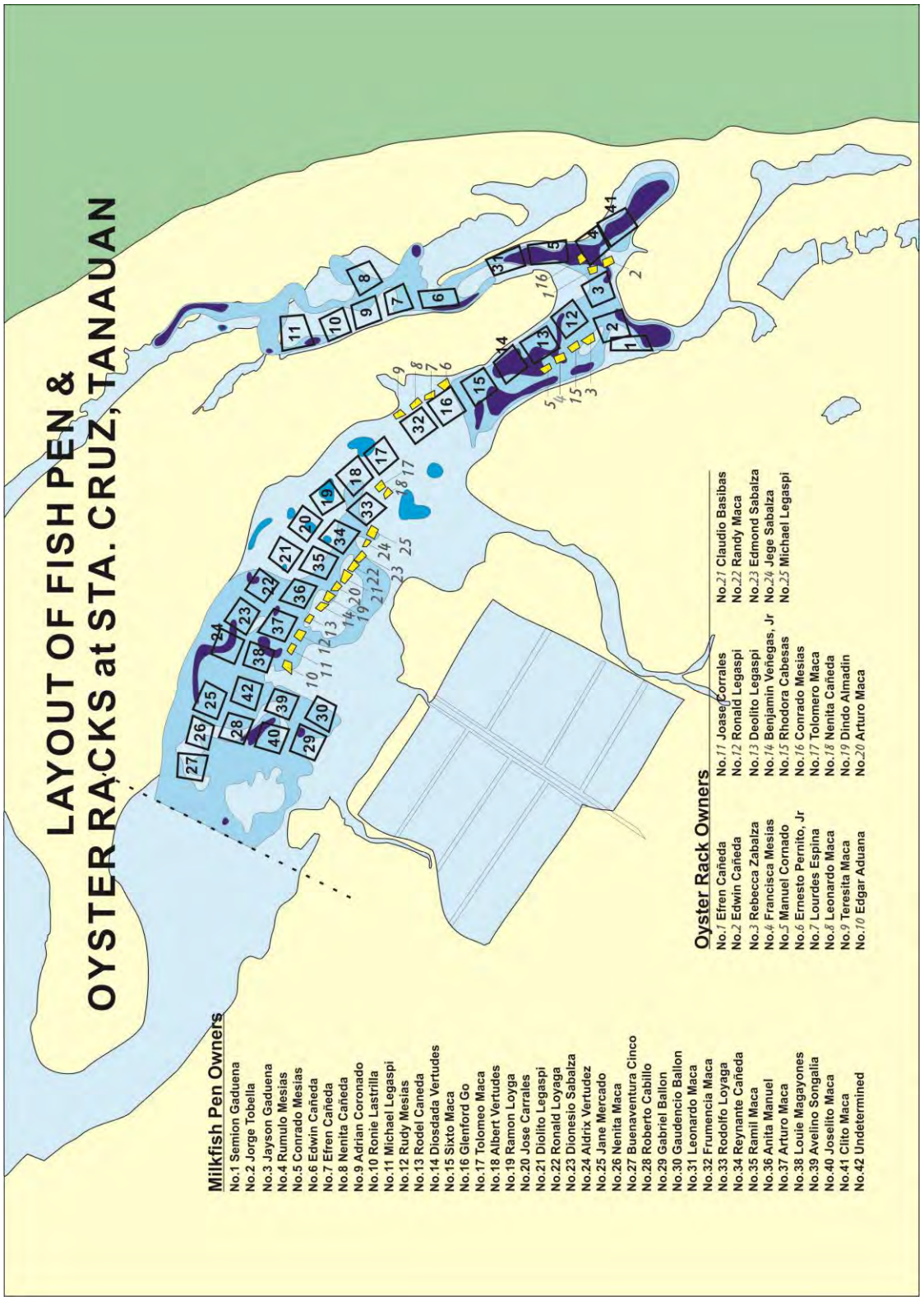
Source: JICA Study Team

Figure 2.2-13 Reconstruction of Mayorga Public Market



Source: JICA Study Team

Figure 2.2-14 Design of Milk Fish Pens and Oyster Racks



Source: JICA Study Team

Figure 2.2-15 Layout of Milk Fish Pens and Oyster Racks

Source: JICA Study Team

Figure 2.2-16 Locations of Barangays where Oyster Seeds Collection Racks are Installed

Source: JICA Study Team

Figure 2.2-17 Reconstruction of Camire Elementary School

Source: JICA Study Team

Figure 2.2-18 Reconstruction of Balangiga National Agriculture School (Phase 2)

Source: JICA Study Tean

Figure 2.2-19 Reconstruction of Abuyog RHU

Source: JICA Study Team

Figure 2.2-20 Reconstruction of Dulag RHU

Source: JICA Study Team

Figure 2.2-21 Construction of Processing Plant in Tanauan

Source: JICA Study Team

Figure 2.2-22 Construction of Processing Plant in Basey

Source: JICA Study Team

Figure 2.2-23 Paving of the Access Road to the Slaughter House in Dulag

Chapter 3 Evaluation of Quick Impact Projects

3.1 Results of Evaluation (Overall Rating: B[1])

(1) Relevance (Rating: ③[2])

The implementation of the twenty two (22) Quick Impact Projects is consistent with the development policy and needs for QIPs both during the planning stage and ex-post evaluation. The three (3) principles of development policy for recovery and reconstruction from Typhoon Yolanda are derived by JICA study as:

i) Building Safer Cities,
ii) Recovering People's Daily Life, and
iii) Restoring Regional Economy and Promoting Local Industries.

Therefore, the relevance of Quick Impact Projects was high. (Rating: ③)

(2) Effectiveness and Impact (Rating: ③)

1) Effectiveness

The project purposes of the twenty two (22) Quick Impact Projects were as follows:

QIP-01: to restore and to improve the livelihood of fishing families in Basey by introducing disaster resilient submersible fish cage for milkfish farming

QIP-02: to restore the health administrative service of Leyte with the functional recovery of Leyte PHO by the disaster resilient system

QIP-03: to contribute to sustainable livelihood activities for food processing of agriculture and fishery products by women's group in Tolosa through reconstruction of multi-purpose livelihood center for livelihood activities

QIP-04: to disseminate knowledge and skills on disaster resilient construction technologies through reconstruction of National Agriculture School in Balangiga

QIP-05: to disseminate knowledge and skills on disaster resilient construction technologies through reconstruction of Cabacungan National High School in Dulag

QIP-06: to recover the function of the daycare center in Salcedo and promote the vitalization of community dialogues including disaster enlightenment through reconstruction of the daycare center by the Japanese-style of prefabricated building

[1] Overall Ratings are A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, and D: Unsatisfactory.
[2] Ratings by DAC evaluation criteria are ③: High, ②: Fair, and ①: Low.

QIP-07: to recover the function of the daycare center in Guiuan and promote the vitalization of community dialogues including disaster enlightenment through reconstruction of the daycare center by the Japanese-style of prefabricated building

QIP-08: to improve livelihoods of typhoon affected fisher-folk families in Guiuan though restoration of lapu-lapu fish farming with environmentally-friendly and disaster resilient fish cage culture system

QIP-09: to improve the capacity of disaster resilient project management of the Municipality and its engineers through reconstruction of the public market in Guiuan

QIP-10: to improve the capacity of disaster resilient project management of the Municipality and its engineers through reconstruction of the slaughterhouse in Dulag

QIP-11: to improve the capacity of disaster resilient project management of the Municipality and its engineers through reconstruction of public market in Mercedes

QIP-12: to improve the capacity of disaster resilient project management of the Municipality and its engineers through reconstruction of public market in Mayorga

QIP-13: to establish a framework of promotion activities for local processed products by the disaster victims and to promote the sales of the local processed products in QIPs -03, -01, -15, and -14.

QIP-14: to contribute to livelihood of the coconut farmers in Mercedes through introducing charcoal production technique

QIP-15: to manage community aquaculture resources and to secure the livelihood of typhoon affected fisher-folk families in Tanauan by establishment of integrated culture of oyster and milkfish as a strategy for sustainable aquaculture

QIP-16: to improve disaster resilient building technology through the reconstruction of Camire Elementary School located in Tanauan

QIP-17: to improve disaster resilient building technology through further reconstruction of two buildings in the National Agricultural School located in Balangiga

QIP-18: to restore regional health service by reconstructing the RHU with a typhoon resilient structure in Abuyog

QIP-19: to restore regional health service by reconstructing the RHU with a typhoon resilient structure in Dulag

QIP-20: to support the processing of milkfish produced under QIP -15, in a hygienic facility compliant to BFAR standards, aiming at the value improvement in the whole milkfish value chain and the diversification of income source in Tanauan

QIP-21: to support the processing of milkfish produced under QIP-1 in a hygienic facility compliant to BFAR standards, aiming at the value improvement in the whole milkfish value chain and the diversification of income source in Basey

QIP-22: to repair the access road from the slaughterhouse reconstructed under QIP-10 to the national highway in order to improve the transportation of livestock and processed meat

The QIPs mostly achieved the planned project purposes, judging from the results of objectively verifiable indicators set in each QIP. Although expression of some of the objectively verifiable indicators in QIPs is delayed, which is due to the delay of completion of the building construction, it is expected to express in the immediate future.

2) Impact

Based on the observations described in "(3) Objectively Verifiable Indicators for Project Evaluation" in sections 2.2.1-22, the positive impacts identified through implementation of the QIPs are summarized as follows.

In QIPs -02, -18 and -19, establishment of a comprehensive regional medical service system can be expected through the reconstruction of RHUs and PHO, with the PHO being the superior administrative body of the RUHs.

In QIP -03, processing activities in typhoon resilient structures will be enabled by constructing a multipurpose livelihood supporting facility and by resuming the processing activities conventionally practiced by women's groups before the disaster. This is expected to improve the livelihood of women's groups. Furthermore, economic (processing) activities of the four women's groups in the multipurpose facility can also work as a demonstration to the other women's groups in the area, where show-casing the activities may induce their intentions for entrepreneurship.

In QIPs -04, -05, and -16, -17, TESDA has been much interested in introducing the training materials and video on disaster resilient construction technologies by Japanese craftsmen, which were prepared through the QIPs, into TESDA construction training program. It is expected that the materials and video will be further utilized to continuously train more skilled workers.

In QIPs -06 and -07, LGU, in charge of daycare centers, has understood the idea of multi-purpose use of daycare centers by the community people for community's

vitalization during vacant times and will start the facilitation to the community after hand-over of the daycare centers.

In QIP -08, sustainable culture of lapu-lapu that does not overexploit aquatic resources is expected to be realized through resuming the activity with the application of methods with less burden to the natural environment.

In QIPs -09, -10, -11, -12 and -22, it is expected that disaster resilient public facilities will be reconstructed and social services for the surrounding residents will be provided in a sustainable manner. Also, through reconstruction of public facilities, the engineers of LGUs will learn appropriate bidding management and construction control skills, which is expected to further lead to the construction of disaster resilient public facilities in the future.

In QIP -14, the farmers who have been practicing coconut monoculture and have lost their livelihood due to the massive typhoon will implement intercropping and start mixed farming. This is further expected to lead to the formulation of a structure where typhoon affected farmers will be able to secure certain means of post-disaster livelihood

In QIP -01, -15, -20 and 021, the commercial processing of milkfish that have been started by women of fisherfolk families and stable production and sales of processed products through sales promotion is expected.

Therefore, the effectiveness and impact of Quick Impact Projects was high. (Rating: ③)

(3) Efficiency (Rating: ②)

The actual total QIPs costs were lower than the planned costs.

All of the QIPs have been completed within the planned period. However, in some of QIPs, such as QIPs -02, -04, -05, -10, -09, -11, -12, and -16, -17, -18, -19, -22 building construction period have been extended for 45 to 60 days due to i) shortage of materials and manpower supply, ii) occurrence of typhoon “Ruby”, and iii) unfavorable weather condition. Due to these reasons, some activities for the QIPs were delayed and the appearance of effects of the QIPs was also delayed.

The project cost was kept within the plan, but the project construction period was longer than the plan. Therefore, the efficiency of the QIPs was judged as fair. (Rating: ②)

(4) Sustainability (Rating: ②)

Through QIPs -04, and -05, disaster resilient construction technologies for truss fabrication and roof installation have been transferred to TESDA graduates, trainers, LGU engineers and contractors’ technicians by Japanese craftsmen. Following the above, skills for the

construction of building frame was transferred from Japanese skilled workmen to TESDA trainers, trainees who completed TESDA courses, masons of local contractors in QIPs -16 and -17. Moreover, skill training programs for building and construction are required to be reviewed and established comprehensively.

Municipal engineers have understood and mastered construction management for disaster resilient structures through QIPs -10, -09, -11, and -12. Capacity of tender process management to employ the contractor and construction management is required to be continuously developed.

In QIP-03, food processing activities of agriculture and fishery resumed successfully. However, the operational management system on production and sales of processed agriculture and fishery products by women's groups are required to be established.

In QIPs -01, -08, -15, and -14, outcome of the projects have been mostly achieved. However, operational management system on farming of lapu-lapu, milkfish, and oyster needs to be maintained. It is necessary to continuously support the stabilization of seedling production technology. Moreover, it is necessary to strengthen sales and the marketing of processed fishery products.

As mentioned above, it is necessary to support and to strengthen the activities continuously for sustainability of the QIPs. Therefore, the sustainability of the QIPs was judged as fair. (Rating: ②)

3.2 Conclusion of Evaluation

In the fifteen (15) Quick Impact Projects, public facilities have been restored and local livelihood of disaster victims have been regenerated by introducing disaster resilient technologies and management. The implementation of the QIPs is consistent with the three (3) principles of development policy and needs for Recovery and Reconstruction from Typhoon Yolanda both during the planning stage and ex-post evaluation. The relevance of the QIPs was "high". (Rating: ③) The QIPs mostly achieved the planned project purposes, judging from the results of objectively verifiable indicators set in each QIP. Although expression of some of objectively verifiable indicators in QIPs is delayed, which is due to the delay of completion of the building construction, it is expected to express in the future immediately. Positive impacts can be seen in some of the QIPs. The effectiveness and impact of the QIPs was "high". (Rating: ③) The project cost was kept within the plan, but the project construction period was longer than the plan. The efficiency of the QIPs was "fair". (Rating: ②) It is necessary to support and to strengthen the activities continuously for sustainability of the QIPs. The sustainability of the QIPs was also "fair". (Rating: ②)

In light of the above, these QIPs are evaluated to be "satisfactory". (Overall Rating: B)

Chapter 4 Lessons Learned from Quick Impact Projects

4.1 Lessons Learned from Quick Impact Projects

4.1.1 Regeneration of Livelihood

Lessons Learned 1: Cooperation with Local Institutions and People in Solving a Conflict in Installation of Cages with Local Fish Owners

One of the private cage owners in the project area of QIP-1, who restored cages and started the operation, claimed that the site intended to be used for the Cambayan cages of the Project belongs to him as it was occupied by his cages before the Typhoon Yolanda although he did not have cages at the same place yet. He was carrying out milkfish operation before Typhoon Yolanda. His claim was based on government rehabilitation policy that restoration of lost cages be given a priority. He did not obtain permission for the site from the Basey LGU.

This problem was solved amicably at a monthly meeting of Basey Mariculture Executive Management Council chaired by the Basey Mayor. The Project in cooperation with INCA Inc. carried out site survey again of the actual area that JICA cages were to occupy and the relative location to the current restored cages of the owner. It found his claim was an intention to secure a wide area for his future expansion plan rather than the actual area previously held. The project coordinated with BFAR Region-8, municipal agricultural office and the fish farming associations to attend the meeting to discuss on the issue. The meeting reached an agreement with the private cage owner to accept the installation of JICA cages at the site.

This incident reminded us of importance of local coordination to solve problems whose root goes beyond the commencement of project. This problem might have taken much longer time to solve if cooperation from the Basey Mayor, Municipal Agricultural Office, BFAR Region-8, INCA and fish farming associations was not obtained. Often emergency project like this one has to enter the site without sufficient prior study on the local situation and environment. Quick and decisive actions are required at the site under emergency situation. There is a good chance of making odd decisions if the staff implementing the project is not well informed on local social and physical environment conditions from the people for whom the project is working for.

Lessons Learned 2: Holistic Approach to Restore the Agricultural and Fishery Production and Practical Countermeasures to Prevent Delay in Stocking Fingerlings

The cage installation in QIP-1 was completed in October 2014 and the Project informed BFAR Region-8 that the cages were ready for stocking fingerlings. BFAR-8 which was responsible to provide 600,000 fingerlings for stocking into the JICA cages had held a tender for the supply and delivery of the required fingerlings in October but failed to get any offer.

The second tender held in November found two local fingerling suppliers for the JICA cages and made contracts with them. Unfortunately, Typhoon Ruby and Seniang hit the region in December and caused the collapse of dikes at the nursery ponds of these two suppliers and fingerlings prepared for stocking in the JICA cages were lost.

In response to the emergency situation, BFAR Region-8 made an arrangement to transfer as many fingerlings as possible from one of the substations located at Lavezares in Northern Samar to Basey. The first stocking of milkfish fingerlings was realized on January 2015 to a cage at the Amandayehan site. The second and the third fingerling stockings were made in the following month at the Tinaogan site. As of the end of February, 2015, 3 cages were filled with the fingerlings from Lavezares farm.

The stocking of fingerlings happened much later than the time expected originally. However, BFAR Region-8 in cooperation with the other partners including the Project team and the municipal agriculture office had made appropriate responses to handle the emergency situation and realized the stocking.

The shortage of fingerlings experienced in this QIP made us reaffirm that recovery of milkfish production requires not only the rehabilitation of production systems like cages and pens but also that of the supporting industries such as for fingerlings and feed suppliers. The Project was aware of the importance of taking a holistic approach for recovery of agricultural or fisheries productions and therefore planned this QIP project to cover the whole value chain from production and processing to marketing.

Nevertheless, severe shortage of fingerlings due to damages on fingerlings producers' facilities to an extent to result to different demands by sizes in the fingerlings supply market could not be anticipated until it actually happened. Understanding general problems in theory is another thing from anticipating practical problems in reality.

