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)

SUMMARY

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



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Composition of Final Report (II)

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

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Map of the Disaster Affected Area and Target Area

Executive Summary

Executive Summary

1 Overall Background of the 2nd year of the JICA Project

1.1 The JICA Forum (March 2015)

The affected LGUs which suffered from the Typhoon Yolanda in November 2013, was prompted by the central government to prepare a recovery and reconstruction aiming at Build Back Better (BBB). Each LGU receiving various support from the central, provincial governments, NGO and international donors, prepared the draft recovery and reconstruction plan until March 2014. At May 2015, the efforts of the complication of LGU's plans were made in the regional Level.

The JICA Project, which started in January 2014 the field activities aiming at supporting the affected areas in terms of their urgent recovery and reconstruction, in the initial stage focused on the implementation of QIPs for enhancement of livelihood of the affected people quickly, the formulating Japanese grant aid program for providing high quality infrastructure and equipment for long term, and the field survey as well as the damage assessment using satellite images which would become the basis for hazard map preparation in order to formulate the recovery and reconstruction plan. The storm surge hazard map by the JICA Study Team gained interests from various relevant organizations because of the high accuracy in terms of the reproduction of the Yolanda inundation area/depth based on the detailed analysis of the past storm surge events. While the recovery and reconstruction planning of each LGU was progressing, some issues such as checking such plans using the hazard map and how to make use of the hazard map in LGU level were prevailed.

The JICA Study Team emphasized, based on the Japanese experience and knowledge on the recent recovery and reconstruction, the recovery and reconstruction plan to be comprehensive, composed of 3 policies. The 3 basic policies are creating safer cities, recovery of people's daily life and restoration of local economies.

The LGUs have been requested by several guidelines to consider the hazard assessment from the climate change viewpoint in the planning process such as CLUP. In addition, most of the LGUs have been facing the necessity of renewal of their CLUP. Taking into consideration of this situation, the JICA Study Team recognized the contents of the comprehensive recovery and reconstruction planning could contribute to the effective updating of CLUP and assisted the model LGUs (Tacloban city, Palo, Tanauan, Basey and Guiuan municipalities) from July 2014 to November 2014 with workshop approach, based on the understanding of the hazard map to propose the revision of existing recovery and reconstruction plan.

In the same time, the immediate implementation of the structural measure (road heightening and tide embankment) to protect Tacloban city, Palo and Tanauan municipalities was proposed by DPWH. The JICA

Study Team supported DPWH in terms of conceptual planning based on the storm surge hazard map to explain for LGUs in the workshops. The LGUs' officials understood the conceptual plan to some extent.

In December 2014, after a series of JICA workshop were held, the super typhoon "Ruby" being the same magnitude as the Yolanda attacked the Yolanda affected areas. The people who experienced the typhoon Yolanda conducted the early evacuation, and the JICA hazard map was made use of not only by the LGUs but also by the NGO, international donors. The importance of the evacuation to save the people's lives and the scientific hazard map indicating the hazard area was recognized over again.

The output of the workshop in the model area covered many sectors and a wide variety of the output was documented as the Final Report 1 at the end of 1st year. In the JICA Forum held in March 2015, which was aiming at sharing knowledge of the JICA project output, it was recognized that one of the most frequently stressed concern by the LGUs and the central government was that they were facing the challenge how to assure the sustainability of the collaborative works between the Philippine side and JICA. It was widely recognized that such assuring sustainability definitely contribute to the realization of Build Back Better after typhoon Yolanda. In this line, it was expected that the JICA Project should continue further focusing on the following.

- Build common understandings on necessity of disaster prevention among LGU officials by use of hazard maps
- · Seamless improvement of evacuation plan
- · Consolidate livelihood means, secure and expand market

The line agencies of central government as well as LGUs are expected to continue and develop the outcomes in the course of the efforts for recovery and reconstruction toward Build Back Better.

1.2 The 2nd year

The activities in the 2nd year started from the confirmation of the conclusion at March 2015 JICA Forum and the basic planning of structural measure. In Tacloban City, Palo and Tanauan municipalities, that were under CLUP revision process since 2014, the viewpoint of disaster prevention, in other words how to create safer cities was one of the main issuer in the CLUP revision.

JICA Study Team proposed the introduction of area management approach as a Japanese know-how for Tacloban city and Palo municipality, which was supposed to be point at issue during the implementation of structural measure. In Palo municipality, under a leadership of the administration body, the future land use plan to be protected by the structural measure was discussed, and a committee on area management was organized and the result of the discussion was going to be reflected in the revision of CLUP. Tanauan Municipality also organized a committee on area management on January 2016 and has been making efforts to reflect the future land use concept into the revision of CLUP.

Thus in the above, the issue to build common understandings on necessity of disaster prevention among LGU officials by use of hazard maps was stepped up the issue to understand the future land use planning based on the structural measure for creating safer cities. JICA Study Team started to conduct technical assistance for Tacloban city, Palo and Tanauan municipalities, where the structural measure is planned, for the updating process of their CLUP.