For this particular problem of fingerling shortage, use of nursery cages of smaller mesh size which may be attached inside of an ordinary mesh cage would be an idea to restart actual milkfish production earlier under the inevitable severe fingerlings shortage situation. How and what kind of countermeasures against the fingerling shortage the Project had taken in the actual implementation was explained in the next section.

Lessons Learned 3: Flexible Implementation to Countermeasure Unexpected Shortage of Fingerlings by Supply of Change Net Materials of Smaller Mesh Size

A part of the cause for the delayed fingerling stock in QIP-1 was due to the size of fingerlings required for stocking. The normal size of fingerlings required for stocking in this region is 4 – 6 inches depending on the mesh size of cage net used by the cage growers. The mesh size of the JICA funded cage was larger (12 knots mesh) for which 6 inch size fingerlings were required.

This large mesh size requirement is disadvantageous in obtaining fingerlings from suppliers when demand is high or supply is short as fingerlings tend to be sold earlier at smaller sizes. Currently, the supply is highly limited because majority of fingerling producers have yet to rehabilitate the damaged nursery ponds and other fingerling production facilities from Typhoon Yolanda. The situation is expected to get worse as restoration of production cages with support from BFAR is ongoing in the region to make demand for fingerlings to continue increasing in the next few years.

The Project in expectation of short supply of fingerlings to the JICA funded cages in Basey decided to supply a cage net in smaller mesh size (14 knots mesh) for each cage unit in addition to the original net (12 knots mesh). Supply of the second net will also support the farming operation in which operators usually change the cage net at the middle of culture period to clean it and remove the fouling materials naturally attaching on the net when it is under water. Without changing net, the fouling materials clog the meshes and block the exchange of water through the net, making a poor water quality condition inside the cage for the fish.

The fish farming associations were provided with sufficient materials for construction of smaller mesh nets and were trained for the construction of net. Fisherfolk are familiar with construction of square cage nets but not with circular cage nets. Change of mesh directions from diamond mesh to square mesh was another technique to learn for the fisherfolk as it is not required for fishing gear construction but it is important for construction of cage nets.

The supply of change net materials was not an activity included in the original plan for this QIP. Implementation of this unplanned activity was done carefully reviewing the potential effects to other activity components especially from the financial aspect. Fortunately, cancellation of resources personnel calling from outside of region and other saving measures taken made the Project implementation possible to carry out the supply of necessary materials for change net construction with associated training to the beneficiary fisherfolk.

Flexible implementation is sometimes necessary to countermeasure the unexpected problem, especially in emergency assistance project for natural disasters like this project. The Project learned it is necessary to expect unexpected situations in emergency projects.

Lessons Learned 4: Communicating with Target and Other Local Population in Organizing Fish Farming Associations

In the original plan of QIP-1, each cage was provided to a group made of three fisherfolk households to share the ownership. Each cage was considered as the basic unit for operation. In consultation with the fisherfolk in the target barangays, the basic unit of operation was changed to 10 units of cages which were in a grid mooring system.

This change was made primarily in response to the requirement for marketing the harvested fish. Fisherfolk informed that the harvest from one cage which can be expected to be 4 - 5 tons could affect the wholesale market price at Tacloban and reductions in the price could be expected if many cages are harvested at the same time. There is also seasonal variation in the market price so that they want to strategically set a harvesting schedule among the fishermen in the same group.

To realize this strategic harvesting schedule efficiently, the target fisherfolk were asked to form fish farming associations based on the grid mooring in which 10 units of cages were accommodated. This proposal was accepted by the fisherfolk in the target barangays. The five fish farming associations in four barangays were established through a series of meeting organized by the Basey municipal agricultural office.

This modification in formation of fish farming associations was another example of flexible implementation required to countermeasure the unexpected problem. The modification did not need any additional funding and no negative side effect was expected. A lesson learned from this change in the method of implementation activities was importance of communication with the target population and other local people who actually were involved and to be affected by the Project implementation. Trying to make frequent field visits and communicating with the target and surrounding people is necessary to realize flexible and appropriate project implementation.

Lessons Learned 5: Raising Awareness of Women's Association Members

In QIP-3, the three groups that restarted their activities in October 2014 have managed to produce and sell their products on a constant basis and have been obtaining a certain level of profit from these activities. However, the activities up to February 2015 were mainly conducted under the initiative of the Study Team, and unprompted actions by the associations themselves were very limited. The reasons for the situations can be assumed from the environment surrounding the associations before Typhoon Yolanda, where; 1) there were no necessities for autonomous actions or contraptions by the association because all arrangements for production and sales were done through external support in a spoon-fed manner, 2) the members of the associations have been conventionally dependent on their chairpersons and are not used to acting spontaneously, and 3) beliefs that processing activities will lead to economic benefit was not sufficiently developed because their activities were suspended before obtaining stable income due to Typhoon Yolanda.

The awareness of association members on the activities leading to economic benefit have been steadily growing after they actually started to accumulate profit. However, the members of the associations are still significantly dependent on their chairpersons. The chairpersons of the three associations are literally in the position to manage everything, including the accounts and

records of their activities. Moreover, the chairpersons of the associations cannot fully devote their time to the association activities since they often burden other various responsibilities such as assisting DSWD or coordinating with community. The concentration of responsibilities to the chairpersons was often observed to result in the stagnation of the activities of the associations. In terms of accounting, nobody besides the chairpersons knew the exact details on the situation of income and expenditure, and therefore, it was difficult for them to submit their records on time.

In order to maintain stable and sustainable activities by the women's associations after the support by the QIP is finished, roles and responsibilities for the activities should be decentralized and dispersed among association members. Awareness and capacity of individual members should also be raised so that members can participate in the decision making of the association, and at the same time, take autonomous actions to realize the decisions made.

Lessons Learned 6: Utilization of the Tolosa Multi-Purpose Livelihood Center for Increased Production

The three associations of Olot, Tanghas and Telegrapho, which are participant groups of QIP-3, have been initially conducting their processing activities in a chapel near the municipal hall. However, the associations were not always able to use the facility even when they wanted to produced their products, because of its availability for use. In response, the associations started temporary production in their respective barangays, but having no permanent facility for processing activities, the production was still limited. The women's association of Telegrapho is a group earning relatively large profits from its activities. Though the group intends to increase its production to enlarge sales volume, their production activities are limited to around two times a week due to limited availability of venue. Securing venues for processing activities is a bottle neck for active production at this moment. Therefore, the use of the Tolosa Multi-Purpose Livelihood Center, which is expected to be completed in April 2015, should be started as soon as possible.

Lessons Learned 7: Effect of Political Conflicts

One of the reasons for the delay in Burak women's association to re-start their activities in QIP-3 was the political conflict between the Barangay and the Municipality.

It is an unfortunate fat that political dynamics in the Philippines are often seen to affect the activities for supporting the local population. Especially at times of disaster recovery and reconstruction, the influence of political bias on access of the affected population to various supporting schemes must be eliminated. In order to do so, the providers of the assistance should be keen in taking preventative measures at the earliest stage possible, by understanding the social dynamics surrounding the target women's association. However, since it is also

difficult for external donors to fully understand such situations including its backgrounds and particulars, support should also be attained from other local resources.

Lessons Learned 8: Supporting Locally Developed Technology for Long Term Sustainability

QIP-8 targets fisherfolk in two different barangays in the Guiuan municipality: Barangay Victory Island in Victory Island and Barangay Camparang in Tubabao Island. The method of grouper cage culture is different between these two sites. The fish cages at Victory Island are set at the bottom of the sea at about 20 m from the surface, while those in Camparang are set near the surface of water around 5 m depth. The two have quite different physical and biological environmental conditions and the design of cage and the method of operation are also different.

The introduced cage design is the same in principle for the two sites but the nets attached to the cage frame were specified differently according to the practice at each site. The net for Camparang site was made of double layers of netting material of mesh size 10 knots, while that for Victory Island was single layer of mesh size of 14 knots. Specifying different net material was necessary for the beneficiaries to apply their traditional culture technology developed accordingly to the surrounding environment.

Similar to QIP-1, fisherfolk were not familiar with conversion of diamond mesh to square mesh in this QIP. The cage supplier, INCA Philippines Inc. constructed the nets at the Victory Island with hired fisherfolk, which made them learn in practice the mesh conversion. The fisherfolk at Camparang however missed the opportunity. The difference in mesh size from the Victory Island cage made it difficult for them to learn the technique from the Victory island fisherfolk. This situation made the supplied net materials for construction of change nets unused because the Camparang fisherfolk were afraid of wasting it by cutting wrongly. A special training was done for learning how to convert meshes to solve this technical problem only for the Camparang Barangay on Feb 5, 2015.

Accommodating different requirements for target populations sometimes demands extra work and time in the implementation but it would be worth to do so as it is expected to make the Project better in sustainability after the termination. Providing exactly the same cages in design to all the 100 beneficiaries in two islands was an easier choice for the Project implantation and would not have made the necessity of training on mesh conversion. The beneficiaries, however, could not apply their grouper culture techniques developed under the respective environment, which might lead in longer term to a situation in which the supplied nets will be less efficiently used. Conducting the supplemental training on the same subject (cutting net for mesh conversion) let us learn that extra and repeated work may be needed to ensure the long term project sustainability.

Lessons Learned 9: Make Haste Slowly in Mitigating a Conflict Between Utilization and Conservation of Natural Resources

In QIP-8, the method of deep water culture technique used at Victory Island involves diving operations for feed supply, cage maintenance and other day-to-day operations. The divers are supported for the underwater activities with locally constructed hookah diving system that supplies air for respiration through an airline tube from a compressor loaded on a fishing boat. This system is unreliable and potentially health hazardous to the diver. In addition, it is commonly used for illegal fishing with cyanide and other toxic compounds. Due to these two reasons, use of compressors in fishing is prohibited in the Guiuan waters by the municipal fisheries ordinance.

The Project intends to get a gratuitous permit provided in an article in the ordinance for the use of compressor in the Project at Victory Island with three main bases: 1) it is used for aquaculture and not for fishing, 2) the SASUBA system introduced by the Project is safe in all aspects of health hazardous risks explained in the ordinance, 3) it is a way to support the development of local technology. The Project held a series of meeting with concerned local and national governmental and non-governmental institutions for presentations of proposal to obtain a gratuitous permit.

QIP-8 aims to recover and improve the livelihoods of grouper farming fisherfolk through implementation of environment-friendly farming methods. This is in line with the government policy of developing aquaculture using limited natural resources in sustainable manners. Discussions on the project objectives and the methods being used on the occasions like these meetings is an opportunity for the Project to extend the project impacts to outside of the project area and is an important part of the Project implementation to achieve its aim of doing fish farming in environmentally friendly and sustainable manners. The process of granting the gratuitous permit requires an authorization from the municipal local council for the Mayor to sign. The council made the resolution on March 19th, 2015 and the permit is expected to be granted.

Introducing SCUBA equipment instead of SASUBA was an option the Project could have taken. A SCUBA system does not include a compressor on fishing boat and therefore is not in conflict with the current Guiuan fisheries ordinance. Accordingly, choosing SCUBA system would not make any problem in the implementation of the fish farming activity at Victory Island. Nevertheless the Project decided to take SASUBA because there is very little possibility of maintaining the SCUBA system by the beneficiaries due to the reasons; 1) the equipment is expensive, 2) the maintenance requires to refill cylinder which can be done only certified shops or government offices, 3) the beneficiaries are not familiar with the technique, 4) application in illegal fishing is difficult to control, and 5) health risk is higher because of highly pressurized air in the cylinder and capability of going to deeper zone. All these

problems make the sustainability of SCUBA to be used after the Project highly questionable. Choosing SCUBA will bring a short term convenience because it does not make conflict with the fishery ordinance but it does not solve the two fundamental issues associated with the current diving system, which are health risk to the divers and use for illegal fishing methods.

Choosing SASUBA, on the other hand, will bring us an opportunity to explain our position and let the concerned institutions and people to think about what is really necessary to conserve the precious natural resources of Guiuan and make use of them in sustainable manners for the people. Obtaining a gratuitous permit for use of SASUBA may take a long time for us. But it is an important part of activities that the Project needs to go through in order to make the grouper fish farming in the Guiuan water to be done by environmentally friendly methods as the Project aims for. Seeking real benefit for the target population to accomplish the project objective takes sometimes extra activities for the Project. Make haste slowly. This experience let us learn what it means in the project implementation.

Lessons Learned 10: Tasting and Sales of Processed Products in Local Events

Tastings of processed food products produced through relevant QIPs that were conducted during local events were generally accepted with favor by the attendees. In terms of leaving a good impression of the products to the potential consumers, the activities could be considered as a success. However, there were no concrete indications that participation in most of these events, which were mainly held in the urban areas of Tacloban and Palo, directly lead to increased sales of the products. On the other hand the orders for the products produced in QIP-03 notably increased after tasting was held in Tolosa, where the products are produced. Taking into consideration that there are no stores that regularly merchandise the processed products in Tacloban or Palo, extra costs such as travel/transportation fee are expected to occur when purchasing the products from their production areas. It is therefore assumed that even though the participation to events in Tacloban and Palo were effective in terms of notifying the existence of processed products, it did not lead to increased sales due to poor access to the products. In order to effectively promote the sales of processed products, indiscriminate participation in local events should be avoided. Participation in local events should be considered together with improving the access to products such as development of retailers that regularly merchandise the products. In other words, close coordination should be examined between promotion activities and sales strategies.

Lessons Learned 11: Access to External Supporting Schemes

The producers of Softbone Bangus in QIP-15 have been specified as a Target Group for the supporting scheme of DOST in FY 2015. Utilization of this support will enable the producers to increase their production, and significantly improve the accessibility of producers to markets outside Brgy. Sta. Cruz, thus provides hope for future developments such as contracts

with large-scale retailers and export to other areas of the country. This fact indicates that if products with due market potential can be developed, local small-scale producers also have the possibility of significantly accelerating their sales by accessing existing supporting schemes.

Lessons Learned 12: Duplication with other Supporting Activities

As a result of most of the male participants being engaged in the shelter program of IOM, the activities of QIP-14 in Busay has been significantly delayed. One of the reasons for this situation is assumed to be the intensive labor that the shelter program required because it had to be finished by December 2014. Under situations where external assistances for emergency recovery are concentrated in a short period, the local beneficiaries will have to choose which assistance they need to respond to. In such cases, activities such as cash for work and construction of housings, which are issues of urgent need, are expected to be chosen with preference. In contrary, the same priority was not attached to the activities of the QIP, which requires autonomous efforts of the participants for producing charcoal, despite the commitment of the barangay. On the other hand, the shelter program was not as intensively implemented in Buyayawon, and the production group in the barangay was actively participating in coco-charcoal production, resulting in more areas of coconut fields cleared of debris. This leaves a lesson for the selection of target areas, where interventions of various donors as well as the intentions of the beneficiaries needs to be duly examined before implementation.

Lessons Learned 13: Developing Ownership for the Activities through Obtaining Cash Benefit

In the past, charcoal production from coconut trunks has never been practiced in the areas including Mercedes. Charcoal products produced from coconut trunks were also never seen in the markets. When starting the activities of the QIP-14, the participants, although they showed interest in participation, were not fully convinced that the activities would really result in extra income. Initially, the participation of group members in charcoal production was also not as active as in the later stages of the project, and the activities had to be conducted under strong initiative of the Study Team. However, as soon as the charcoal started to sell, there were obvious changes observed in the attitudes of the group members. Particularly in Buyayawon, active production and sales of coco-trunk charcoal has been started in the early stages of the QIP. This indicates the importance of actually showing the benefits to the participants in a tangible form in order to raise their ownership on the activities, particularly when introducing a new practice. Such experience should be provided to the participants at the earliest stage of the activities as possible.

Lessons Learned 14: Utilization of Coconut Fields after Clearance of Debris

In the areas including Mercedes, some of the farmers have started re-planting of coconut trees

and intercropping of crops such as sweet potato and cassava between the coconut trees, where fallen trunks have already been removed. However, according to the production groups of QIP-14, who are coconut farmers themselves, the productivity of soil in the region is low, and production of commercial crops cannot be done without fertilizers. On the other hand, there was a case in Dulag, Leyte, where donor organizations provided the local residents with seeds and seedlings of vegetable. There, the local residents started production of same types of vegetable at once, which resulted in the saturation of the market, leaving the residents without a place to sell their products. Another case was the cultivation of bananas, which can be harvested in six months. Though this was started in a vast area in the region, Typhoon Ruby hit the area in December 2014, one month before the bananas were ready to be harvested. As a result, most of the banana trees were damaged and could not be harvested. When making use of the coconut fields cleared through this QIP, crops to be planted should be selected from the viewpoint of avoiding effects of typhoons, low requirement of input, and high marketability. Crop rotation systems should also be developed to avoid replant failure and farmers should be provided with guidance for appropriate cultivation of the selected crops.

Lesson Learned15: Regulation on the Logging of Coconut Trees and Replantation

Social situations such as regulations and land ownership should also be well considered in addition to the local environment and farming situation when programs of this nature are implemented. There is a logging restriction of coconut trees in the Philippines. Replantation of the damaged coconut trees had not advanced after typhoon Yolanda because their farm will be bound by coconut until the tree dies. Some land lords are reluctant to take this long term responsibility. Thus it required to spend more time to get the target people to understand the intention of the project.

Such regulations affect more significantly in the case of tenant farming (share cropping system). The landowners cannot divert their own land freely and must continue lending land to tenant farmers until the coconut wither once the coconuts were replanted in their owned land. On the other hand, the tenant farmers should harvest coconuts to sell copra and pay half of the sales to the landlords as long as coconut trees are alive. They cannot grow other crops without the landowner's permission.

It is also said that incentives for the efficient land use and production become deteriorated for both the landowners and the tenant farmers under such landowner systems because their ownership tend to get low. Indeed, most local people had had lower interest in the sustainable coconut land use by intercropping with horticultural production.

However, it is considered that the coconut production is best practice for the target area under such environmental conditions like climate, including frequent typhoon, and the soil is unsuitable for other crop production. It is little possibility to obtain more income by diverting to produce other crops for more or equivalent income compared to the coconut production.

Thus, it was tried in this project to make farmers understand the adequacy of the replantation of coconut trees together with intercropping by showing its possibility of profit. As a result, farmers became to have incentives for coconut intercropping and started replanting the coconut trees by convincing the landowners who do not want to replant them. The farmers also decided to promote intercropping with horticultural production while receiving the assistance from the LGU and the DA.

It was concluded that the intercropping model designed in the pilot program is adequate under the local environment of natural condition through the trial of horticultural production. However, when farming models are needed to be designed to introduce in other places, it is necessary to consider local regulations and local situation which formed the farming situation and social condition even in the coconut production area.

Lesson Learned 16: Introduction of Technology in Consideration of the Natural Environment and Farm Management and Improvement by Farmers

In the case of the introduction of coconut intercropping, it is necessary to introduce crops and cultivation techniques in consideration with natural environmental conditions such as climate, soil and farm management based on the their customs and other livelihoods. It is also favorable to establish the base for adaptability by repetitive trials which will lead the farmers to be able to improve the techniques by themselves.

It is important to introduce horticultural production for intercropping along with replantation of coconut trees to effectively recover the coconut farmer's livelihood from damages from typhoon Yolanda in the target area of Mercedes. The Project team carried out interviews in the Visayas University, soil analysis in a laboratory, and questionnaire surveys to get to know the farmers financial situation before the implementation of the project. Based on the results, a farming model and cultivation techniques to be introduced were designed. Then the model was implemented as a trial with the crops which are commonly grown in local environment. As a result, crops were growing well steadily and an adequate harvest was also obtained until around mid-term. However, some crops began to wither at a later stage because of the inappropriate farm management followed by drying under the El Nino. Especially for sweet potatoes, those did not arrive at harvest because the tubers did not grow, while there was harvest with the traditional way in same area. Several causes can be considered such as the planting season, variety, or introduced techniques (fertilization, rooting) for the sweet potatoes. In general technical assistance, the recommended techniques are established by comparing and utilizing the experience of this failed trial to improve the production through repetitive trial for experimenting different varieties and techniques. Farmers are also able to learn how to apply and improve the techniques through such process, but there was no such opportunity to implement follow up trials because of the limited time period of the project.

As a complement, a technical manual with full information was established and distributed aiming at the application and improvement examined by farmers. Yet the ability of technical application can only be grown on farmers though practice. If the trial of horticultural production in the coconut field could be conducted several times by utilizing the manual, in the subproject, the participating farmers and the project team were able to examine and identify the suitable techniques, and to establish grounding which facilitates farmers to apply and improve them.

Lessons Learned 17: Working with Other Institutions for Finding Financial Partners for Operation of Fish Farming

Milkfish farming at Sta. Cruz in Tanauan (QIP-15) is practiced by a partnership between an "owner" who owns the farming facility and provides labor for operation and a "financier" (or an investor) who bears the operational costs (for supply of fingerling and feed). The Project provided materials for the facility to be built by the owners. However, for operation of the facilities built through the QIP, the owners had to find financers, and there was a risk of the owners not being able to operate if they could not find their financers. The Project, therefore, set a precondition for the owner to receive the material, which was that the owner had to submit a written consensus of the financer for his/her commitment for operation. At the early period of project implementation, it was not easy for the owners to find financiers as many of previous financiers lost their investments when Typhoon Yolanda hit. Seeing the situation, the procurement for the materials was separated into two phases. In the first phase, only ten owners were able to provide the signed documents of consent from financiers. Accordingly, materials sufficient for construction of 10 units of fish pens were procured in the first phase.

Among the remaining 32 units, 10 units were supported by OXFAM for the operational cost. This was realized through coordination by the Project working together with the provincial and municipal agricultural offices. Unlike the individual partnership between the owners and the financiers, the funds from OXFAM were deposited into a bank account of Sta. Cruz Milkfish and Oyster Farming Association opened specifically for the OXFAM project for the funds to be revolved for continuation of production.

Observation of erected facilities after distribution of the first batch of construction materials encouraged the other potential financiers and made easier for the owners to find their partners thereafter. All the rest of materials for building 32 units of milkfish pens including those for the owner supported by OXFAM were procured in the second phase.

This experience made us realize the importance of working together with other institutions. OXFAM's financial assistance to the fish farming association was a significant factor to complete the facility construction in time, which was made possible by coordination with provincial and municipal agricultural offices.

Lessons Learned 18: Solving Problems by Active Participation of Beneficiaries in Control of Culture Area and Spacing between Milkfish Pens

One fish farmer in QIP-15 started the construction of his pen with his own funds before the Project started distributing the materials. This farmer made his pen culture area about 2,000 m^2 or twice the size that the municipal agricultural office approved for an issued permit. This was then illegal but it was the size this farmer previously held before Yolanda.

He belongs to the fish farming association and accepted an offer made through the association together with advices from the municipal agricultural office to remove the facility as a condition to receive the material from the Project. The size limit under the municipal permit (not more than 1,000 m^2) is kept for all the facilities built in the site.

The Project did not intervene directly in this problem but let the fish farming association play the main role to solve it as an internal issue, and also asked the association to consult the municipal agriculturist which holds legal responsibility to issue the license for fish farming and make them compliant to the conditions associated with the issuance. The problem rooted far before the time of Typhoon Yolanda and was expected to be complicated by personal and social issues among the members in the fish farming association. The solution therefore required understanding on the background and history that made the problem emerge, which may be beyond the comprehension of the Project.

The Project brought the funds and technical expertise but these resources needed to be applied to the activities of the target people to achieve the aim of recovery of fish farming activity. That application of project resources was only possible by active participation of the target people. The solution of this problem made the Project learn on the limitation of project intervention and necessity of active participation of the target people without which the resources provided by the Project would not have achieved its target output.

Lessons Learned 19: Increased Cost in Procurement of Construction Materials from Local Market

Procurement of materials for construction of fish farming facilities in QIP-15, especially bamboo poles, faced difficulty in obtaining the required quantity in time because of shortage in the local market caused by damages or losses due to Typhoon Yolanda in the early phase of recovery and because of high demand from the recovery constructions that started at the same time in the later phase. Materials transported from outside of the region were still available but materials which were sourced locally such as bamboo poles for construction of fish pen wall and oyster racks were in severe shortage in the market. Price of bamboo poles increased twice or more compared to the price before Yolanda.

Super Typhoon like Yolanda causes heavy damages on the economy of the region and brings a

temporary chaos. Loss of property makes sudden increase in demand, resulting in hikes of prices for the goods. Budgeting for an emergency project to assist the victim needs to consider on the demand and supply condition of goods in the aftermath of the incident.

Lessons Learned 20: Practical Details for Developing an Insurance Package for Milkfish Farming Operation to Complement the Physical Structural Weakness

Typhoon Ruby which hit the region in December 2014 caused minor damages on the milkfish and oyster farming facilities built under QIP-15. The bamboo poles of some facilities inclined although no loss of stocked fish occurred. Another strong Typhoon Seniang hit the region at the end of the same month and this time a total of 7,760 fingerlings were lost in 6 units of fish pens. Some pens which had bracing on the poles did not get damaged. Assessment of damaged facilities made the Project to decide supplying additional bamboo poles for putting braces for the bamboo walls for all structures.

Milkfish pens and oyster racks constructed in this project are made of bamboo poles in a basic design following the traditional design. Remedy such as adding braces for the bamboo poles are limited in increasing the structural strength. The farming facility is fundamentally weak, and it is not expected to survive in super typhoon like Yolanda with extreme storm surge and wind.

The Project therefore recommended to the fish farming association of Sta. Cruz to consider protecting their facility and operation by insurances. It is a strategy to protect the property by increasing software resilience because increasing hardware resilience is limited. Following this strategy, the Project coordinated to invite an insurance company to discuss with the fish farming association's members on possible development of aquaculture insurance.

Philippine Crop Insurance Corporation (PCIC) which was providing free limited time insurance to farmers and fishermen as a response to the Yolanda incident with government subsidy accepted the invitation. Meeting with PCIC resulted in provision of insurance packages for the facility and also for the aquaculture operation tailored to the condition for the Sta. Cruz milkfish farming. In addition, the members and other barangay fisherfolk were provided an opportunity for applying their limited time free insurance packages for their farm stocks as well as for personal injury and life. Households with swine production and some milkfish farmers who started operation earlier completed the application.

Preparation in formulating an emergency project is inevitably limited. Structural weakness of the milkfish pen facility which is made of bamboo was apparent at the time of project formulation. There were several options to complement the weakness in theory. Software protection such as by insurance was one of those options, but how to combine the idea into practicality was not done well until the Project actually saw the damaged bamboo fish pen walls at the site.

The meeting with PCIC and the fish farming association revealed the following two points to be considered for insurance application. The owners informed that they need the insurance to cover the operations only during the time of typhoon season not all year around. They also wanted to cover only the materials which needs to be bought from outside but to exclude labor cost which may be managed within the community in the emergency situation. These factors would affect the amount of insurance premium considerably. Without these details it would be difficult to formulate a proper countermeasure for the problem, and thus there might be a chance of going to lead the project implementation into a wrong direction. Working in this issue made the Project realized the importance of understanding real situations at the field.

Lessons Learned 21: Modification in the Oyster Seed Collection Activity that could Result in an Expansion of Impacts

Oyster farming started in Sta. Cruz barangay during early 1990s by transplantation of oyster seeds from northern Leyte. QIP-15 intended to obtain them from Leyte Bay to restore the oyster culture which was damaged completely by Typhoon Yolanda. The original idea was to transport the oyster seeds one time and allow the shells to breed in same water thereafter.

The one time transportation was found not sufficient to fill up the planned 25 units of bamboo rack which requires about 5,000,000 seeds. The number of transportation has to increase at least to three times. It was also found that this much number of oyster seed collection needs special seed oyster collection facilities to be built at the source locations. Fortunately the Project obtained cooperation from the Leyte municipal agriculture office to establish oyster seed collection facilities in eight barangays recommended by the mayor.

Six out of eight barangays participated in the oyster seed collection program in Leyte Bay and successfully collected oyster seeds, so far 3.8 million seed oysters were harvested and transplanted to the oyster growing racks of Sta. Cruz. A total of 400,000 pesos were paid to the fisherfolk who build the facility with the supplied materials and collected the seed oysters.

The selling of oyster seeds was a new opportunity of income generation for the Leyte Bay fisherfolk. If the procurement of oyster seeds is proved to be an economically viable way for the Sta. Cruz oyster growers more than collecting oyster seeds from self-breeding mother oysters within the tidal flat water, there would be continuous purchasing of oyster seeds from Leyte Bay by the Sta. Cruz oyster growers. The Project aims to collect enough economic and biological data to conclude the viability.

In the oyster seed collection activities, the original plan of single transplantation was changed to a plan of multiple-transplantation, and this change created an opportunity for the fisherfolk working for collection of seed oysters at the source barangays. This could be an unexpected impact of the Project not included in the original plan. Modification of the original plan has to be done with careful considerations of its effects, but flexible implementation is sometimes

necessary when the expected benefits due to the modification surpass the cost. This was the case in the change of oyster seed collection plan in this QIP.

Lessons Learned 22: Potential Economic Impact of Milkfish Production for Future Planning

QIP-15 also now started seeing some farmers harvesting milkfish from the newly established fish pens. Each cycle of grow-out takes about 4 months, which means every pen could harvests three times in a year. At the full scale operation of 42 units of fish pens, therefore, it is possible to see three harvest operations in every week. Each harvest is expected to be about 3 tons, making maximum potential annual production of 12 tons per unit of pen. For 42 units, the total maximum production could reach over 500 tons in volume and 55 million pesos in value. A very rough net profit estimate of 1/3 of gross sales makes 18 million pesos for the barangay. About half of it would go to pay to the financiers who may be staying outside of the barangay, but the other half (9 million pesos) could remain in the barangay. For a barangay of about 150 households, this will be sufficient income generation to boost the whole economy.

This is a theoretical maximum economic benefit that could be achieved by the Project. In practice, half or less than half might be realized due to practical reasons which hamper the real operations of the fish farmers. The Project needs to find the reality and remove these obstacles that are preventing for the beneficiaries to achieve the theoretical maximum in the project implementation.

Lessons Learned 23: Future Potentials in Integration of Milkfish Farming and Processing and Required Continuous Supports for the Women's Association

QIP-15 sees the processing women association or SCWFA in confidence making profit from sales of the newly learnt pressure cooked milkfish around the barangay. With the continuous full scale operation of milkfish farming from the fish pens restored by the Project, the women association will have secure and cheaper source of milkfish to increase the production of processed milkfish. Even a mere 5 % of the total maximum annual production of the 500 tons estimated in the above section would supply 25 tons of material fish for the processing, which could generate a gross sales of 6.25 million pesos. This provides them an opportunity to expand the business into a new step with continuous production for the market outside of the barangay.

In seeing this new opportunity, the Project with advices obtained from relevant government and education institutions guided SCWFA to learn sanitary and hygiene procedure to produce a safe product for selling outside of barangay. The Project also tested the product for the safe shelf life period in bacterial count examination. This process was still underway as of end of February 2015.

During the interventions toward upgrading of production level and quality, an excellent opportunity and assistance commitment was offered to SCWFA. Department of Science and Technology (DOST) Region 8 identified the association as a target group for the fiscal year of 2015 and committed for; 1) provision of consultancy service for product development, 2) support in providing training opportunities and 3) use of Food Innovation Center (FIC) which is accredited with License to Operate (LTO) by Bureau of Food and Drug (BFAD).

With the expected increased milkfish production from fish pens within the barangay and supports offered from outside of institutions like DOST and VSU, it is very realistic to upgrade the production level to more than 6 tons/year, which is equivalent to 500 kg/month or 125 kg/week (4.2 styrofoam boxes of milkfish per week). The production has to be made one styrofoam box of milkfish processed for every weekday.

This would be about 10 times of the current production level based on the records. Such an operation would demand division of functions such as for resources procurement, production, marketing, accounting and facility maintenance. It would be quite difficult for the women's group which formed last year to realize the required transformation by itself. Continuous support from the Project to perform as a leading coordination agency in addition to the expected supports from the various institutions would be necessary to realize the potential into practices. Realization of such potential would be a shining example to encourage the other groups especially women's groups.

Lessons Learned 24: Self-sustaining Development of Establishment of Fisheries Cooperative for Operation of Milkfish Cage Farming

Aquaculture programs for the livelihood recovery of the affected fisherfolk have been implemented in three quick impact projects of the Typhoon Yolanda Emergency Recovery and Rehabilitation. The activities in the extension period aimed to surpass the livelihood status which had been achieved in the previous period since the beginning of the project. The recovery from Typhoon Yolanda has been implemented with its slogan of Build Back Better (BBB) emphasizing the spirit of recovery not only to return to the pre-typhoon condition but also to use the recovery process as an opportunity to re-build the affected region to be even better than the pre-typhoon situation. In consonance to this slogan, most of the activities in the extension period were for achieving the state of livelihood beyond the pre-typhoon condition.

As it has been reported in the previous sections, there were several major changes in the management structures for the overall implementation of the fisheries QIP activities that took place during the extension period. Namely, a fisheries cooperative is about to be established for the Basey Mariculture Park by the Basey LGU, and the JALEYSA Women's Federation Inc. was established by the five women's processing associations in Basey and in Tanauan. These two changes can be seen as structure reforms for the implementation framework to

achieve higher levels of project objectives. Focusing attention on these structural reform activities and similar change in project management systems, the following discussion is to elucidate common issues in the implementation of disaster recovery assistance projects for improvement of livelihood status of the affected people.

In this section, "Recovery" and "Rehabilitation" were used intentionally to distinguish the two successive progressive livelihood statuses of the people affected by Typhoon Yolanda. "Recovery" means to return to the condition to the pre-typhoon situation and "Rehabilitation" to progress further and to exceed the pre-typhoon situation. In relation to the BBB slogan, "recovery" is a process of activities for the first two B's or Build Back, and the "rehabilitation" is the successive process of activities for the last B or Better.

In a previous section, it was explained that the establishment of fisheries cooperative at Basey will improve the milkfish farming activities of the JICA QIP supported cages both in quantitative aspect by activating all 40 cages and in qualitative aspect by the expected efficiency in operation and management which would be achieved in relation to the use of interest bearing funds [Achievement 13 (extension period) for QIP-1]. And as explained in the sections that followed, the structural change in the management body is considered to have occurred to facilitate the quantitative and qualitative improvements necessary to achieve the higher level of fish farming business.

The Typhoon Yolanda emergency recovery and rehabilitation project started to restore the livelihoods of the disaster affected people. The target population for the milkfish cage farming project at Basey (QIP-1) was selected from the people who were actually doing the fish farming or those who received the fish farming training as candidates for the Rent-to-Own program of the Basey Mariculture Park. Therefore, those selected were people were technically specialized in fish farming operations, but they had no experience in management of organizations. As already mentioned, the gross revenue from the 40 cages which were supported by the JICA assistance could reach an annual gross revenue of 60 million pesos. It is not realistic for these small scale fish farmers whose management experiences might be limited to the family business operation in monetary order of a few thousands pesos to be able to effectively manage such a large scale business. The operation needs a high level management capability and cooperative governance. The cooperative's management which would involve the double loan management (repayment to the development bank while lending loans to the members for their fish farming operations) would be even more complicated than the management of ordinary small to medium business enterprises. It would also require high levels in transparency and cooperative ethics as the amount to handle is large. These institutional capacities are different from the technical capacities on which the target fisherfolk were selected at the beginning of the QIP project and are not expected to be handled well by the fish farmers' associations formed.

The establishment of a fisheries cooperative with necessary institutional administrative capacity to manage the fisherfolks cage culture operations will increase the chance of successful and sustainable operations in a long term perspective. Although the establishment of a cooperative alone does not automatically mean that their institutional capacities will increase, it is expected that the lending bank will provide necessary services and specialists for the proper management as they would like to ensure repayment of the provided loan.