The resultant activities in the 2nd year in the 3 LGUs showed things different and interesting.

2 Output of the JICA Project

2.1 Development of Structural measure

JICA study team worked together with DPWH and assisted them in making the basic planning for the DPWH project of road heightening and tide embankment in the section of Tacloban, Palo and Tanauan against the 50 years return period of storm surge. The total length of the structure is about 13 km. Further, the technical assistance for preparation of the basic design for the prioritized section (the length was about 3 km) was also made for the DPWH officials.

The proposed structure for Section 3 and 4 (totally 13 km) are the tide embankment, new road, road widening, access road, intersection, flood gate and drainage structure.

The structures included in the prioritized section (3 km) are also the tide embankment, new road, road widening, access road, intersection, flood gate and drainage structure.

In the course of the basic design of the above structural measure, the mutual collaborations among DPWH, relevant LGUs, communities were made under the assistance of the JICA Study Team.

The prioritized section as well as the remaining section is expected to be implemented by the DPWH, as soon as possible using the local fund.

2.2 Updating Comprehensive Land Use Plan (CLUP)

2.2.1 Tacloban City

The Tacloban City who experienced the Typhoon Yolanda disaster, in order to achieve the Build Back Better, has been expected to make the city safer than before by preparing the revised land use plan. In Philippines, there has been a policy to mainstream the disaster risk reduction into the development plan.

In the recovery and reconstruction plan of the city after the Yolanda, the North area development concept was expressed and later the Tacloban North Master Plan was formulated by the City. Following this plan, the relocation from the coastal area has been progressing. On the other hand, the existing urban area is already saturated. Based on the actual inundation area by the Yolanda, the expansion and reallocation of the present urban functions toward the South and the higher West is preferable for the future population increase and properly balanced local development.

Tacloban City has expressed a policy to follow the HLURB for the revision of the current CLUP. JICA Study Team worked together with the city and conducted the screening of the hazardous area based on the storm surge hazard map, and proposed a basic direction of the spatial structure regarding the urban land use. The city planning officials learned the importance of the discussion on basic future land use policy from an entire city area's viewpoint and understood the JICA proposed policy, and discussed on it with other city officials and barangay people holding workshops.

In the course of the workshop and meetings with the city, JICA Study Team always inputted many technical matters such as how to prepare scientific hazard maps, the experience in the Great Eastern Japan Earthquake Disaster in 2011 and building codes in hazardous areas.

Thus the city's CLUP revision has been progressed. The final compilation of the CLUP is supposed to be by May 2016.

The remaining issues to be solved are regarding the implementation of the tide embankment in the city area to solve the relocation problems and reasonable coordination with other development plans of the city. For those issues, the approach of area management is to be introduced by the city.

Still it takes time to implement the tide embankment in the city area. But the next dangerous storm surge may come to the city soon. For that it is necessary to make efforts for building safer city to prepare evacuation plan and timeline action plan as well as introducing the proposed building codes in the hazardous area. In addition, a system for the smooth implementation of the plans and the establishment of the operation and maintenance organization are required.

The strong leadership of the Mayor and the deep understanding on local conditions of the Municipal officials shall be significant to the proper formulation of the plan.

2.2.2 Palo Municipality

The Palo Municipality who experienced the Typhoon Yolanda disaster, in order to achieve the Build Back Better, has been expected to make the city safer than before by preparing the revised land use plan.

In the coastal area of Palo, even before the Typhoon Yolanda, the lively activities for environmental protection existed. For such Palo area the structural measure was proposed by DPWH based on the JICA Storm Surge Hazard Map. The probable enhancement of the future land use by the structural measure matched with the development needs of the Palo Municipality.

Palo Municipality quickly established the area management committee under the Mayor's leadership to provide periodical opportunity in which relevant stakeholders sit together officially. They discussed on the restoration of MacArthur Park as an intangible legacy and mangrove ecosystem, flood and rainwater drainage improvement as the living environment, and maintaining livelihood such as fishermen's access in the coastal area.

The committee drafted the dream plan composed of the existing local plans based on the discussion in the committee. The plan will be reflected into the updated CLUP soon. The plan includes the new road and cycling road associated with the DPWH tide embankment, and places of recreational and relaxation for people such as sport facilities, view deck, MacArthur Park located in storm surge free area by the embankment. Also the plan includes the consideration for maintaining livelihood such as fishermen's access in the coastal area, and the installation of promenade to enable people to feel nature and safety in mangrove ecosystem. The dream plan will be publicized to more general people through various media such as animation video and pamphlet. In addition, it is important to develop a system for the smooth implementation of the plans and establish the operation and maintenance organization.

The strong leadership of the Mayor and the deep understanding on local conditions of the Municipal officials shall be significant to the proper formulation of the plan.