The milkfish cage culture project at Basey started with the aim to restore the livelihood of affected individual fisherfolk. The capacity of each fisherfolk to know and to be able to do fish farming technically was the fundamental requirement to be the target beneficiary for the project. It was a very reasonable criterion for the selection of target beneficiaries in the implementation of the project. Even though the project team was aware that the potential total monetary scale of the cage culture operation could reach 60 million pesos when all 40 fish cages will come under operation, it was not appropriate to include the institutional management aspect in the project components as the emergency recovery project must prioritize the individuals' livelihood recovery as the primary objectives. The increasing institutional capacities for the overall management of the fish farming operations could not be included as the detailed nature of such capacities were depending on the realization of the first objective of the individual livelihood recovery. From the viewpoint of project efficiency, inclusion of such components without concrete requirement would result in wasteful resources appropriation.

The establishment of fisheries cooperative is not an idea initiated by the QIP project, but it was an immanent development in response to the necessity. The activities were initiated and currently led by the Municipal Agriculturist of Basey, who was a former officer of Cooperative Development Authority and knows well about the practical aspects of Philippine's cooperatives and the procedure for establishment. The presentation from the Philippines Development Bank in the investment forum organized by BFAR RO-8 in cooperation with this project also facilitated the establishment[1]. The Basey LGU also is preparing for establishment of agricultural cooperative for the municipality which has been progressing ahead of the establishment of fisheries cooperative. These cooperative establishments are implemented as a main development strategy for the municipal agriculture and fisheries sector.

Seeing from the viewpoint of QIP fish farming project which has just ended its field operations, the establishment of fisheries cooperative is a good idea which enable support on the operation of all 40 cages established in the project at the same time to increase the institutional capacities of the overall management body. The point that the movement was not

[1] The LGU's shortage for the feed procurement funds for all 40 cages explained in the previous section would have been the most direct cause of this initiative for cooperative establishment.

initiated by the project but it was initiated internally led by the counterpart institution through the project activities gives us hope that it would increase the project long term sustainability.

We have learned from this lesson that there are additional inputs which are necessary for dealing with the economic development achieved later in the emergency assistance project but the project did not have in the operational framework as it was prepared for recovery of basic livelihood needs. We also learnt that it would take time to change the production from the recovered livelihood activities into the economic value. On the other hand, there were possibilities of self-development as seen in the QIP-1 (establishment of fisheries cooperative) to complement the shortfall to achieve the economic development. What the project needs to do is to support such self-development initiatives with close monitoring even though it cannot handle the problem directly.

Lessons Learned 25: Issues and Measures for Sustainable Operation of Milkfish Pen Farming

Fisherfolk and the investor share the net operational profit at the equal ratio of 50% to 50% after each harvest. The amount that a fish pen owner receives at the end of production cycle was in fact higher compared to the income of ordinary small scale fisherfolk in fishing villages in the region as mentioned in the above section. When the financial responsibility for each parties of the fisherfolk and the co-partner investor is examined in detail, however, it becomes apparent that the real profit for each party is fairly different between the two.

In the fisherfolk-and-investor co-management system for milkfish pen farming at Sta. Cruz, the fisherfolk is responsible for all labor for the operation and the facility construction and maintenance. The investor is responsible for the supply of fingerlings and feeds. Fisherfolk needs to provide all labor supply not only for the daily feeding, security and maintenance of facility which could be carried out by the family labor but also for the occasional large labor work such as in fingerling stocking and harvesting which require additional labor hired outside the family. They also bear the cost for required materials for facility repair and maintenance such as bamboo poles, nylon twine and nets. The investors are not required to pay for these costs although they are necessary costs for the operation. The investor does not have to pay any money other than that for fingerlings and feeds for the operation. At the time of harvest, all the cost spent for the fingerlings and feeds for the production cycle was deducted from the total sales revenue of harvested fish and the balance is divided equally between the fish farmer and the investor. Thus at this time, all the fingerling and feed costs are already returned to the investor. The 50% share to the investor is the real net profit for the investment for the fish farming operation. On the other hand, the same amount of 50% share is not the real net profit for the fisherfolk because the cost spent during the operation for the hired labor and the materials for repair and maintenance of facility have to be deducted from the 50% share. These costs may be actually paid from the 50% share after the harvest if he or she arranged

them on credit during the operation. The total costs for these additional spending that the fisherfolk is responsible under this partnership arrangement amounts to about 1/3 of the total operational cost. In addition to these real cash spending, there is a cost of labor by the fish farmer and his/her family members spent during the production period (or opportunity cost that the fisherfolk lost due to working for the fish farming) which should be counted as a part of operational cost in an appropriate economic analysis for the fish farming business. If this opportunity cost is included in the total operational cost, the real net profit for the fisherfolk could be even negative.

Table 4.1-1 shows the comparison of the summary of revenue and expenditures for the fisherfolk and investors. The summary for investor shows that the investors need total investment cost (for supply of fingerlings and feeds) of about Php 210,000.00/cycle and the net profit which is generated from the investment is Php32,000.00. This means the return of investment (ROI) is about 15% for the four-month investment period (rearing period). The cost spent for the fingerlings and feeds for the first operation cycle can be used for the second cycle, therefore, no further investment is necessary for the successive operation in the same pen. By continuing the operation for three cycles in a year, the net profit compounds at 15% rate for three times to increase 45% in a year, or the RIO for the year will be 45%/year, which is a very good investment profit.

Considering the result for the fisherfolk who receive the same Php 32,000.00, the net profit after deduction for the costs of necessary hired labor, material for repair and maintenance, and depreciation from the share value is Php 7,009.00 which is equivalent to Php58.00 per day for the four months working period. The daily income of Php58.00 by fish farming could still be a significant additional income but it is not at the income level which can support the family livelihoods as an alternative main business[2].

Table 4.1-1 Comparison of economic performance of milkfish pen culture between investor and fisherfolk

INVESTOR		FISHERFOLK	
Revenue		Revenue	
Revenue from fish sales	277,200	Fisher's share	32,284
Expenses		Expenses	
Fingerlings	49,000	Employed labor cost	7,600
Feeds	157,470	Overhead expenses	2,700
Registration fee to LGU	1,000	Maintenance Expenses	636
Insurance premium on working capital	5,162	Insurance premium on facility	3,332
		Depreciation	11,008
Total Expenses	212,632	Total Expenses	25,275
Net profit	64,568	Net operational profit	7,009
Investor's share	32,284		

[2] The ROI of the fisherfolk, which indicates the ration of profit to expenditure is 28% and is higher than that of the investor. However, this is because the cost of cash investment is extremely small, and the high percentage of ROI does not mean that the profit will be sufficient in improving the livelihood of the fisherfolk.

Investment indicators		Livelihood indicators	
Investor's share	32,284	Net income/work period	7,009
Total Investment	212,632	Daily net income	58
ROI	15%	ROI (=7009/25275)	28%

Source: JICA Study Team

The daily catch for a small scale fisherfolk is a few kilograms on average and the revenue expected from the sales is several hundred pesos per day. After spending for the gasoline, fishing gear, and other operational cost the real daily income for a fisherman is smaller. There are times when none or only a negligible volume of fish is caught in a fishing operation, aggravated further when fishing boats could not go out to sea because of rough seas due to weather disturbances (tropical cyclones, easterly waves, inter-tropical convergence zone, monsoons, and local disturbances) in the area. The fisherfolk tend to think that they got a large amount of profit when they received the 50% share in cash from the harvest revenue. However, the real income after considering the real expenses paid (hired labor cost, repair and maintenance cost, and depreciation) from the received cash would be much smaller. The income received would actually be used up for the fisherfolk's daily necessities and not much would be for improvement of livelihood of the family. The depression cost is a theoretical expenditure for the economic analysis and it might be difficult for the fisherfolk to comprehend the necessity of one. But if the same amount is not put aside from the share received at harvest time, the farming operation would stop when the facility already needs to be renovated or overhauled since the fisherfolk would not have sufficient funds accumulated for buying all the necessary materials.

The fish pen is made of simple materials such as bamboo poles and nets and the fish farm owner needs to continuously provide for the repair to maintain the condition. Bamboos needs to be replaced every year or so. The polyethylene net can be used with maintenance for torn parts and cleaning but it needs to be replaced completely after about 5 years due to the material weathering mainly from ultraviolet radiation. If the farmer does not have accumulated sufficient funds for the nets, no more fish farming operation would continue in the same pen facility. A realistic option for the fish farmer would be borrowing the funds from the partner investor to avoid loss of income source. Then, from the next production cycle, the farmer needs to pay back for the debt and the actual disposable cash income for the family's livelihood will reduce further.

The pen fish farming at Sta. Cruz started around year 2000. If the farmer had been accumulating the funds for the replacement of the whole net and other requirements for overhauling the facility before the Yolanda hit the region, they should have been able to rehabilitate the facility by themselves. But no one was able to do so and all were waiting for this project to come to assist for the facility rehabilitation. This suggests that the 50% share as calculated about Php 33,000.00 were depleted by spending for the daily needs and the

additional operational expenditures. The pen fish farming at Tanauan is important to support for the livelihood activity but it is not enough to accumulate its profit for changing/improving the standard of living to another level.

The co-management partnership with investor is a very innovative way for the small scale fisherfolk to carry out the fish farming which requires very high operational costs. The operation significantly supports their livelihoods. This management framework is efficient and facilitated the rapid recovery. However, a big part of the profit which is boosted due to the vitality of private sector's involvement in the management goes to the benefit of the investors. The actual net profit after taking the additional costs as discussed above is considered to be small for the fish farmers. It seems that without a measure taken the continuation of fish farming operations in this management framework would not improve their current livelihood condition greatly.

Lessons Learned 26: Mindset of Producers Groups Engaged in Small-Scale Livelihood Activities

It is a rather common in the Philippines that local resident's groups are not formulated in a completely autonomous manner, where residents truly intend to start their own businesses, but rather under the initiative of government or non-government organizations with the aim of the group to function as a recipient of project activities. Under such circumstances, the mind-set of the participants tends to be oriented towards "receiving external support", and is not highly motivated to be independent.

As for the groups supported under the QIPs, the base causes observed when group activities were stagnant were mainly; hesitation from approaching potential buyers and other stakeholders due to lack of confidence in their businesses, and personal disputes among the group members.

Many of the group members anticipated that their efforts may not bare any results, and tended to refrain from stepping out of their community before they even started trying. The strong and courteous support that has been usually provided to local groups and associations may have been one of the reasons for such situation, where members only needed to work on production activities, and did not need to be actively involved in the sales of the product, which is of course more challenging. Hopefully in the future, repeated experiences of small success stories for sales promotion will contribute in changing the mindset of such people.

There was another tendency of group members being over responsive to being left aside from other members. These incidents usually occurred when some members were not informed of the schedules for group activities (at the same time, they were usually waiting for someone to inform them and not inquire for the information by themselves). It was a common case where insufficient sharing of information lead to emotional disputes between the members. As seen

in such cases, the fact that not all members of local groups have professional attitudes towards their activities, and that the dynamics between the members is often functioning on a basis of personal relation should be noted with attention.

Considerable time and repeated experiences of success is required to create the sense of true ownership in such groups consisting of people who are not necessarily professional business persons.

Lessons Learned 27: Access to Supporting Schemes

Although there are various government schemes/projects for supporting local livelihood activities (both in technical and financial aspects), information such as application/implementation schedule and requirements for application are not widely shared to the local residents. The current situation is that the LGU contacts individual groups, but the LGU itself does not always have sufficient information on all activities conducted in the Municipality. Under such circumstance, it is difficult to say that all supporting schemes can be fairly accessed by those who need them. Furthermore, without the information on available schemes being widely shared, it is difficult for the beneficiaries to proactively approach the support that they actually need.

Apart from the above, the directionalities/goals of the supporting schemes, as well as the required capacities of those who participate, widely varies among the different agencies that provide them. For example, DTI, with the mandate to develop regional industries may have emphasis on activities such as market development for SMEs and enlarging the business activities to become large scale businesses, and less emphasis on formulation of community groups for small-scale livelihood activities. On the other hand, DSWD may have intensive support for supporting the socially vulnerable in having their first steps in economic activities, but not necessarily on linking them to the market. When looking at the entire process of; 1) formulation of community groups, 2) initiating livelihood activities, 3) expanding business towards local industries, different schemes of support should be applied, taking into consideration the stage of which the beneficiaries stand. However, existing schemes are not in the form of a continuum where one can smoothly shift from one to another, and coordination among different schemes is not necessarily active.

Accumulation of information and coordination among various supporting schemes should primarily fall in the hands of the Municipal Government. To address the issue, the Municipality of Tolosa has set up a position of a “Livelihood Manager” from 2016, and is planning to provide support the local groups. Setting up of such position is expected to contribute in the collection of sufficient information on local groups. Monitoring structures for the groups supported under the QIPs are also being set up in Tanauan and Basey, where active accumulation of information is hoped for.

Lessons Learned 28: Limitations in Government Support

As mentioned earlier, meticulous support will be required when introducing new livelihood activities to local groups that do not necessarily have professional mind sets. With its limits in human and financial resources, provision of such support may be beyond the capacity of the LGUs. Though the Municipality of Tolosa has been making active effort for supporting the local groups by newly setting up the position of Livelihood Manager, the kind of support required by the groups in experiencing success is expected to be difficult for a single government officer, especially when it comes to supporting numerous groups with different nature. On the other hand, the groups supported under the QIPs have experienced this process, including the various issues that similar residents' groups are likely to encounter. These groups can provide their lessons learned and valuable guidance for the new comers in the field.

Lessons Learned 29: Administrative Constraints for Promotion of Small-Scale livelihood Activities

One of the possible constraints for local residents to initiate small-scale livelihood activities under their own initiative could be the application fee for the business permit provided by the LGU. Groups that are not yet engaged in business activities are not likely to have sufficient initial investment, and preparing application fees including business taxes would be a significant obstacle for them to start their activities. Supportive schemes such as setting grace period for SMEs are expected to contribute in vitalizing small-scale livelihood activities.

Lessons Learned 30: Milk Fish Value Chain Analysis Workshop

An action plan for the improvement of the entire value chain of the local milk fish cluster was formulated through the Value Chain Analysis (VCA) workshop held by DTA. Various actions including the establishment of local seed production facilities and setting up of calamity damage insurance have been proposed in the action plan, and are currently being followed up in the subsequent follow-up meetings. Many of the activities proposed require intensive research and/or considerable investment, thus may not be completed in the expected time frame. However, the series of meetings are of important value for the local industry, as it functions as a venue for different stakeholders of the milk fish sector to meet and to frankly exchange their opinions for the future of the industry.

Lessons Learned 31: Establishment of Women's Federation in milkfish processing activities (QIP-1& QIP-15)

In regard to the institutional reform of the management body, the establishment of women's federation from the five processing associations in QIP-15 in Tanauan and in QIP-1 in Basey has also occurred in this project. The expected initial sales volume for Sta. Cruz Women's

Fisherfolk Association with the new processing plant currently under construction is 5,200kg/year as softbone bangus product. Assuming the production capacity of four new plants at the Basey side is a half of the Tanauan plant, the total output volume from the five plants would be 15,600 kg/year (=5,200 kg×(1+0.5× 4)), which is equivalent to 6.9 million pesos in value at the current retail price of Php440/kg. Although this is about 1/10 of the expected gross revenue for milkfish cage fish farming production, the scale of business is still very big for the small scale fisherfolk women. The management of processing business at this level is quite a challenge for them.

The milkfish processing activities are implemented to add value to the fish harvested from the milkfish farming in QIP-1 and QIP-15. The target women were selected because they were living in the same barangays where the main activity of fish farming was taking place. There was no screening carried out for the selection of women members but they were selected only by the reason that they were in the villages where milkfish harvests would be made from the fish farming being supported by the QIPs. The willingness to participate in the activity was confirmed time to time during the project implementation and member changes had actually occurred within the groups. Nevertheless, it cannot be denied that the selection of those women was an initiative in principle from the project side as an incidental decision related to the milkfish farming component of the project activities.

Fortunately, the processed product, softbone bangus, received good acceptance and reputation among the project stakeholders and was used many times in the project events and promotions in special occasions and trade fairs. The women's interest had increased along with the project's progress to have their active participation. However, it is the fact that they did not start their activity completely on their own wish but rather the project side that approached them and initiated it. Table 4.1-2 is the summary of answers to a question to the member of SCWFA of Sta. Cruz, Tanauan, at the time of commencement of the project activities about their wish for the hypothetical condition of successful business achievements in softbone bangus processing. They answered the question "what do you want to do if the proposed project on the processing became successful and obtained plenty of money from it?" The exact translation of answers was presented in Appendix 4-1. The answers were classified into five categories according to the content. The largest number of answers fell on the category of "sideline business" in which they said that they would use the money for supplementing the costs for their sideline family business activities (rearing of pigs and other livestock animals, operation of sarisari store[3], tricycle running business, rice farming, and coco-wine brewing). The second category was their wish to use the money for supplementing the educational cost for the children. The other categories followed were also all abstemious and it was apparent that those women considered the processing activity as one of the similar sideline businesses

[3] Sari-sari store: small scale vending store for daily needs in the village people, dealing with soft drink and snacks, seasoning, and other daily commodities.

as they were doing before, with which they wanted to uplift their family livelihood a bit better than before the Yolanda time. We, both the project implementing side and the beneficiary/recipient side believe that the project had helped fulfill by some degree their wishes expressed in the interview. Another interview made in January 2016 showed similar results (shown in the second part of Appendix 3-9), which showed their basic idea for the expectation remains abstemious and focuses to support the existing livelihood styles, except one person who mentioned to use the hypothetical money for the improvement of business performance of SCWFA together with the improvement of the own family's living status.

Table 4.1-2 Answered wishes by 6 women members of SCWFA on the use of profit on the hypothetical business success of softbone bangus processing

Answer		Sideline business	School fees	Facility repair	Foods	Own brush-up
1	Buy and grow animals, buy own items	○				○
2	Rear pig or chicken and install electrical connection to the house	○		○		
3	Use for school fee or buy stocks for sari-sari store	○	○			
4	Use as own income to spend for school fees for 4 children		○			
5	Use for enrollment fee, want to start food vending business		○			○
6	Repair tricycle, school fee, foods for family	○	○		○	
7	Buying stocks for sari-sari store, school fee for the children	○	○			
8	Use as a part of matriculation for grandchildren, rice farming cost, school fee	○	○			○
9	Use to support coconut wine brewing or soft drink vending business	○				

Activities have been implemented in the QIP based on the principle of "Build-Back-Better" aiming to improve the livelihood conditions of the affected people to a better state than before the typhoon incident. After entering the extension period and the possibility of improving the livelihood conditions of the target women involved in the processing activities became apparent, the project decided to support them further with the construction of five processing plants which was not included in the original plan at all. The environment surrounding the target women is going to change drastically with the construction of the processing plants. As mentioned at the beginning of this section, the total estimated production capacity of softbone bangus from the five processing plants would be 15,600 kg/year and its value could reach nearly 7 million pesos. This production volume is equivalent to 1,300 kg/month, or 300 kg/week, or about 1,200 packets of sales per week, which would require 24 customer shops of 50 packets/week sales volume. The market probably needs to reach out of Tacloban city and extend to Manila and Cebu. They will become capable to produce softbone bangus at the competitive standard to sell in commercial markets with all necessary licenses issued by the government authorities.

This means the project is now entering into the new phase of economic development with milkfish processing activities aiming to increase economic proficiency for supporting their livelihood status further. This new phase, however, may not necessarily be the wishes of all the participating women who were considering the activity as a sideline business only to supplement the abstemious family needs. Involvement in these new business activities will demand more time for the processing activities and reduce the time spent with their family members which might affect their fundamental relation with the family members. This may not be the ideal condition that the processing women want. Depending on their wishes and also the competence in business activities, some of the members may want to withdraw from the future activities voluntarily because of the difference in the life styles aimed for or because keeping up competence requires time and individual capacity. The project needs to be aware of the difference in the fundamental nature of the project between the emergency recovery phase and the successive economic development phase. One thing that the project should not do is to treat those who are not willing to come together to aim for further economic prosperity as strugglers, which may cause psychological secondary effect to the victims. This is a very important lesson.

The establishment of processing women's federation is considered to give a good opportunity for restructuring the managing body to be prepared to enter into the new phase of economic development and competition with higher efficiency and proficiency in business management. By increasing the organization's human resource base, the new federation's management capacity is expected to be upgraded. At the same time, those who do not want to spend a large part of their life for the business activities can also decide their level of involvement to the processing work according to their ideal life style.

Disaster does not choose victims. It raids indiscriminately. Therefore an emergency disaster assistance project which targets all kinds of victims who are affected by the disaster has to deal with a very wide variation of people in their economic capacities. Understanding and respecting this personal differences and to support them according to their needs is essential.

Lessons Learned 32: Changes in Management System in QIP-15 Milkfish Pen Farming at Tanauan

The milkfish pen farming activities of QIP-15 at Tanauan was implemented by the fisherfolk who had been actually doing the fish farming in the management system of partnership with outside investors. The same fish farming association continued taking the role of overall management for the activities without major problem. There is no sign of changing the management system up to the end of project activities in December 2015. The association's new strategy to increase the new management system in which the association functions as the investor replacing the outside investor is being implemented in the six operations funded by OXFAM. This is a change in management system but it is led by the association without

accompanying structural reform.

When we look at the management system in detail, however, there is a change occurring in the field level. It is about the new development in the partnership between the fisherfolk and the investors. Some fisherfolks are managing fish farming activities in multiple facilities. There were 31 operational fish pens as at the end of December 2015. Among the 31 pens, some of those which started recently were operated in effect by the same operators who had started the operation earlier. The project so far confirmed only one case where the same fish pen owner was operating four pens in effect.

Some project beneficiary fisherfolk have not found the partner investor and were not able to start using the pen farming facility for more than a year since the facility was completed. On the other hand, those who started the fish farming activities earlier is already in the fourth cycle of farming operation. The partner investors for those early operations wanted to increase the investment because of the good performance in the first year operations. The result of fish farming operation is, however, highly dependent on the skills and credibility of the operating partner-fisherfolk. And therefore, they proposed to the same fisherfolk operator to increase the number of operating fish pens with the condition that the same operator in effect manages the other fish pens. The fish pen operator approached the fisherfolk who has not found the investment partner and started the next operation using the facility which was idle before. The fish pen was reported as a newly activated fish pen under the name of the owner-fisherfolk who in turn does the daily activities (e.g. feeding) but is now however supervised by the same fish pen operator who started the operation earlier and has the confidence of the investor.

The workload for fish farming operation is relatively light and short in the duration with the daily feeding as the main activity. It is not necessary for an operator to stay the whole day and the feeding work can be done by a female operator. As mentioned earlier, it is possible to do fish farming as a sideline business by the fisherfolk family with the female member taking the part of fish farming operation while the male members continue doing the fish capture activities at the sea. Therefore, it is possible to manage more than one fish pen operation within the family labor force. The fish farming operation is highly profitable. Although it is pointed out that the daily income expected from the fish farming operation under the current investment arrangement system with outside partners is too small to improve the livelihood of the fisherfolk significantly, it was because of the small absolute daily income (Php 58/day) but the rate of profit (total expense to net profit ratio: ROI) was actually higher than that for the investor. The small daily income comes from the too small expense and operating more than one fish pen by one operator-fisherfolk will effectively increase the amount of profit due to the high profit ratio. Therefore, it is very reasonable for a fisherfolk to intend to operate multiple fish pens.

Operating multiple fish pens will increase the total volume of feeds and the number of

fingerlings also so that the investor can improve the efficiency of fish farming operation with the quantitative (volume/bulk buying) effect. The fisherfolk in most cases determines the brand of feed and the supplier for fingerlings to be used, although the funds are arranged by the investor. Thus, the fisherfolk as well as the investor can increase the bargaining power to increase profit through negotiation with the feed and fingerling suppliers.

The final decision for the multiple operations is determined by the negotiation between the operating fisherfolk and the owner fisherfolk. There are several benefits as described above for the operating fisherfolk. The investor who proposed the idea is also willing to do the operation. Moreover, it is possible for the owner fisherfolk who has not been able to find any investor for more than one year, watching the gradually weathered facility but is incapable of providing the necessary repair, to lend the pen facility to other fisherfolk. It is not a bad option to take so long as he or she can get a reasonable compensation for the temporary use of the facility. The actual condition for the facility rental seems to vary but the operator is responsible for the maintenance and repair of the facility as expected and this condition will make additional benefit for the owner. In any case, the conditions are determined through the negotiation to a mutually acceptable term.

The multiple operation management system provide some benefits to all the three partners (investor, operating fisherfolk, and owner fisherfolk) under the condition of shortage in the total number of investors for all the 42 fish pens established. There were 11 fish pen facilities which were not under operation yet as of the end of December 2015, this operating system is expected to increase the number until all the fish pen come into operation[4].

The increase of multiple facility operation by one fisherfolk will increase the total number of operational pen facilities and thus increase the total yield from the tidal flat at Brgy. Sta. Cruz. It also increases the overall efficiency of operation as more pens are under the advanced farm management system by the supervision of experienced fisherfolk operators. Therefore, the introduction of multiple management system is expected to increase the overall production efficiency and the total production volume. In this regard, this change in the management system could also be considered as a management structure reform in response to the increased production and efficiency This lesson showed us the importance of close monitoring to the dynamic economic development in the emergency disaster assistance project and provision (or no provision) of appropriate responses in accordance to the development especially in the later stage in “recovery”.

[4] The number of remaining fish pen without investor is not many though, considering the operation to be supplied by the OXFAM funds and two fish pen to be operated by the Sta. Cruz Women Fisherfolk Association with the funds supported by DOLE Kabuhayan fund. The number of new investor is also expected to increase from March or after the risky season of typhoon.

Lessons Learned 33: "Rehabilitation" component in QIP-8 grouper farming at Guiuan and its relation to the project framework

In the QIP-8 grouper farming project, there has been no structural change of management body unlike the other two fisheries QIPs. This outcome is reasonable if we see the changes of the management structure observed in QIP-1 and QIP-15 as responses to the project's progress towards the increase in fish production volume and the improvement in productivity efficiency because the QIP-8 grouper farming intended neither to increase the production volume nor to improve the production efficiency. The project aimed to improve the livelihood for the target fisherfolk by achieving a long-term sustainability not only for the current generation but also for the following future generations. The "Better" condition for the QIP-8 project is a situation where the fisherfolk runs grouper farming in such an extremely long term sustainability, but not to produce more and efficiently. Therefore, it does not need to have the structural reform in the management system of the fisherfolk.

The current grouper farming at Guiuan bases on the existence of a super high-end export market with extremely high buying prices for the particular target fish (suno), more than ten times higher than the ordinary fish sold at the local markets. Naturally, the fisherfolk intends to capture or culture the suno fish to sell at the buying stations. There is a contradiction in the development of this fisheries and fish farming system. The more the fisherfolk captures the fish, the more the fish resources depletes to lead to the collapse of the fisheries and fish farming business. In order to prevent the depletion of natural resources, the relevant government and non-government institutions are exercising strict enforcement of regulatory control measures against the fisherfolk's fishing and farming activities. Such strict control may protect the natural resources but the fisherfolk who do not have an alternative income source could lose their livelihood. In fact, these control measures do not seem to have been achieving the intended results. The fisherfolk are using illegal fishing methods to evade the regulatory measures. They are more and more marginalized and excluded from the other part of the Guiuan society. What this project wants to do is to change the status quo of this social exclusion into a new co-existing relationship between the fisherfolk and the natural resources protection agencies in solving the problem together by providing a sustainable fish farming method to the fisherfolk as an alternative means for the livelihood while protecting the natural resources.

The fisherfolk invents new methods of illegal fishing with more sophisticated means to evade the strict control. In response, the regulatory agencies enforce more stringent control measures. An endless vicious cycle is established. As a result, the fisherfolk society go underground and are more and more isolated from the other part of society. The observed high rate of decompression disease with more than 20 people who lost their lives due to the diving related diseases and accidents and about a quarter of fisherfolk population showing irreversible

symptoms of decompression sickness at Brgy. Victory Island can be seen as a tragic manifestation of this social exclusion.

This projects approach is that the current strategy which leads the fisherfolk into "social exclusion" can be changed into a new strategy of "social inclusion" with the approach of introducing long-term sustainable fish farming methods as an alternative livelihood means for them.

One of the main activities in the extension period of the QIP-8 grouper farming project was to lobby on the relevant stakeholder institutions such as BFAR RO-8, LGU, PAMB, FARMC, and MELETF for modification of the Guiuan Fisheries Ordinance regarding the use of compressor for aquaculture use. The project team explained to these law enforcement institutions and other relevant stakeholders that the compressor was an indispensable tool for the development of local grouper farming, while it introduced concrete examples of sustainable fish farming alternatives (use of hatchery raised fingerlings and moist feed) to the fisherfolk societies. What the project did, therefore, was an outreach activity to bridge both sides to achieve the social inclusion through the implementation of technical activities to fulfill the direct aim of restoring their grouper fish farming.

When we see what was done in the project in the extension period as an outreach activity, the overall project framework for achieving the social inclusion must be much larger than that for QIP-8 for the technical interventions. Such a framework must cover all the Guiuan society including those relevant institutions for marine environmental protection. The project contributed to shorten the distance between the target fisherfolk societies and the relevant stakeholder institutions by introducing and explaining the importance of sustainable aquaculture methods. With regards to the structural reform, it can be said that there has been a substantive expansion of the project framework associated with the change in the approach for the solution of the problem from the social exclusion to the social inclusion.

This QIP-8 has 100 fisherfolk beneficiaries. The situation where this project consider as the "Better" aquaculture development stage can only be achieved by the whole society including all stakeholders surrounding the 100 direct beneficiary people into the overall project framework. Not only the economic sphere but also the social sphere of the society needs to be included as the target components for the social inclusion activities. This lesson teaches us the possible diversity in the type of emergency disaster assistance projects and the accordingly wide range of interventions necessary to provide.

Lesson Learned 34: "Recovery" to "Rehabilitation" phases in emergency disaster assistance

In economic development assistance projects of usual time, the beneficiary people are carefully selected to achieve the highest potential for the successful implementation. Those

who are highly motivated and capable individuals and organizations are selected. The selection is based on the "equality of opportunity" where all people are given equal opportunity but will be selected fairly based on the individual competency. As a result, the project will have a higher chance of successful implementation.

In emergency disaster assistance projects, there is no sufficient time for such a screening process for the target people and organizations. It would not be appropriate ethically to select individuals or particular organizations from the disaster victims in the situation where they lost the lifesaving means and dependent people. In emergency assistance projects, the target people should be selected based only on the extent of damage and all the selected should be given the same assistance regardless of their individual characteristics such as their economic competence. Therefore, it can be said that the selection of people in emergency disaster assistance has to be based on the principle of "equality of results", not the equality of opportunity. This means no victim should be screened out of the chance for receiving the livelihood support services based on the individuals' economic capacity and/or social condition. The only criterion which can be applied for the selection is the extent of disaster received by the victims.

This principle of equality of results in the selection of project's beneficiaries would be commonly accepted for the implementation of emergency livelihood recovery project which aims to support the disaster victim's livelihoods to attain at least the minimum level for their survival. When the emergency recovery activities successfully achieved the purpose of recovering the victim's livelihood status and bring them almost back to normal, the project could enter into the next phase of livelihood "rehabilitation" aiming at further economic development. The nature of this phase becomes similar to the ordinary economic development projects where the target people have to compete with the others in the real business world to attain higher economic objectives. The new phase of business completion for higher economic gains based on the equality of opportunity in capitalist economies requires a different set of support services to the target people than the services provided during the emergency "recovery" phase which is based on equality of results. The type of services provided to the target population for them to be able to compete in the real economic competitions needs to be changed in the project implementation. There is this fundamental change in the nature of project phases between the emergency "recovery" phases and the "rehabilitation" phase despite the target population which remains the same. In the three JICA fisheries QIPs, the project period was extended to include both recovery and rehabilitation phases while the target population remained the same. There would be an issue of mismatch between the objective to achieve and the receptivity for the required competence of the target population in the rehabilitation phases (in the extension period) because these people were not chosen for that purpose at the beginning of the first phase.

There is a good example to elucidate the issue of mismatching the objectives and the means for achieving them in the extension period in QIP-15 milkfish pen farming at Tanauan. 42 fisherfolk families were selected in this project to provide 42 sets of fish pen facilities in the first "recovery" phase. Each set of the distributed facilities was equal as the distribution was based on the principle of equality of results. In the extension phase, there were fisherfolk who started operating more than one fish farming pens by borrowing the idle facilities from the other fisherfolk who could not find investors. Those who were advanced in operation cycles since the beginning of the project and probably advanced in technical competence were getting more benefits by operating multiple facilities than the others. The situation is apparently out of the principle of equality of results. Based on this principle, using multiple facilities by one beneficiary is not fair and should not be encouraged. The rental fee received by the owner fisherfolk could be seen as an "unearned income" which is not an outcome expected from an official development assistance project. This situation of new fish farming management, however as explained in the previous section, is a reasonable development in which all three parties involved (investor, facility borrowing fisherfolk and renting fisherfolk) mutually agreed upon, would lead to a higher total fish production from the same water body and to a higher production efficiency as more fish pen facilities are managed by technically advanced fisherfolk. Seeing from the principle of "equality of opportunity" of the rehabilitation phase, the situation is an advanced level of economic development. Therefore, the multiple facility operation is a favorable situation and should be encouraged if the project is recognized to be already in the rehabilitation phase. Depending on which principle the project is based on and which phase it belongs to, the same phenomenon is evaluated differently.

A similar development is observed in the QIP-1 milkfish cage farming while a fisheries cooperative is about to be established. When the project started, the beneficiary fisherfolk were organized into fish farming associations for which very minor membership fee was asked when joining. Some members of the existing associations would not be able to get the membership of the new fisheries cooperative as the members will be asked to purchase shares which are not as cheap as the membership fees for the previous associations. The lending amount to individual members from the cooperative will also be expected to be limited according to the member's share possession. The principle of equality of results in the recovery phase will be no longer held here but the situation will be advancing according to the equality of opportunity. Development in both management systems in the multiple facility use in QIP-15 and in the establishment of fisheries cooperative in QIP-1 would result in increasing the total fish production using all the QIP supported facilities and in improved fish farming efficiency being implemented by technically and financially advanced fisherfolk. Both situations are considered to be guided by the "invisible hand" of capitalist economy which leads the situation into the most efficient resources distribution. It also means both QIPs are

already exiting from the "recovery" phase and entering into the "rehabilitation" phase.

This Project of Emergency Recovery and Rehabilitation from Typhoon Yolanda including the extension period entailed both the "recovery" and "rehabilitation" phases continuously. For such activity components which achieved the primary objectives in early stage, the project gradually came to resemble an ordinary economic development project. Especially in the extension period, such projects faced difficult situations where the target population who were selected based on the principle of equality of results were asked to compete with the others in the real business world based on the principle of equality of opportunity.

The difference between the "recovery" phase and the "rehabilitation" phase are summarized in Table 4.1-3. There are two types of rehabilitation phase shown in the table. The first type, for which the milkfish farming of QIP-1 and QIP-15 are examples, has the rehabilitation phase that aims for higher level of economic development for the livelihood improvement for the target people. The second type, for which the grouper farming of QIP-8 is an example, has the rehabilitation phase that aims for long term sustainability for the livelihood improvement for the target people.