2.2.3 Tanauan Municipality

The coastal area in Tanauan Municipality suffered from the Typhoon Yolanda disaster, which affected a lot of victims, closed the main local factories, and damaged to the local economy. The relocation of people from the hazardous area has been progressed to some extent and the land use in such coastal area has been changed drastically. For such Tanauan area the structural measure was proposed by DPWH based on the JICA Storm Surge Hazard Map. The probable enhancement of the future land use by the structural measure matched with the development needs of the Tanauan Municipality seeking delightful Tanauan.

Tanauan Municipality, taking into consideration of the outcomes of Palo Municipality's area management, quickly established the area management committee under the Mayor's leadership to provide periodical opportunity in which relevant stakeholders sit together officially. The committee drafted the dream plan composed of the existing local plans.

For the moment, the committee is expected to make steady and lively discussion for the issues such as conservation of mangrove ecosystem, flood and rainwater drainage improvement as the living environment, and maintaining livelihood such as fishermen's access in the coastal area.

The remaining issues will be the smooth implementation of the plan and the establishment of the operation and maintenance organization.

The strong leadership of the Mayor and the deep understanding on local conditions of the Municipal officials shall be significant to the proper formulation of the plan.

2.2.4 Formulation of the handbook

The process and knowledge of the activities in updating the CLUP in Tacloban City and Palo Municipality were compiled as Handbook, named "Building Safer Cities," so that other LGUs can refer their activities to update their CLUP. Objectives and target user are indicated in follows:

Objectives:

- To introduce the Building Safer City (BSC) Approach
- To share the CLUP revision experiences of the LGUs and to achieve build back better

Target user: LGU (Mayor, planning officers, DRRM officers and officers in charge of CLUP revision), Barangay captains and INGO which supports LGUs in the CLUP revision etc.

The handbook illustrates the actual discussion, issues and challenges of some LGUs (Tacloban and Palo) that were affected by typhoon Yolanda. Therefore, this is a handy book which shows many photos and charts so that users can easily understand.

2.3 Updating LDRRMP (Evacuation Planning and Timeline Action Planning)

Before and after the Typhoon Yolanda disaster, hazard maps for various natural phenomena such as storm surge and flood have been prepared and disseminated by a lot of organizations and agencies such as the Philippine Government and JICA Study Team. Hazard maps are regarded as useful tool for formulating structural measures and non-structural measures such as land use planning and evacuation planning. The merits of hazard maps could be proved only when the people living in the hazardous area and the relevant stakeholders understand and make use of them.

JICA Study Team has made use of its own hazard maps and worked together with the affected LGUs, namely Tacloban, Tanauan and Palo, to improve the evacuation plans.

The main work items are as follows.

- Confirm capacity of ECs in LGU
- Confirm estimated evacuee's numbers in each Barangay
- Confirm the location of ECs on the (hazard) map
- Consider allocation of evacuees to ECs
- Confirm the allocation on the map
- Continue the allocation of Evacuees to the ECs Including finding ECs
- Selection of evacuation route

At first, in each barangay of LGU, the target hazard was clarified. For the targeted hazard (for example, storm surge or flood or their combination) the above items were studied. In Palo and Tanauan, the present capacity of the evacuation centers is much smaller than the number of people to be evacuated. In order to solve this problem, it is necessary to use private facilities in addition to the public ones. Also depending on the hazard conditions, the combination of vertical land use planning and evacuation planning is required to allow people evacuate to the upper floors in the buildings.



Figure 1 Image of utilization by vertical land use

JICA Study Team also worked together with other donors and NGO. Also a drill of evacuation was conducted in the area around Camire elementary school, which was reconstructed in the course of JICA Project.

JICA Study Team introduced the timeline action planning to Tacloban city and other LGUs. The timeline action plan is a plan for preparedness among relevant organizations and sectors before a large scale disaster such as flood and typhoon disasters. In Japan, the planning has started already in some areas. In Tacloban city, targeting typhoon disaster the preparedness before 72 hours in advance from a large scale typhoon landing was discussed among clusters in terms of their roles and a chain of command. Also Palo and Tanauan municipalities have started to discuss about their timeline action plan.

In the curse of updating evacuation plan and timeline action planning, the preparedness for the next typhoon landing will be improved to result into the reduction of disaster risk in the area.

The knowledge, especially presentation materials used for input by JICA Study Team was compiled as support documentation for DILG manual and expected to share with relevant agencies such as DILG.

2.4 Continuation and Enhancement of Quick Impact Projects

In the 2nd year, the 5 QIPs and 7 QIPs were implemented following from the 1st year and newly the 2nd year, respectively. The covered LGUs and NGA are Basey, Tolosa, Guiuan, Mercedes, Tanauan, Abuyog, Dulag and TESDA, which is an educational organization under DepED.

In the course of proper implementation of the QIPs, the consolidation of the livelihood means, securing and expanding local market were enhanced.



Figure 2 Location of QIPs

2.4.1 Evaluation of QIPs

In terms of relevance, effectiveness and impact, efficiency, sustainability, the implemented QIPs can be justified as follows (refer to Main Report Volume 3 Chapter 3).