Table 4.1-3 "Recovery" and "Rehabilitation" phases of emergency disaster assistance project for livelihood support

Recovery Phases	Recovery	Rehabilitation Type-1	Rehabilitation Type-2
Corresponding part in BBB slogan	Build Back	Better	Better
Livelihood support objective	Basic needs	Economic development	Long term sustainability
Principle of selecting target population	Equality of results	Equality of opportunity	-
Intervention target	Individual	Management Institutions	Stakeholders, society
Main intervention type	Technical assistance	Operational management	Social inclusion, outreach
QIP examples	All (before extension period)	QIP-1 milkfish farming, QIP-1/15 milkfish processing, QIP-15 milkfish farming	QIP-8 grouper farming

The "recovery" phase of emergency disaster assistance rebuilds facilities for livelihood means and provides technical assistance mainly to attain the basic needs for the affected people. The successive "rehabilitation" phase intends to attain a higher level of livelihood for the people by expanding and increasing efficiency of the business (Rehabilitation Type 1) or by obtaining long-term sustainability (Rehabilitation Type 2). The purpose and means of intervention required for fulfilling these rehabilitation objectives are different from those for the "recovery" phase, and therefore, it is difficult or inappropriate to include the intervention components for the "rehabilitation" phase at the beginning of the emergency disaster assistance. The necessary preparation for fulfilling the "rehabilitation" objectives, on the other hand, tends to emerge naturally in response to the changing business environment.

The three structural reforms in management system (1. establishment of fisheries cooperative, 2. establishment of JALEYSA Women's Federation, 3. multiple facility operation by a single operator) are all considered as responses to the change in business environment corresponding to the change in objectives from the "recovery" phase to the "rehabilitation" phase, namely attaining livelihood for basic needs to higher economic level. The QIP-8 grouper farming project is different from these three cases in terms of type of higher level of livelihood aimed in the "rehabilitation" phase. It aimed to attain a long term sustainability instead of higher economic production or efficiency. This project approached various stakeholders to attain this "rehabilitation" objective according to a new development strategy of social inclusion. The required inclusion of various stakeholders into the working framework can be seen also as a change corresponding to the new objective in the rehabilitation phase. Therefore, all these changes in project framework or management structural reform can be considered to be responses to the change in objectives from the "recovery" phase to the "rehabilitation" phase in the emergency disaster assistance project.

As explained earlier, the total gross sales of milkfish farming both at Basey (QIP-1) and at Tanauan (QIP-15) would be over 60 million pesos. That for the milkfish processing is also expected to be nearly 7 million pesos. All these project activities may use interest- bearing loans from banks. Success in each project depends on the overall management for the operations rather than on the technical efficiency in the production activities itself. Considering the fact that each project started with the target people who were selected based on the individual technical merits and with the management associations formed by them, the project is expected to face difficulty in handling the issues on institutional management (i.e., accounting, governance, corporate ethics, etc.). On the other hand, however, there are developments in overall management structure that naturally emerged from the situation where increased economic efficiency is intended to attain.

The original framework of the projects for attaining the objectives of recovery phase has a limitation to deal with these institutional management issues, while there are developments in structural reformation that emerged from the changing circumstances corresponding to the change in the fundamental nature from "recovery" phase to "rehabilitation" phase. As a conclusion, it can be said that the functions of the project as an emergency disaster assistance which was started to solve the "recovery" phase objective is diminishing in its capacity to contribute for further development, or the project is ready to be terminated.

Lesson Learned 35: Timing for Termination of Emergency Disaster Assistant Project

On the other hand, on reviewing the project activities, the project could have missed many achievements if there was no extension period of the project. Although many of the achievements were realized cooperatively with the counterpart institutions and many of the interventions provided from the project were in accordance to the initiation by the target

people or the counterpart institutions, the final outcome would have been different if the project did not give the assisting activities during the extension period.

The milkfish cage farming of QIP-1 at Basey at the beginning of the extension period in March 2015 had seen all cages installed already but only a few were actually under operation due to the delay in the fingerling stocking. The target fish farmers had not yet fully comprehended the maintenance of grid mooring system. Although the new development of establishing a fisheries cooperative has been led by the municipal agriculturist, the project's monitoring activities and the initiative to hold the investment forum worked as catalysts for facilitating the development. The outcome in the cooperative establishment would have been different if there was no extension period at all.

The decision of constructing milkfish processing plants in QIP-15 and in QIP-1 was made during the extension period. Thus, they could not exist if there was no extension period of the project. The initiative for this development and for the corresponding establishment of women's federation was mainly facilitated from the project side, and there was little initiative from the beneficiary people, unlike the establishment of fisheries cooperative at Basey. Although there was concern on emergence of self-consciousness on project ownership and future sustainability for the processing activity, the establishment of the women's federation will function to accommodate the expected expansion of processing volume and required management reform.

The operation of multiple fish pen facilities observed in QIP-15 at Tanauan was a change in management system between the beneficiary fisherfolk, which would have occurred with little or no intervention from the project. The management change from the current fisherfolk-investor partnership to a new system with the fish farming association as the investors, however, occurred with the OXFAM funds supporting fish farming operations at the start of the project's extension period. Thus, this project's outcome also is expected to be different if there was no extension period.

There was no change in management of fish farming in QIP-8 at Guiuan. The overall framework of the project which worked for social inclusion for the fisherfolk was expanded to include various stakeholders and the Guiuan society. This development is related to the project objective of long term sustainability in the "rehabilitation" phase of the project and facilitated by the project's activities for the amendment of the Guiuan Fisheries Ordinance regarding the use of compressors for aquaculture operation which was carried out in the extension period. Therefore, this project's outcome was also different if the project did not have extension period.

As a conclusion after reviewing all three fishery related QIPs, it can be concluded that the project's activities in the extension period contributed for the development in structural reform

and a change in overall framework corresponding to the change in the objectives from the "recovery" phase to the "rehabilitation" phase of the emergency disaster assistance project. At the same time, the project framework prepared at the commencement of the project to tackle the objective of "recovery" phase is losing its effectiveness. It could be therefore be concluded that the two year period was necessary to support the livelihood of the affected people by this emergency disaster recovery and rehabilitation project.

4.1.2 Construction Work

Lessons Learned 1: Quality Identification of Steel Material

For construction related QIPs, quality of steel material was essential and confirmed by mill certificate and tensile test. For the approval of the steel materials to be used for the project, contractor has to submit mill certificate and corresponding sample subject for tensile test. JICA Study Team Inspector would witness the conduct of laboratory testing of the steel material. For testing results that failed to meet the requirements, contractor was advised by JICA Study Team Inspector for the replacement of supplier. Hence, all materials to be incorporated to the project must undergo material testing aside from the issued mill certificate prior to the approval for quality control and assurance.

Lessons Learned 2: Concrete Aggregate

In QIP-7, the JICA Study Team Inspector noted and observed that the delivered concrete aggregates at site were not the approved kind of material that had passed laboratory testing. With this, JICA Study Team Inspector instructed the contractor for the replacement of the aggregates from qualified suppliers in Tacloban as the quarry sites of Samar are not suitable and not approved by the Department of Public Works and Highways. Hence contractor had to strictly follow the compliance of procuring approved and quality materials to be incorporated to the project.

Lessons Learned 3: Quality Assurance of Welding Works

In the early stage of the welding works for the fabrication of steel trusses it was noted and observed that the welding works of the contractor were of poor quality. JICA Study Team inspector instructed to re-work and come with the standard protocol for welding works. With this, JICA Study Team planned out for skills enhancement on welding works to all QIPs sites. Orientation was undertaken to all welders of the contractor for proper and exact welding methodology. Furthermore JICA Study Team conducted competency test ensuring that all welders are qualified to handle the welding works for the project. Then, JICA Study Team reasonably formalizes the conduct of the proper training on welding works for skills advancement.

Lessons Learned 4: Control of Concrete Workability

The presence of honeycomb on concrete surface after removal of formwork was noted and observed. It was because concrete mix could not flow properly due to re-bar placement on columns and beams. Although honeycomb does not affect the integrity of concrete's strength, it affects the structure appearance. Accordingly the correction of the noted honeycombs as instructed by JICA Study Team to the contractor is the application of concrete epoxy. To prevent such occurrence, JICA Study Team finds it necessary to educate the local contractor with the proper mixing fluid concrete within allowable range of slump, and using vibrator well.

Lessons Learned 5: Support Installation

Traditionally the distance between supports on the concrete slab is 50cm as executed by local contractors in the Philippines with the following reasons 1) dead load is small because slab concrete thickness is about 10cm. and 2) live load is also small because pouring speed using portable concrete mixer is slow subsequently no accident was experienced. But with limited support, formwork may get distorted, or collapse by biased load, or concrete weight on concreting. For safety construction, JICA Study Team instructed the contractor for additional measure, showing required numbers for total concrete weight of slab and beam and requiring more reinforcing for support. JICA Study Team believed it necessary to educate the contractors on exact calculation and theory in adjusting the distances of support subject to the slab thickness and site situation to secure the safety work.

Lessons Learned 6: Foundation Works and Installation of Scaffolding

Traditionally in the Philippines, scaffoldings both horizontal and vertical are of timbers material as guide for the frames, formworks of columns and beams and support. Also this can serve as support for excavation work but good for shallow distance only. In the case of NAS where excavation reached to 1.50m deep, the working efficiency became down as no machine was available and the work was done manually. Because of the soil condition, dewatering was needed with the plan of connecting the foundation but because of the timber problem dewatering was undertaken individually. While, in the case of NAS where excavation reached to 1.50m deep, the working efficiency became down as no machine was available and the work was done manually. Because of the soil condition, dewatering was needed with the plan of connecting the foundation but because of the timber problem, dewatering was undertaken individually. Construction schedule were delayed for these reasons. And so, JICA Study Team found the necessity to instill to the contractor the proper working sequence including scaffolding, foundation excavation, confirmation of bearing capacity on foundation works to avoid occurrence of any delay.

Lessons Learned 7: Fixing of Column Formwork

In one of the concrete works of the project, it was noted and observed by the JICA Study Team Inspector that after form work removal, a concrete column was not placed vertical. Therefore, the contractor was instructed to remove and replace it. The defects were due to lack of support on the formworks. The local contractor usually carries out placing of concrete using a 1-bagger mixer where the rising speed of concrete is slow, and the concrete pressure is not so big against formwork. In such cases, the contractor tends to install the column formwork without due attention to its rigidness. This showed that it is necessary to teach the contractor reinforcing method using horizontal tie bar or brace to fix the top of formwork to prevent any moving by the concrete weight or pouring impact.

Lessons Learned 8: Site Inspection

After excavation for foundation of stockyard area in QIP-10, the contractor intended to lay aggregates and prepared for re-bar fabrication. It was noted and observed by the JICA Study Team Inspector that the gravel did not undergo the required material testing for bearing capacity at the excavated point. JICA Study Team Inspector instructed stoppage of work and comply with the required material testing for approval.

In another incident, the JICA Study Team Inspector confirmed with the contractor on the status of ordering roof material. The contractor was aware that the material was already ordered, but it was not aware of the quantity. It was noted and observed that the ordered volume of roof material was only intended for slaughterhouse and material for stockyard was not included. The incidence shows that the contractor did not have sufficient knowledge to carry out work proper construction management. This is because they have no experience in proper rigorous construction supervision. To resolve the issue, constant supervision and inspection of work at site is important in order to let the contractor to comply the standard technical requirement of the project.

Lessons Learned 9: Safety Management

In the reconstruction of Mayorga Public Market, the truss was designed to be interconnected with concrete beam and column due to existing structure. In Japan, the common practice of lifting of trusses is by using equipment like crane and fabrication is done on the ground for safety measures. As there was no available crane in this case, welding works on connections on trusses were completed after it was lifted up to its location on the concrete column and beam. It was very common for the local contractor to work welding operation in high place without concerning safety measures. Therefore, JICA Study Team instructed them to have working platform for welding operation to make safety working condition as same as work on the ground. This showed that it is necessary to supervise the local contractor to work with safety condition with appropriate steps to avoid hazardous situations and with full awareness

of safety management.

Lessons Learned 10: Alternative procedures for Important Works

Initially, the concrete placing method of second floor slab in QIP-5 was planned for using concrete pump and concrete plant due to big volume requirement. But, as the bridge on the way to site suffered damage by a typhoon, access became not available for heavy equipment/vehicle. Therefore, the contractor needed to change the concrete mixing method from the plant to site mixing. Concreting was done using scaffolding, slope, three portable concrete mixers with 75 labors engaged for 13 hours. Not only for this project, but in cases of recovery projects after disasters, there are possibilities of surrounding facilities being damaged. This may affect the project's compliance to plan out schedules. Consequently, JICA Study Team had recognized the need for alternative procedures for important works to be considered in order to avoid delays in the process.

Lessons Learned 11: Payment Condition

QIP Projects adopted the ratio for Advance Payment as much as 40% of the contract worth for the contractor to finance the initial construction phase. Local bank guarantors for the Advance Payment Bank Guarantee could not easily issue such document. With this, contractor had difficulty availing the advance payment. As a result the contractor carried out the construction works of his own finances until the project accomplishment reached 50%. Even though JICA Study Team introduced other banks, the contractor couldn't use them as they are required to deposit the same amount of the advance payment that will be held by the bank. The high rate of advance payment may create financing difficult for small scale contractors.

Lessons Learned 12: Contractor's Skill for Documentation

Documentations for the project were deemed necessary thus requiring the contractor to submit construction schedule, bending schedule, work requests and shop drawings for Engineer's approval. The purpose of the documentation would hasten the construction operation from the procurement of construction materials, deployment of manpower and equipment and control of the construction flow to lessen the delays and low quality results. As a reality, it was noted and observed that contractor's find it hard to comply with such requirements. So, JICA Study Team ascertained the need for coaching the contractor to develop the necessary documentation for control of work progress and maximizing construction resources.

Lessons Learned 13: Technical Transfer to LGU Engineer

Through reconstruction of market and livelihood facilities, JICA imparted to the Local Government Units (LGU) during the Kick-off/progress meetings regarding 1) reinforcement measure of building drawing, 2) estimation and construction cost, 3) project procedure and 4) supervising including quality control and assurance. The purpose of which for the LGU

Engineers to undertake recovery projects on their own since noted and observed of their superficial understanding on their supervising skills for a quality Project. For lack of positive understanding on the necessity of precise procedure and method, JICA Study Team recognizes for the continuing education to the Engineers regarding proper project supervision for a good quality Project.

Lessons Learned 14: Contract Category

In the Project on reconstruction of Artificial Feed Preparation Facility in Victory Island, the project was planned as an equipment procurement project, because the main purpose of this project was 1) solar power system, 2) artificial feed preparation equipment and 3) repairing work of the existing building for the said equipment, and the cost of the equipment was much larger than the repairing cost. However, at time of project estimation, it was observed that the proposed existing building to be repaired was unsafe to install solar panels at roof side of the building. Also, it was found through a local supplier survey that only one supplier had an engineer in Tacloban City, and he had no experience and capacity to manage construction work. Moreover, there was most concern on quality control in building construction at an isolated island of one hour distance by boat from Guiuan. Thus, the QIP Team changed the contract category from a procurement project to a construction project in order to select the contractor among the QIP experienced contractors who had the knowledge on the QIP standards on quality control/assurance. The QIP Team nominated the supply mentioned as subcontractor for equipment supply/installation with responsibility for the operation and maintenance of the solar power system. Thus, it was recognized that it was necessary to determine the project category regarding the site location and suppliers capability even if the main work is equipment procurement.

Lessons Learned 15: Counter-Measure against Seawater

In the Project on reconstruction of Artificial Diet Production Facility in Victory Island, during the excavation work for the foundation it was noted that seawater was coming in through existing revetment. The situation was that seawater could penetrate freely during high tide because the mortar filling work in the existing stone masonry was very poor. As countermeasures against seawater, the following items were added; 1) Provision of polyethylene membrane (plastic sheet - 0.2mm thickness) to cover the concrete footing; 2) Reducing slump from 4 inches to 2 inches in order to improve the water tightness of concrete; and 3) Application of anti-corrosive agent to re-bar. Thus, it was recognized that the countermeasure is required to be designed against sea water in advance when the site is facing the seashore.

Lessons Learned 16: Soil Investigation

In the Reconstruction of Camire Elementary School Project, when the contractor conducted bowling test for confirmation of foundation design after the construction contract, it was found that bearing capacity (N-Value) was extremely low at the site, and it was estimated that a 10cm settlement will occur in the long term by the two-story building originally planned. JICA Team discussed with DepED and school side, and the design was change from a two-story to a one-story building and this involves additional construction period and budgetary requirement.
Thus, it was recognized that soil investigation is necessary to be included in the TOR of the QIP to avoid any time loss for the design of foundation.

Lessons Learned 17: Demolition Permission

In the reconstruction of Camile Elementary School project, it contended of demolition work of existing the building damaged by the typhoon, and reconstruction work of the new building. Since the damaged school building was a government facility, permission to demolish from the Commission of Audit (COA) was required. But since the municipal engineer of the Local Government Unit (LGU) of Tanauan had no experience in the procedure with COA, he did not take any action for the application, and the contractor could not start the demolition work. Therefore, the QIP engineer assisted him in securing the required documents and coordinated with the COA staff to fast-track and prepare necessary documentation for the application. Hence, if LGU engineers are not familiar with the local government permission, the necessity for them to be educated, familiarized and assisted on the procedure was recognized.

Lessons Learned 18: Skills Enhancement in TESDA Training

Following the construction training of roof and truss in the Reconstruction of Balangiga National Agriculture School phase-1, construction training of structure was provided in phase-2. The target was carpenters, bar-benders and concrete workers who handled formworks, re-bar and concrete as basic elements for structural frame of buildings. In the same manner as phase-1, the QIP provided technical training to trainees (TESDA graduated) who were employed by the contractor for the project. As TESDA training program were only about carpentry and masonry, re-bar and concrete work were added for masonry who graduated from the previous program. The TESDA training program seems to have been built before RC structure technology was known widely. Thus, it was recognized that it is necessary to transfer the technology that frameworks, re-bar and concrete are basic elements of RC buildings.

Lessons Learned 19: Aggregates of Concrete

The QIP engineer found that mixed concrete had valid slump even if the contractor used

specified material ratio. After observation of the mixing operation and material, he found that stocked fine aggregate (sand) was wet and its high moisture content affected concrete slump. The headman of concrete work took care in water volume of mixing, but not in stocked material. The QIP engineer advised him to cover fine aggregate with blue sheet to prevent it to be bet by rain so that mixed concrete could become to have stable slump.

Thus, in order to make concrete in stable quality, it is recognized that it is necessary to teach the contractor to take care in basic work through actual case, such as aggregate storage.

Lessons Learned 20: Splice Position

It was noted that the splice of the upper and lower horizontal bar were placed at the same position during inspection conducted in the reconstruction of Dulag RHU. That must be avoided and the splice must be located with the minimum moment in the beam. Misplaceing the splice happen from lack of knowledge of the contractor's steel man, thus the instruction was given to all the bar benders by the QIP engineer for the necessary correction and compliance.

With this, it is recognized that regular inspection and education is necessary for compliant of the required bending and placement schedule.

Lessons Learned 21: Transformer Capacity

Welding works was part of the plan for the fabrication and installation of steel trusses in Dulag RHU. Although an existing transformer of LGU could be utilized for the welding work, due to the insufficient capacity and voltage fluctuation the transformer was damaged. With this, it took almost one (1) month to replace the damaged transformer which affected the completion of the said activity. Thus, it was recognized that when the existing facility is provided by the counterpart for construction purpose, an alternative method should be prepared in case of these kinds emergency.

Lessons Learned 22: Land Acquisition

In the reconstruction project of Abuyog RHU, a discrepancy was found when LGU, the contractor and QIP engineer confirmed the corresponding lot and boundary. This problem occurred since there was a discrepancy between the size of the cadastral map and the actual site lot. Fortunately, the proposed site had sufficient area enough to accommodate the requirement for RHU building. The importance of confirming the project site with the corresponding stakeholders prior to the approval of the project as the situation of the site may differ from the proposed cadastral map, so that the construction will complete as planned.

Lessons Learned 23: Concrete Block

In Abuyog RHU, some concrete blocks were noted to be sub-standard material, thus the

contractor was instructed to remove and replace them. Since all of the construction materials require the QIP engineer's approval, the contractor submitted samples of concrete blocks, and the QIP engineer inspected and approved them. During construction, the materials in use were checked and this issue was found. The QIP engineer instructed the contractor to replace them, and check the quality of material on delivery at the site. Hence, even though the materials are already approved, it is necessary to have a regular inspection and specially perform quality control/assurance in material which are used in large quantities.

Lessons Learned 24: Specification of the Design for Processing Plant

JICA Study Team reviewed the basic design obtained from DOST for the fishery processing facility in Tanauan and Basey, and provided the strengthening measures for the critical sections of the structure for the construction drawing. Before the bidding was conducted, BFAR issued comments on the proposed plans/drawings of the processing plants that is should comply with HACCP (the food hygiene management technique of an international standard) regulations for the plant to be operational.
Therefore, the bidding was postponed, and the design was modified with additional sanitary measures compliant to HACCP standards; consequently the budgetary requisite and targeted schedules were changed. Thus, when the project is under the jurisdiction of several authority and each of them have each standards, it is necessary to make clear and coordinate with the proper authority/standard for the design.

Lessons Learned 25: Soil Condition of the Site

The fishery processing facility in Tanauan and Basey is to be inevitably located near the seashore. In the case of Tanauan, when foundation excavation started, it was found that organic soil with mangrove leaves and boulders were mixed in the soil and seawater infiltrated during high tide. During the designing, the bearing capacity of the soil of the site was judged as enough to handle the plant from the result of the bowling test conducted by the QIPs Team, but it became apparent that one meter of the surface soil was determined as the above mentioned. As counter-measure the following are necessary:

1. Provision of polyethylene membrane (plastic sheet - 0.2mm thickness) to cover the concrete footing
2. Reducing the slump from 4 inches to 2 inches to improve the water tightness of concrete
3. Application of anti-corrosive agent to re-bar

Thus, countermeasures should be considered in advance when the site is close to the seashore.

Lessons Learned 26: Water for Concrete Mixing

During concrete work at the processing plant construction in Basey, it was observed by the QIP engineer that pond water near the site was used for concreting. Clean water should be

used for this purpose, and impure water affects the strength of the concrete. Water from the deep well available near the construction's temporary house was used instead. The contactor's project engineer and foreman were instructed that not only the quality of cement and aggregates but also of the water is important as it will affect the strength of the concrete. Thus, it is necessary to instruct about quality control regarding construction to workers in through actual cases.

Lessons Learned 27: Pavement Concrete

Concrete pavement need to be resistant to wear on the surface thus need to have a different mixed proportion from building structures. Trial mixing was conducted and was judged in the flexural testing that the initial trial mix did not have the required strength needed for the pavement. Subsequently another trial mixing was undertaken to obtain and satisfy the required result. The failure noted was due to the contractor's lack of knowledge in pavement work as they are mainly engaged in building construction. Generally, in the Philippines, concrete mixing for pavement is considered to be the same as for the building structures but the functionality is much different from the other. Thus it is necessary to train the local contractor on the proper concrete mixing depending on its usage or purpose.

4.2 Recommendations

4.2.1 Regeneration of Livelihood

(1) Working with the People in Emergency Livelihood Support Projects

Livelihoods of people are built on various environmental, social and financial factors which surrounds them. Supporting to improve it needs understanding on the interactions among the factors and identification of the root factors at which a project can render an intervention.

It is important to realize in principle that an emergency project coming from the outside to help the victims of severe natural disaster cannot know much about the target people because it did not have sufficient time to prepare. Planning of an emergency project has to be done in a short time without making thorough study on the factors which affect the livelihoods of target people.

This means the probability is high to encounter situations which were not expected in the project plan in various aspects. On emergency project planning, it could be said generally that incompleteness is a part of presumed characteristics that have to be taken as granted. In other words, uncertainty of the plan should be taken as presumption rather than exception.

Project implementation is a process of rendering the activities defined in the plan. In a normal project cycle of plan-do-see, implementation carries out precisely what are listed in

the plan. Modification on the plan, if necessary, could be applied after evaluation in the "see" process in an ordinary project cycle.

In an emergency project where uncertainty is presumption, implementation is not just a step to render the planned activities but it is a step in which the uncertainty hidden in the plan could be revealed and turned to certainty while planned activities are being carried out. This requires performing of "do" and "see" steps within the same project cycle of implementation.

The best way to do in practice is to ask the target people whose livelihoods are intended to be improved. It is also important to consult local institutions and coordinate with other organizations working in the same region and in the same technical field. In other words, an emergency livelihoods support project needs to take a participatory approach as a principal strategy.

In the QIP-1 submersible cage project, the Project faced a conflict between a private cage owner and the beneficiary cage farming association for the location of cage installation. Working closely with the members of beneficiary fish farming associations found the owner is one of the major private fish farmers in the Basey Mariculture Park and operates a business of providing harvesting and marketing services for the cage growers. A large part of the fish farming association's members is expected to ask him harvesting services when the fish in their cages grow to the harvest sizes. The Project realizing the situation for the beneficiaries then tried to avoid the direct conflict between the concerned owner and the project beneficiaries but asked the municipal agriculture office of Basey to take the issue to Mariculture Coordination Committee where the problem could be mediated by the chair, Mayor of Basey municipal government. The committee reached an amicable solution for the private owner and the project beneficiaries.

The similar conflict between different members of fish farming association of Sta. Cruz, Tanauan about the area and location of fish pen in QIP-15 of integrated oyster and milkfish fish farming project was solved by mediation of the agriculturist of municipality of Tanauan.

These were other examples where communication with beneficiaries and supplemental information on the root cause of problem helped implement the QIP projects. The Project was able to make necessary modifications based on the additional information obtained during the implementation period.

In QIP-1, the Project through enquiries with the beneficiary members found that individual ownership of supplied cage is not compatible with the operation requirement especially with the existing marketing condition. Thus it asked them to form fish farming associations based on 10-cage grid mooring unit instead of single cage ownership originally planned.

In QIP-15 of oyster and milkfish integrated farming project, the Project found financiers for the milkfish farming are vital for the operation and thus a written proof from each financier was one of the conditions for releasing the construction materials.

Working with the beneficiary people and relevant local organizations is a basic requirement for any project implementation. Nevertheless, it has a special importance in emergency livelihood projects as lack of local information is a presumed condition.

(2) Flexible Implementation

This recommendation is closely related with the first recommendation of working closely with beneficiary people. As it was explained that emergency project planning often have to be done with incomplete background / local information, thus chances for making necessary modification in the original plan during implementation is high. Emergency project has to be aware of this fundamental requirement and have to make quick decision making for timely and swift implementation. Some examples of flexible implementation made in fisheries QIPs include;

- Supply of supplemental net of small mesh for facilitating stocking of smaller sized fingerlings (QIP-1)
- Forming fish farming associations based on 10-cage grid mooring unit (QIP-1)
- Supply of SASUBA diving equipment and obtain a gratuitous permit based on fishery ordinance (QIP-8)
- Reducing number of permit for fish farming based on bathymetry study (QIP-15)
- Method of oyster seed collection and transplantation (QIP-15)

Without making these modifications, these projects would have been delayed or even gone to different directions away from the intended project outputs.

(3) Holistic approach to restore aquaculture production

Industrial production needs input materials to be processed and markets to receive the output products. For example, fish farming production requires seeds and feeds supplied by supporting industries. The fish produced have to be sold at markets. Lack of any component does not realize actual production. Resumption of industrial production from a severe natural disaster site where all components are damaged will not start until all components start functioning. An emergency livelihood project which aims restoration of industrial production, therefore, needs to consider all aspects of production. In general, an emergency project is recommended to take a holistic approach although it does not mean that the project needs to make actual inputs to all components. Information on relevant sectors has to be collected and efforts have to be made to complement the insufficient components.

In QIP-15 of integrated oyster and milkfish project, the Project provided the materials for milkfish pen farming facility. The cost of operation fundamentally for supply of fingerlings and feeds were left to the beneficiaries' responsibility. At Barangay Sta. Cruz, it was customary to form a team of an owner taking responsibility for facility construction and operation labor and a financier taking responsibility of supplying fingerling and feeds to operate the milkfish farming. This joint operation system had been working well before Yolanda and was taken as a condition for the project.

In the actual implementation, however, the owner (project beneficiaries) faced difficulty in finding financiers as many of the previous financiers lost their investments paid as fingerlings and feeds costs (which were paid in advance before realizing the profits from the harvests) when Typhoon Yolanda hit. The Project had to separate the procurement of material into two phases as only 10 owners (about a quarter of beneficiary) secured financiers. At the beginning of implementation, the rest of three quarters (32 units) had no definite beneficiaries.

While constructing 10 units of milkfish pen facilities, the Project made two efforts to secure the financiers. One was to seek cooperation with other NGOs to share the project costs and the other was to inform fingerling suppliers on the JICA support to the Sta. Cruz fish farming association. The former effort resulted in financial support for the operation of 10 pen farming units by OXFAM (with USAID funds) working at the same barangay. The later effort resulted in early restoration of fingerling supply facility located in the same barangay (owned by a restaurant owner in Tacloban) and commencement of fingerlings supply for the 10 units of constructed pen facilities. The earlier-than-expected restoration of fish pen farming operation encouraged the other financiers to return to the investment.

This was an example of how a holistic approach works in emergency project. The QIP-15 project targets the fish pen owners to restore the production. The project input was limited in material supply for the facility but its activities had to be extended to the other components such as fingerlings and feed supplies.

In QIP-1 of submersible cage project, the Project supplied smaller mesh net to the beneficiaries as a countermeasure to prevent the expected delay of fingerlings stocking due to different demands for fingerlings by size. The Project made a through enquiry on how the shortage of fingerlings occurred and causing the delay, and decided to do unplanned activity to prevent the further delay. The previous section of Lessons Learned for QIP-1 explains the detail for another example of holistic approach taken by the Project.

(4) Follow-up supports

Emergency livelihood projects aim to restore the previous livelihood activities which have sustained the victim's life but were destroyed by the incident and caused the emergency.

The resumed livelihood activity, therefore, is assumed for its sustainability. This is however not always the case because the condition surrounding the livelihood activity changes rather drastically after the severe incident like super typhoon Yolanda. Restoring the previous activity as exactly the same as it was before does not guarantee the sustainability of activity under a condition where social and economic conditions are changed drastically.

The recommendation of flexible implementation is important in this regard because adjusting implementation according to the social and economic environmental changes will remedy the possibly impaired sustainability due to incompatibility with the suddenly changed environment.

Flexible modification if applied in project implementation means there are outcomes which come out as response to the modified implementation, including such outcomes not expected in the original plan. This further means that an emergency livelihood project which is implemented under an aftermath of chaotic social and economic condition has a good chance of generating various unexpected impacts.

One of good examples of unexpected outcomes in fisheries QIPs was development of pressure cooked milkfish by SCWFA of Tanauan, It was not an output listed in the original plan but an auxiliary activity started as preparation of oyster processing development which was in the original plan. Milkfish processing was included as an input for the submersible cage project (QIP-1) in Basey. But because the Tanauan was closer to the Project base in Tacloban (later in Palo) and local resources personnel was available in Leyte Provincial Agriculture Office, the initial works for development of pressure cooked milkfish were carried out at Tanauan, Leyte, for convenience. The active and diligent participation of SCWFA made the pressure cooked milkfish of high potential through various opportunities given by the Project. The processing activity has already established its economic viability and now seems to be able to step up to a higher stage of commercial activity. It has acquired the recognition of DOST with its commitment for supporting as a target group for the fiscal year 2015.

SCWFA which was established to be a viable cottage industry group just six month ago with the support of this Project now has an opportunity to be a commercial entity. This transformation needs a fundamental change in the association's nature. The product has to be accredited by government authorities. The association has to comply with the legal obligations as a commercial entity. For SCWFA to realize the opportunity which was grabbed by their diligent endeavor, continuous assistance is essential because of the very rapid development and is not yet sufficient to accomplish the required transformation.

Another reason for necessity of continuous support for the emergency livelihood support

projects is related to the basic policy of Yolanda recovery and rehabilitation program. The Yolanda program has its catch phrase of "Build Back Better" which emphasizes the mind of taking the disaster event not only as a tragedy but also as an opportunity for re-building the society better than before Yolanda. In accordance to this BBB phrase, the fisheries QIP projects introduced some technical inputs which were not included in the livelihood activities before the Yolanda incident. QIP-1 introduced submersible cage technology imported from Japan. QIP-8 also introduced improved grouper cages. QIP-15 introduced concept of integration of oyster and milkfish farming. These technical inputs are characteristic to the Japanese assistance and continuous monitoring is recommended, especially if the implementation did not progress as it was originally planned by various reasons. There were delays observed of fingerlings stocking in QIP-1 and QIP-8. In both projects, harvesting operations planned in the original schedule were not accomplished within the project period. QIP-15 progress as planned for the first 10 units of milkfish pens and harvesting started in December 2014. But the Project had to separate the implementation into two phases of procurements because of insecurity in finding financiers for the farming operation.

An emergency livelihood support project has a good chance of having unexpected outcomes because they are operated under chaotic environment which demands provision of unplanned inputs as timely countermeasures. Depending on the nature of outcome, follow-up of the project implementation becomes necessary. Follow-up support also tends to become necessary when emergency project emphasizes improvement of livelihoods rather than just restoration of livelihoods because the newly input factors for causing such livelihoods improvements takes time to be absorbed by the people and the society.

(5) Strengthening of organizational capacities for group activities

The implementation of the QIP-3 has resulted in several women's associations in the Municipality of Tolosa attaining a certain level of economic benefit through processing and sales of agro-fishery products. However, autonomous contraptions or efforts by the women's associations in enhancing their production or expanding their market were very limited. Also, there was a general tendency of association members being dependent on their chairpersons and reluctant to proactively participate in the activities without their instructions. Such situation is assumed to gradually change by continuous efforts for enlightenment activities and accumulation of successful experiences through continuation of the activities. However, it is also assumed that such process will take considerable time.

Considering the further expansion of the activities of QIP-3, which will involve new establishments of women's groups to start processing activities, efforts for raising the awareness of the participants should be emphasized from the very first stages of the activities. Enlightenment activities should be carried out so that decisions do not have to be

fully made by external supporters, but by the participants themselves to enhance their spontaneity in their future activities.

(6) Developing ownership for the activities through obtaining cash benefit

At the initial stage of QIP-14, although the participants were interested to participate in the activities, they were not fully convinced that the activities will bring cash income to them. However, their enthusiasm for charcoal production has significantly increased after the products actually began to sell. Particularly in Buyayawon, active production of coco-trunk charcoal has been started from the early stages of the Project. Generation of cash income is a strong motive for the participants, especially when introducing new products or technologies for improving livelihood. When planning production activities, target consumers should be identified before production and measures should be taken so that participants can obtain cash income at early stages of the activities.

(7) Necessity of technical support in restarting agricultural activities

Production of coco-trunk charcoal through QIP-14 will generate a certain amount of cash income as long as there are fallen coconut trunks to be processed. However, utilization of the cleared coconut fields (replanting of coconut trees and practice of intercropping) should be urgently planned in order to secure income sources after the clearing of debris. Even if coconut trees are replanted, it will take several years until coconuts could be stably harvested. During this time, crops produced through intercropping will be an important income source for the coconut farmers. Moreover, intercropping will also contribute to diversify the income source of coconut farmers, and its continuation after the maturing of coconut trees will decrease the risk of losing income sources by possible future typhoons. However, in order to do so, appropriate crops should be selected and cultivated with suitable techniques, so that cultivation will not deprive the soil of its nutrients. This will further lead to reduced cost for input, increased productivity and more profit for the coconut farmers. Furthermore, the products to be cultivated also need to be examined in terms of marketability. Examination of such issues would be difficult to be done by the farmers alone, and thus external support from donors or research institutions will be necessary for surveying natural environment, soil, markets, and to establish a crop rotation system consisting of suitable crops, and to provide guidance to farmers for their cropping techniques.