Item	Rating
relevance	High (Rating: ③)
effectiveness and impact	High (Rating: ③)
efficiency	Fair (Rating: 2)
sustainability	Fair (Rating: ②)

Table 1 Evaluation Rating of Overall QIPs

			Building Safer Cities			Recovering People's Daily Life			Restoring Regional Economy							
QIP No.	Name of Municipality	Project Name	Major C/P Agency	Facility	Project Purpose	Target Group	Introducing Technologies in Japan	Structural Measures	Non-Structural Measures	Healthcare	Education	Social Welfare	Livelihood Improvement	Agriculture	Fishery	Services and Industry
Type A: Training/Capacity Development for Disaster Recilient Construction Technologies/Manegement & Function Recovery																
QIP-02	Palo	Recovery of Rural Health Service Support System Through Reconstruction of Provincial Health Office	РНО	PHO Reconstruction	Recovery of PHO System	PHO, RHU, PHO Users		Disaster Recilient Building	Function Securing at Disaster	Function Recovry						Local Industry Vitalization
QIP-04	Balangiga	Training on Disaster Resilient Construction Technologies Through Reconstruction of National Agriculture School	TESDA	National Agriculture School Reconstruction	Training on Construction Technologies	TESDA graduates/trainers, School teachers/trainees	Training by Japanese Skilled Worker	Disaster Recilient Building	Function Securing at Disaster		Training on Japanese Technology					Local Industry Vitalization
QIP-05	Dulag	Training on Disaster Resilient Construction Technologies Through Reconstruction of National High School	TESDA	National High School Reconstruction	Training on Construction Technologies	TESDA graduates/trainers, School teachers/students	Training by Japanese Skilled Worker	Disaster Recilient Building	Function Securing at Disaster		Training on Japanese Technology					Local Industry Vitalization
QIP-10	Dulag	Improving Municipal Capacity for Disaster Resilient Construction Management Through Reconstruction of Slaughter House	Municipality of Dulag	Slaughter House Reconstruction	LGU Capacity Development	LGU, House users		Disaster Recilient Building	Function Securing at Disaster		Capacity Development of LGU Staff					Local Industry Vitalization
QIP-09	Guiuan	Improving Municipal Capacity for Disaster Resilient Construction Management Through Reconstruction of Public Market	Municipality of Guiuan	Pablic Market Reconstruction	LGU Capacity Development	LGU, Market tenants		Disaster Recilient Building	Function Securing at Disaster		Capacity Development of LGU Staff					Local Industry Vitalization
QIP-11	Mercedes	Improving Municipal Capacity for Disaster Resilient Construction Management Through Reconstruction of Public Market	Municipality of Mercedes	Pablic Market Reconstruction	LGU Capacity Development	LGU, Market tenants		Disaster Recilient Building	Function Securing at Disaster		Capacity Development of LGU Staff					Local Industry Vitalization
QIP-12	Mayorga	Improving Municipal Capacity for Disaster Resilient Construction Management Through Reconstruction of Public Market	Municipality of Mayorga	Public Market Reconstruction	LGU Capacity Development	LGU, Market tenants		Disaster Recilient Building	Function Securing at Disaster		Capacity Development of LGU Staff					Local Industry Vitalization
Type B: I	ntroduction of	Disaster Recilient Technologies & Comm	unity Rehat	ollitation												
QIP-06	Salcedo	Reconstruction of Daycare Center for Community Rehabilitation (Vitalization of Peoples' Dialogue)	Municipality of Salcedo	Daycare Center Reconstruction	Vitalization of Community Dialogue	Center users, Community People	Prefabricated Building	Disaster Recilient Building	Function Securing, Disaster Prevention Education			Function Recovery				Local Industry Vitalization
QIP-07	Guiuan	Reconstruction of Daycare Center for Community Rehabilitation (Vitalization of Peoples' Dialogue)	Municipality of Guiuan	Daycare Center Reconstruction	Vitalization of Community Dialogue	Center users, Community People	Prefabricated Building	Disaster Recilient Building	Function Securing, Disaster Prevention Education			Function Recovery				Local Industry Vitalization
Type C: I	ntroduction of	Disaster Recilient Technologies and/or S	ustainable i	Livelihood Improve	əmənt											
QIP-03	Tolosa	Regenerating Local Livelihoods Through Processing of Agriculture and Fishery Products by Small-Scale Community Groups	Municipality of Tolosa	Construction of Livelihood Activities Support Facility	Livelihood Improvement	Community group		Disaster Recilient Building					Promotion	Production Prosessing	Production Prosessing	Sales and Marketing
QIP-01	Basey	Improving Livelihood Through Introduction of Disaster Resilient Submersible Fish Cage	BFAR, Municipality of Basey	Submersible Fish Cage for Milkfish	Livelihood Improvement	BFAR, Fishermen's families	Submresible Fish Cage	Disaster Recilient Facility	Function Securing at Disaster				Promotion		Fishery Cultivation	Prosessing and Sales
QIP-08	Guiuan	Introduction of Disaster Resilient Submersible Fish Cage for Lapu-lapu Culture	BFAR, Municipality of Guiuan	Submerged Fish Cage for Lapu-Lapu	Livelihood Improvement	BFAR, Fishermen's families	Submresible Fish Cage	Disaster Recilient Facility	Function Securing at Disaster				Promotion		Fishery Cultivation	Sales and Marketing
QIP-15	Tanauan	Community Aquaculture Resources Management by Re-establishment of Oyster Farming	BFAR, Municipality of Tanauan		Livelihood Improvement & Resources Management	BFAR, Fishermen's families	Oyster Culture		Function Securing at Disaster		Resource Management		Promotion		Fishery Cultivation	Prosessing and Sales
QIP-14	Mercedes	Regenerating Livelihood Through Production of Coco Charcoal Briquette	Municipality of Mercedes		Livelihood Improvement	Farmers' families							Promotion	Production Prosessing		Sales and Marketing
QIP-13	Tacloban	Promotion of Local Products to Improve Livelihoods for the Survivors of Typhoon Yolanda	City of Tacloban		Livelihood Improvement & Market Promotion	Production/sales workers (QIPs-1, 3, 14, 15)							Promotion			Sales and Marketing