(8) Examination of livelihood improvement plan for ‘Build Back Better’

As above mentioned, it is imperative to bear in mind the practice of participative development in the emergency livelihood improvement. However, for plan can be in the concept of ‘Built Back Better’, the plan should be made with reconsiderations of natural environment and social situation surrounding the people lives and possible assistance to be introduced, not only of resident people’s intentions. If a livelihood improvement plan is

beyond people's imagination and comprehension they may be opposed to it at the beginning. If the plan has a feasibility and adequacy, the people will agree and implement it positively.

Farmers were skeptical about the coconut intercropping to be introduced in the target area of the QIP -14. They were negative to the replantation of coconut trees due to the limitation of logging even though the recovering of the coconut field was an urgent business. Also, most of them were opposed to practice horticultural production in the coconut field because the environmental condition is considered not suitable for horticulture. However, there are few logical grounds on this inadequacy and case succeeded in the horticultural production in the similar environmental condition, and the horticultural production is necessarily impossible. Thus the study team researched thoroughly the local environmental and farming situation as well as other area's case. And then designed farming model which could be the most advisable based on the results. Participating farmers expressed that they got a good impression on the horticultural production in coconut fields through observation of the plant growth and farm works during the pilot project.
In addition, new coconut replantation method to withstand the strong winds, which was developed by the PCA, and the expected profitability from the intercropping with horticultural crops promote the farmers motivation to continue practice the coconut intercropping by themselves after the project. This reaction of the participated farmers can certainly be called the 'Built Back Better' scheme.

It is important to develop a rehabilitation plan by analyzing the actual situation such as natural condition, farming background and the practices in the surrounding area to be comprehensive and to convince the target people.

(9) Livelihood supports in emergency disaster recovery and rehabilitation assistance project taking the difference between "recovery" and "rehabilitation" stages into consideration

In the Lessons Learned part of the report in Chapter 4, project activities in the three fishery related QIPs in the extension period was reviewed by focusing on the difference between "recovery" and "rehabilitation" phases of emergency disaster assistance projects. The project team would like to give the following three recommendations generalized from the lessons learned in the review:

- Disasters do not choose the victims. Therefore, the target population for the emergency disaster assistance project to handle in the "recovery" phase would be extremely diverse. The vision that each affected people aims in the "rehabilitation" phase is even more diverse. The "recovery" phase and the "rehabilitation" phase for livelihood support of the affected people in emergency disaster assistance projects are different in their objectives and the means of intervention. Build-Back-Better is a

continuous process for an emergency disaster assistance project but the process for "Build Back" in which the basic needs for the affected people's livelihood are aimed to be re-established is different from the successive process to be "Better" than before in which additional economic development or sustainability are intended to be attained. The nature and the means of the intervention should, therefore, be different accordingly.

- During the "recovery" phase, the assistance activities are mainly technical for rebuilding the damaged facilities and returning to their operation by the affected people for income generation. The project's target people are selected based on the extent of disaster damage and the assistance for returning to the minimum level of livelihood to support basic needs are equally distributed, based on the principle of "equality of results". This is a characteristic phase for disaster recovery process and the reestablishment of the basic needs is the most important aspect for the disaster assistant projects.

- The "rehabilitation" phase is the succeeding phase to attain a higher level of livelihood for the affected people after securing the basic needs in the recovery phase. The nature of assistance in this phase is to target on higher aims. In general, however, the assistance gradually starts to resemble ordinary economic development projects, and the assistance to facilitate economic development through competition based on "equality of opportunity". It will become difficult to handle issues expected to appear in this phase in the project frame prepared at the commencement of the disaster assistance project based on the "equality of results". However, project activity should be facilitative for catalyzing the natural development of structural reform for business management guided by the "invisible hand" of capitalist economy which leads the situation into the most efficient resources distribution.

(10) Continuous Support for the Groups Supported by the QIPs

Many of the groups that participated in the activities under the QIPs are still at their juvenile stage. There is still significant lack in their abilities in developing new markets, which is crucial for business operation, and thus they still require continued support to maintain their business activities in a sustainable manner. The following approaches are recommended for continuous support for these groups.

a) Proactive support for livelihood activities and accumulation of information on supporting scheme at the Municipal level

Accumulation of information on supporting schemes for livelihood activities, as well as the actual needs of the local groups engaged should primarily fall in the hands of the Municipal Government. Each LGU should set up a position that is responsible for supporting livelihood activities and appoint an officer with due capacity, so as to formulate a mechanism that can effectively match the local needs

and various government/non-government supporting schemes. The negotio-centers currently being promoted by the DTI could be effectively utilized to support this mechanism.

b) Utilization of DTI sales missions

DTI sales missions were found to be an effective approach in promoting the products produced under the QIP activities. It is recommended that the sales missions will continue to be held frequently and be utilized by local livelihood groups. Meanwhile, one improvement that could be made for the sales mission would be to increase the number of potential buyers that are engaged in the sales mission. The Chamber of Commerce Philippine Chamber of Commerce & Industry - Eastern Visayas is now working on the formulation of a database of local business. Collaboration with such effort would be recommended to increase the number of stakeholders and to enhance the chance for adequate matching.

c) Utilization of the lessons learned by foregoing groups

Though in limited numbers, some of the groups/members supported under the QIPs have shown substantial skills in carrying out business activities. These are the women who actually faced all the difficulties in starting a business and are the ones that managed to overcome these issues. It is recommended that such resources should be efficiently utilized in providing further support for the livelihood groups.

4.2.2 Construction Work

(1) Payment Condition

For QIPs related to construction works, the percentage for Advance Payment for the contractors was adjusted to a higher ratio to enable the contractor to start the work with adequate fund. In exchange for the released Advance Payment, contractor's submitted a Bank Guarantee equivalent to the amount of Advance Payment. However, some contractors, especially the ones with smaller scale had difficulty securing the Bank Guarantee due to the high amount required from them to be posted on the bank in exchange of the Bank Guarantee. In some cases, contractors encountered financing problem for the construction since a bigger sum of their fund where on hold at the banks for the Bank Guarantee. In future projects, it is recommended that contractor's financial capability should be considered in the preparation of guidelines for Payment Conditions especially on the Advance Payment and Progress Payment.

(2) Technical Transfer to LGU Engineers

Through the collaborative works in the preparation of building designs, technical

specification, estimation, tender, contract and construction supervision of the reconstruction of facilities under the QIPs, JICA Study Team was able to equip and improve the technical skills of LGU Engineers particularly in terms of supervising and management method for recovery projects. However, it wasn't sufficient as some of the LGU Engineers were not present all the time during site inspections and meetings.

Lack of skills and drive in project supervision of the LGU Engineers can be mostly attributed to: 1) their common professional practice and work background as LGU Engineers; 2) they are loaded with responsibilities due to lack of support staff in their department and 3) rare experience in extensive construction supervision specially on recovery projects.

Therefore, to improve their deficiencies in terms of project management and supervision, it is necessary for the continued support on them through provisions of capability trainings related to construction and management as well as the updates on new constructions technologies and recent revisions in structural and building codes. In addition, due to the Engineers' work load, it is necessary to expose and involve the other LGU Staff in construction supervision using basic monitoring method and by providing them checklists to enable them to supervise the project in the absence of the Engineers.

(3) Documentation skill of the contractor

Most of contractors could not submit Construction Schedules on time. Moreover, they were not able to prepare the correct Bending Schedule (showing bending and installation of re-bar) and Shop Drawings (showing truss fabrication). Therefore, JICA Study Team has fully supported them through the provision of technical support in terms of documentation.

Additionally, in relation to the construction schedule, it was found that they couldn't prepare it because they didn't have the proper format for calculation of the quantity of required materials, equipment and labor/manpower work, and construction progress/statement of work accomplishment, and because they didn't know the proper calculation method for the construction volume and quantity per unit item, etc. Thus, it is very useful and important to teach the contractors as well as LGU Engineers, the basic skills for preparation of construction schedule, and through these they can be able to prepare working plans with scheduled material/labor, so that delays caused by construction materials shortage and poor quality of work can be prevented.

For shop drawings, it was noted that most contractors do not have skilled personnel/CAD operators that have the basic knowledge in the preparation of drawings for the placement of re-bars and truss diagrams, and details of welding works. These drawings are very useful for the procurement and fabrication of materials. Also, it is important for the quality control and assurance of materials as well as for the benefit of the contractor in terms of profit.

(4) Welding Skills

JICA Study Team Engineer noted that most of contractor's welders for the QIPs acquired there welding skills only through work experience. Hence, JICA Study Team provided Orientation to all QIPs contractors' welders to equip them with the fundamentals or basic knowledge for welding and the proper methods for welding works. Moreover, JICA Study Team conducted a skills assessment on the welders on site through actual welding and evaluated them. And so, the welders who passed the evaluation were the ones who were allowed to do the major welding works for the QIPs. As stated above, it is necessary to evaluate workers in advance especially for those assigned on structures/works items that require special skills such as welding works and to provide them as well the necessary education or knowledge related to the works.

Also, JICA Study Team provided trainings on truss welding, truss anchorage and roofing installation, which were conducted by Japanese experts. This was carried out as a measure to enhance the local technology/techniques in the strengthening and reinforcement of the superstructure of buildings, which had remarkable damage after Typhoon Yolanda. Although, the training was done in a short period (twice a month), the trainees (TESDA Graduates and Trainers) were able to acquire the knowledge and techniques as targeted; only the number of trainees were very limited.

Hence, QIPs provided training video and manual entitled "The Technology of Welding, Truss and Roof" to TESDA. It is expected that through these training materials, TESDA will be able to train a large number of skilled workers and improve their trainings substantially.

(5) Concreting Management

In QIPs, all contractors used portable concrete mixers for concrete production at site. Consequently the quality of mixed concrete would depend greatly on the skill of the mixer operators. More so the quality of concrete in columns, beams in relation to pouring and vibrating, would significantly be influenced by the skill of the supervisor/foreman or site engineer. Therefore it is important to teach the contractor regarding these points for them to be able to achieve high quality standard of concrete.

(6) Support Installation

Traditionally in the Philippines, the distance between supports on concrete slab is 50cm. This is decided without any calculation and practiced widely by local contractors. Depending on the situation on site, JICA Study Team instructed the contractor to reinforce this with additional support. Without sufficient support, formwork may get distorted, or collapse by biased load or concrete weight. It is important to install support properly for

safety construction. The required numbers of support need to be calculated depending on the total concrete weight of slab and beam at every site. For safety construction, JICA Study Team instructed the contractor for additional measures, showing actual figures for total concrete weight of slab and beam and explaining about the requirements for reinforcing more support. JICA Study Team believed it necessary to educate the contractors on exact calculation and theory in adjusting the distances of support subject to the slab thickness and site situation to secure the safety work.

(7) Installation of Scaffolding

In the Philippines, most of the local contractors use timber or lumber scaffoldings around pillars prior to excavation of the foundation. They tend to use the scaffoldings to mark the locations of the structure. There may be no problem with this if only shallow excavation is required for the foundation, but in case of deep excavations, workability using machines will be interrupted. Moreover, in the cases where dewatering is necessary due to high groundwater level or in cases where the soil bearing capacity is low, scaffolding may disturb the implementation of proper countermeasures since it physically occupies the working space. As a result this may lead to delay of work since scaffolding may have to be removed or some work may have to be done manually. Hence, it is necessary to teach the contractor proper working sequence including the installation of scaffoldings, foundation excavation works and the investigation or checking of soil bearing capacity to avoid any construction delays.

(8) Quality Identification of Material

For QIPs, quality of steel material was essential and thus quality of each material had to be confirmed by mill certificate and tensile test. There were cases where the test result of the testing of material conducted at a laboratory did not match with the mill certificate issued. This signifies presence of sub-standard materials at the market. Hence it is recommended that all materials incorporated to the project must undergo material testing to counter check the issued mill certificate prior to the approval for quality control and assurance.

Other cases of QIPs were where concrete aggregates needed for foundation work was not the approved kind of material that had passed laboratory testing. In these cases, JICA Study Team Inspector instructed the contractor for the replacement of the aggregates from qualified suppliers in Tacloban as the quarry sites of Samar are not suitable and not approved by the Department of Public Works and Highways. Hence it is recommended for contractors to strictly follow the compliance of procuring quality materials from approved suppliers before it can be incorporated to the project.

(9) Alternative procedures for important works

There was a case where initially, the concrete placing method of second floor slab was planned with use of concrete pump and concrete plant due to big volume requirement. But, as a bridge on the way to site suffered damage by a typhoon, access became unavailable for heavy equipment/vehicle. Therefore, the contractor needed to change the concrete mixing method from the plant to site mixing. Concreting was done with scaffolding, slope, three portable concrete mixers, and 75 labors for 13 hours. In case of recovery projects after disasters, surrounding facilities could be damaged and it may affect the project's compliance to planned out schedules. Consequently, it is recommended that alternative procedures should be examined for important works to avoid delays in the process.

(10) Fixing of column formwork

In QIPs, there were several cases that the Inspector found misalignment of concrete columns. In worst cases, some were found leaning after removal of formworks which resulted to removal and replacement of such columns. Generally, local contractors carry out the placement or pouring of concrete using portable concrete mixers. In such cases, the rising speed of concrete is slow, and the concrete pressure is not so strong against formwork, so that the contractor tends to install the column formworks easily. But, formwork can be moved by concrete weight or pouring impact during concreting if support is not strong enough/stable. This default may cause a work interruption, through the repairing of formwork by removal or replacement. In order to avoid such cases, it is necessary to teach the contractor appropriate reinforcing methods using horizontal tie bar or brace to fix the top of formwork.

(11) Site Inspection

In one of the QIPs, it was noted that after excavation for foundation of stockyard area, the contractor intended to lay aggregates and prepared for re-bar fabrication where noted and observed that the gravel did not undergo the required material testing for bearing capacity. Therefore, the contractor was instructed stoppage of work and to comply with the required material testing for approval.

In another incident, the JICA Study Team Inspector identified insufficient quantity of roof material ordered by the contractor. This resulted in delays due to reordering. The incidence shows that the contractor did not have sufficient knowledge to carry out work proper construction management. This is because they have no experience in proper rigorous construction supervision. Therefore it is recommended for constant supervision and inspection of work at site is important in order to let the contractor to comply the standard technical requirement of the project.

(12) Safety Management

In QIPs, there were cases where contractors worked for welding/painting operation in high places without concern for safety. JICA Study Team instructed the contractors repeatedly to take safety measure by installation of temporary fences, using of safety ropes and preventing any third person to entering without the required Personal Protective Equipment (PPE) such as safety helmet. Despite of the constant reminder for the compliance of the safety measures, contractors and labors just ignored the instructions. Hence it is important to prepare working plan for weld/paint on ground as much as possible, and then install the fabricated one to high places. In case there are no other alternatives but to really work at high places, working platform is very helpful to get safety environment like on ground avoiding any accident. Safety management can prevent any unintentional damage to the construction workers and local people.

Therefore, it is recommended for the continued educational enhancement of LGU Engineer and the local contractors for safety control and measures for a healthy working environment and appropriate steps avoiding any dangerous conditions. Lastly, it is a must that safety officers will be deployed in every construction sites for safety management.

(13) Counter-measure against Seawater

QIP constructed a processing center in order to support the livelihood project. The location of the site is near the seashore in which during the excavation work seawater was noted to coming out. The presence of seawater in the foundation would greatly affect the quality of the structure, thus countermeasures was planned and recommended as follows: Provision of polyethylene membrane (plastic sheet - 0.2mm thickness) to cover the concrete footing; Reducing slump from 4 inches to 2 inches in order to improve the water tightness of concrete; and Application of anti-corrosive agent to re-bar. Thus, when the construction site is close to the seashore, it is necessary to incorporate the required countermeasures from the basic design phase and incorporate necessary measures into the contract by conducting required investigation in advance, considering any influence of sea water. Moreover, after the construction starts, as there is concern regarding the influence of the sea water which was had not been able to be assumed during site investigation, careful observation should be taken on any influence of sea water during foundation work.

(14) Soil investigation

In the first batch of QIP, Soil Investigation was not mentioned in the TOR. Therefore, the foundation was designed based on locality standards and design submitted by the authority concerned, and was confirmed by soil investigation conducted by the contractor after the construction contract. Minor modification such as revision of dimension was conducted

accordingly.

In second batch of the QIP, the test result indicated an extremely low bearing capacity at the site for the two-story building. Considering long term settlement, the design was modifies from two-story to one-story building and this involves additional construction period and budgetary requirement. Thus, soil investigation is recommended to be included in the TOR of QIPs to ensure the suitability of the design of the foundation to avoid any loss of time.

(15) Aggregate of Concrete

In the second batch of the QIP, it focused on the quality of concrete to build a strong structure against a typhoon. Quality test were required for materials such as aggregate (fine and gravel) and cement. After passing the quality test, the contractor has to prepare a design mix for the concrete and trial mixing is undertaken prior to the actual pouring of concrete. For the contractors who are not familiar with concreting on pavement, the QIP engineer advised the concrete mixing proportion. A slump cone is used to determine the cement–water ratio in order to have a strong concrete mix for a building of good quality. Therefore it is recommended to train the local contractors on the fundamental construction procedure such as trial mixing, proper storage of material, and the method of a slump test for quality control/assurance.

(16) Re-bar Inspection

Re-bar inspection is always conducted in the QIPs before formworks closure as it becomes difficult to see re-bar installation after formworks closure.

The inspection is to confirm if the actual work is done according to the approved bar bending schedule which was prepared by the contactor and checked/approved by the QIP engineer before re-bar work. Not only sizes, length and arrangement of re-bar, but also splicing is inspected because it is the weak points. Length and position of the splice should be located considering the concrete joint and moment of the beam. Wrong positioning should affect the strength of the member stiffness. If there were any deficiencies, the QIP engineer pointed out the adjustment and advised on the skills of fabrication of the re-bar, installation, and splicing to the contractor's engineer, foreman, and steel man. Thus, carrying out re-bar inspection during fabrication and installation of re-bars prior to the formworks closure is recommended to avoid making any weak points.