Table 2 Relevance of QIPs to Recovery and Reconstruction Policy

Source: JICA Study Team

3 Recommendations

3.1 Recommendations for structural measure

Some of the items remained unsolved as of December 2015, end of on-site assistance by JICA Study Team for structural measure. Those items are described below with recommendations.

DD drawings and bidding documents to be completed by DPWH R8 except the items related to flap gate / slide gate

JICA Study Team has assisted DPWH R8 in preparing the specifications of the gate as well as quotations from Japaneses manufacturers for reference. DPWH R8 will have to finalize the method of procurement and accordingly the drawings and documents. DCCD, the contracted consultant may not have experiences in gate design and coordination with other consultants shall be considered.

Approval by NEDA ICC (Outside the scope of JICA Study Team)

Among the documents required for NEDA ICC approval, the resolution of the project from Tacloban City is not yet collected and RAP is still being prepared by DPWH R8. There may also be a perception gap between DPWH and NEDA, because NEDA is requesting F/S Study of the project although this DPWH project was started as the project of the upmost emergency to be implemented.

Coordination among relevant stakeholders should be continued to find common ground and solve the problem.

Land Acquisition (Outside the scope of JICA Study Team)

Parcellary survey is still ongoing by outsourced survey firm and negotiation to affected lot owners have not yet started by DPWH R8.

The problem has to be addressed promptly and properly.

3.2 Recommendations based on Comprehensive Planning Activities

Consideration of the ideal Building Code assuming vertical land use

- From the findings obtained in Japan, it is considered possible to set No-Build-Zone or No-Dwelling-Zone, with setting the standard inundation height due to high tide to 2 m. Even for areas where the inundation height become 2 m, it is considered possible to apply vertical land use, for instance, designating the sections above the inundation height of 2 m habitable for sturdy buildings (except wooden building). By giving considerations for the future, on the ideal Building Code assuming such vertical land use, it becomes possible to effectively utilize the limited coastal zone.
- It is recommended to reconsider the ideal land use from the temporal and spatial viewpoints by utilizing the JICA hazard map.

Continuous updating of CLUP to always aim at building a safe city from the viewpoint of DRRM

• After the Great East Japan Earthquake, area management is carried out in each region, and various considerations have been gradually put into practice inside the area. Especially, efforts are made beyond the boundary of areas, such as formulation of regional evacuation plans and solving the matter of concern, i.e. drainage of inner basin, by the region. Like these examples, it is vitally important to always aim at building a safe, secure and livable city without being limited to the update of CLUP or formulation of simple plans of area management.



Both Comprehensive Master Plan and Area Management Plan are very important .

Figure 3 Example of regional evacuation plans and utilization plans as area management (example of Great East Japan Earthquake)

<u>Development of the process and outcome of CLUP formulation into the comprehensive plan of</u> <u>LGU</u>

- In Japan, there are not only land use plans but also comprehensive municipal plan for planning the general municipal administrative policies. In the Philippines, while there are nation-level and region-level plans, they are not put down to plans at each LGU.
- CLUP is a comprehensive city building plan. The consideration process and outcome themselves are considered to become a comprehensive municipal plan.
- Data collection is to be maintained and managed as the basic statistics to be updated every year, every three years, every five years, etc., and considerations at each sector can be utilized as the mainstay of the plan for the sector in a comprehensive municipal plan. The restoration and revitalization plan proposed by the JICA Study Team is the very plan that is related to all sectors, leading to a comprehensive municipal plan.
- Like these examples, it is considered desirable to develop CLUP into a comprehensive plan of LGU without limiting it to a mere land use plan.

In Japan, 5 years have passed since the Great East Japan Earthquake, and the restoration and revitalization plan is currently being revised into a comprehensive plan of municipality. It is recommended to use these activities in Japan as reference.



Lessons learned from the Great East Japan Earthquake

Figure 4 Relationship diagram between the restoration and revitalization plan (general plan) and the area management after the Great East Japan Earthquake

3.3 Recommendation through the activities for evacuation planning

Evacuation plan of LGU

Through the activities of this project, it was ensured that the LGU could not instruct the barangays to formulate their own evacuation plan without the evacuation plan of LGU. It is necessary to formulate first the evacuation plan of LGU, to have a more suitable instruction to the barangays and lead to a smooth coordination between several barangays in the evacuation.

For the evacuation plan of the LGU, evacuation to ECs in the neighbor Barangays should be considered in the event of impending or giant scale of disaster such as Typhoon Yolanda. As of now, the disasters which affect the entire area of some barangays have been not considered in the evacuation planning. Therefore, the necessity of evacuation between several barangays was not fully understood.

In addition, concrete steps and contents for formulation of evacuation center and additional guideline should be prepared in the Local Disaster Risk Reduction and Management (DRRM) Planning Manual. The existing manual notes necessity of preparation for evacuation plan, but there is no guideline and instruction for the evacuation planning.

Capacity Development of LGU

The planning procedure is not difficult, but the geographic condition, disaster to be assumed and social structure such as population are different. The plan, therefore, should be formulated depending on the characteristics of the area. The LGU have to deal with numerous detailed aspects. That is why capacity development is needed to enhance their knowledge and skills to distinguish applicable strategies in the evacuation planning.

Coordination of evacuation plan between LGU and Barangays

The evacuation plan of the LGU focuses on the whole boundaries of the LGU, that's why the evacuation plans of the barangays should also be compiled including the actions in the community level, in order to achieve a smooth evacuation. The evacuation plans of the barangays should be formulated by each barangay, but their plan should be based on the evacuation plan of LGU. It's important that the evacuation plans of LGU and barangays are coordinated and shared.

In addition, evacuation action points going to the ECs of the neighboring Barangays of all the barangay, and the plan of the evacuee barangay and the receiver barangay should be coordinated. The LGU needs to give an instruction to them so that they can make a consistent plan for each other.

In the actual situation, CRS has been supporting to formulate evacuation plan in the Barangay level, by conducting a training adopting the Community Based DRRM Basic Instructor's Guide (CBDRRM BIG) prepared by OCD with the support from JICA. The LGU should conduct trainings for both the evacuee barangay and receiver barangay at the same time. Through the training, the basic idea of evacuation or camp management planning is expected to be prepared and well-coordinated.

Timeline Action Plan and DILG Manual

The DILG manual called "Local Government Unit Disaster Preparedness Manual," shows the actions to be taken 48 hours before the landfall of typhoons. These actions should be clarified depending on "who will do" and "when to activate the actions," so that concrete action plan with timeframe can be formulated. Once the action plan is prepared by the LGU, they can present their available support and suitable instruction to the barangay for better coordination and smooth evacuation planning.

This DILG Manual focuses on the typhoon hazard only, but it should also be taken into consideration to formulate a Timeline action plan for the different kinds of hazards such as flood, tsunami and etc. after the preparation of Typhoon Timeline Action Plan. It is also important to enhance the response capacity of the LGU against the hazards to be considered.

3.4 Recommendations based on QIPs Implementation

The recommendations based on the implementation of QIPs are the following items (refer to Main Report Volume 2 Chapter 4.2). The recommendations are categorized into mainly 2 items such as "Regenerating Livelihood" and "Construction Work".

Regeneration of Livelihood

1) Working with the People in Emergency Livelihood Support Projects

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

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.

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.

4) Follow-up supports

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

For introducing business activities involving local groups, 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

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

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'

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. 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

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".

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. 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.

Construction Work

1) Payment Condition

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

To improve deficiencies of LGU Staff 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

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. Shop drawings for the placement of re-bars and truss diagrams, and details of welding works 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

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. 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. 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. It is 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. This may be no problem if only shallow excavation is required for the foundation, but in case of deep excavations, workability using machines will be interrupted. 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

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

In case of recovery projects after disasters, surrounding facilities could be damaged and it may affect the project's compliance to plan 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. 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

Local contractors were found to 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

To avoid any accidents at high places, 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. Also, it is a must that safety officers will be deployed in every construction sites for safety management.

13) Counter-measure against Seawater

The presence of seawater in the foundation would greatly affect the quality of the structure. 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

A site for a two-storey building to be constructed under a QIP was found with extremely low bearing capacity. Considering long term settlement, the design was modifies from two-storey to one-storey building and this involves additional construction period and budgetary requirement. 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

Some contractors were not familiar with proper concrete mixing. 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

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.

3.5 JICA Forum in February 2016 and recommendations based on JICA Forum

JICA Forum in February 2016

A series of JICA Fora were held in Tacloban and Manila on February 9 and February 11, 2016 the Fora to end the 2nd year of the Study. This forum aimed to share the outcome and lessons learned from the JICA Project, introduce the progress of QIPS and report the result of the technical support on the planning for recovery and reconstruction in the model areas and confirm how the outputs of the JICA Project can be sustainable after the end of the Project.

Tacloban Forum

The Tacloban Forum was held in February 9, 2016 at the Multi-purpose hall in DPWH Region 8 inviting key officials from eighteen LGUs and regional representatives from line agencies and international NGOs. The program was composed of presentations and panel discussions on the outcome and lessons learned from the JICA Project by the counterparts from the LGUs and NGA.

The outputs of the JICA Project were shared in the Forum:

- The LGU understood the hazards and plans for building safer cities, using the hazard maps provided by JICA.
- Barangay and relevant NGAs were effectively involved in the planning process and effective non-structure and structural measures were discussed, as a result, the process which then led to capacity building for the LGUs.
- The Japanese strategies, such as, timeline action plan and disaster resilient construction technologies, was effectively shared and utilized.
- For the livelihood activity of QIPs, various activities of production, such as, fishery and intercropping, were introduced and the activities of value adding including processing, promotion, and creating value chain were also introduced.

At the panel discussion, challenges of the JICA Project and necessary activities after the end of the Project were discussed. At the session of planning, it was discussed how to implement measurements such as relocation and structural measure as the next step of planning. At the session of livelihood, necessity of capacity building, financial management and support of funding from the government was discussed to maintain and expand their activity. The JICA Project was the start and to maintain each activity is important for building back better. Therefore, it is concluded that building relations between LGU and NGA and collaborators to the activities are necessary.

<u>Manila Forum</u>

The Manila Forum was held on February 11, 2016 at the St. Giles Hotel inviting key officials from central governments such as DILG, NEDA, HLURB and international NGOs. The forum program was composed of the presentation on the output in JICA Project by the JICA Study Team and LGUs, and the discussion at round table..

JICA Study Team introduced their activities from the first year of the Project and shared the output and lessons learnt noted in Tacloban Forum. In addition, next necessary steps were shown to achieve build back better, and it was introduced how the detailed plans such as drainage plan and evacuation plan were formulated and various plan was reviewed for sustainable development during area management in Japan.

At the session of DRRMP, necessity of care for disability during evacuation was pointed out.

For future more reconstruction, the involvement of central office of NGA was also discussed, and appropriate management of hazard maps provided by JICA and sharing with relevant agencies including LGUs were proposed. Furthermore, necessity of sharing actual cases of planning was recognized because each LGU faces different situation for planning. It was strengthen that feedback from LGU should be shared with central office of NGA including HLURB, then to use handbook formulated by JICA Study Team, to show the cases of CLUP updating in Tacloban City and Palo Municipality was proposed.

Republic of the Philippines The Urgent Development Study on The Project on Rehabilitation and Recovery from Typhoon Yolanda

Final Report (II)

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Abbreviations

BFAR	:	Bureau of Fisheries and Aquatic Resources
CDP	:	Comprehensive Development Plan
CDRA	:	Climate and Disaster Risk Assessment
CLUP	:	Comprehensive Land Use Plan
DA	:	Department of Agriculture
DENR	:	Department of Environment and Natural Resources
DILG	:	Department of Interior and Local Government
DEPED	:	Department of Education
DOH	:	Department of Agriculture
DOST	:	Department of Science and Technology
DPWH	:	Department of Public Works and Highways
DRRM	:	Disaster Risk Reduction Management
EVRMC	:	Eastern Visayas Regional Medical Center
FAO	:	Food and Agriculture Organization
HLURB	:	Housing and Land Use and Regulatory Board

INGO	:	International Non-government Organizations
JICA	:	Japan International Cooperation Agency
LGU	:	Local Government Unit
LDRRM	:	Local Disaster Risk Reduction and Management
MDRRMO	:	Municipal Disaster Risk Reduction and Management Office
NBZ	:	No Build Zone
NEDA	:	National Economic Development Agency
NGO	:	Non-Goverment Organizations
OCD	:	Office of Civil Defense
PAGASA	:	Philippines Atmospheric Geophysical & Astronomical Services
		Administration
PCA	:	Philippine Coconut Authority
PWD	:	People With Disabled
RHU	:	Rural Health Unit
TESDA	:	Technical Education and Skills Development Authority
UNDP	:	United Nations Development Programme

Chapter 1 Introduction

1.1 The background and scope of work of the 2nd year

1.1.1 Background

The output of the "Urgent Recovery and Reconstruction for Typhoon Yolanda Project", hereinafter called "the JICA Project", which started in January 2014 already prepared and submitted the Final Report 1 of the 1st year's product in May 2015. During the 1st year of the JICA Project, the activities on recovery of livelihood of the disaster affected people, capacity development of resilient construction technology and planning for recovery and reconstruction based on the hazard map have gained the understanding and support of the stakeholders in the Philippines and JICA officials. On the 1st year anniversary of Typhoon Yolanda Disaster on November 2014, DPWH announced the immediate implementation of structural measure to protect one city and two municipalities in the affected area against storm surge and requested JICA for the assist with the planning and design. On March 2015, JICA decided to extend the JICA Project for 1 year until the middle of 2016 to respond to the desire of the Philippine Government, which seeks to materialize continuously the output of 1st year and develop horizontally in the country.

The Final Report 2, contains the all result of the scope of work of the 2nd year of the JICA Project described below. The Main Report is composed of 2 volumes, namely Volume 1 and Volume II.

Volume 1 Recovery and Reconstruction Planning

Part I Updating Comprehensive Land Use Plan (CLUP)

- Development of Structural measure
- Assistance for Updating CLUP focusing on Building Safer Cities
- Part II Improving Disaster Risk Reduction Management Plan
 - Performed Activities focusing on Evacuation Planning

Volume 2 Quick Impact Project

- Recovery of Livelihood of the Yolanda affected people
- Capacity development on of resilient construction technology

1.1.2 Scope of Work

(1) Assistance for Planning and Basic Design of Structural measure

Basic Planning of Structural measure in Section 3 and Section 4 to protect Tacloban City, Palo

Municipality and Tanauan Municipality from 50 years return period Storm Surge

Basic Design for the prioritized section among Section 3 and 4

Technical assistance for DPWH officials to implement the structural measure immediately

(2) Assistance for Updating Comprehensive Land Use Plan (CLUP)

Technical assistances for Tacloban City, Palo Municipality and Tanauan Municipality who are in the process of updating the CLUP considering the natural disaster hazard. For these LGUs, an approach called area management is introduced to reflect in their CLUP.

(3) Evacuation Planning

Technical assistances for the preparedness and evacuation planning for storm surge and/or river flood in Tacloban City, Palo Municipality and Tanauan Municipality.

(4) QIPs

Technical assistances for Recovery of Livelihood of the Yolanda affected people and Capacity development on of resilient construction technology

In this year, 12 QIPs have been carried out, divided in 4 groups, (1) Production/ cultivation, (2) Processing, (3) Distribution/ market, and (4) Public service/ human resource development. 5 QIPs are continuous projects from the last year and 7 QIPs are new projects.

Updating Comprehensive Land Use Plan (CLUP)
Chapter 2 Development of Structural measures

2.1 Basic Conditions

2.1.1 Role of DPWH and JICA

For the development of structural measures, the following were confirmed between DPWH and JICA in December 2014 regarding the JICA's technical assistance to DPWH.

- GPH Goal: realization of tangible physical protection structure (i.e., Road Heightening and Tide Embankment) to protect from the storm surge affected before 2015 / 2016.
- > Prompt action is highly required as a first priority.
- Therefore special Procedure to be considered to accelerate the implementation of the Project, however, environmental and social protection shall be carefully considered.
- Section 3 and 4 were prioritized, yet it contains some areas that need resettlement and/or land acquisition.
- Phasing approach is necessary for planning and implementing the physical protection for the entire section.
- Basic Design should be conducted for the prioritized section that has less land issue and negative impact on residents & environment, within Section 3 & 4, in order to accelerate the realization of physical protection.

Source: JICA HQ

Figure 2.1-1 Confirmed Basic Contents between DPWH and JICA

2.1.2 Outline of the Initially Proposed Project

The Project to be planned in this report can be called as follows, based on the DPWH documents.

Project Title	: Project on Road Heightening and Tide Embankment for Section 3 and 4
Project Area	: Tacloban City and Palo Municipality in Leyte (Region VIII)
Implementation Agency	: DPWH
Finance	: DPWH (100%)

The location of Section 3 and 4 is shown in Figure 2.1-2. The lengths of Section 3 and Section 4 are 5,200 m and 7,800 m, respectively as lengths of existing road. The categorization such as heightening of road and tide embankment in the figure is from initial concept of the project, which is subject to change in the basic planning.



Source: JICA Study Team

Figure 2.1-2 Location of Section 3 and 4

2.1.3 Study of Alternative Alignment and Structures

(1) Study of Existing Conditions

In the study of structural measures, a field survey was first carried out and the following points were examined: land use conditions, circumstances of roads and crossings, and locations of houses near the initial planned embankment. As a result, the following issues were identified regarding the proposed initial alignment.

- ✓ There is a large volume of traffic, indicating the possibility of considerable road traffic disruption during the construction work to heighten the road. (Issue-a)
- ✓ There are many intersections, and near junctions, sloped "transition sections" will be necessary on roads connecting to the heightened road. (Issue-b)

- ✓ There are many sections with houses built next to the road. (Issue-c)
- ✓ There are many houses, factories, and other facilities between the proposed initial alignment and the shoreline, meaning that the area that should be protected cannot be sufficiently covered. (Issue-d)
- ✓ "No Build Zone" has been established to the seaward side of the proposed initial alignment. (Issue-e)

In consideration of the above issues, and in order to decrease their impact to the extent possible, a further two plans are proposed in addition to the proposed initial alignment: a plan in which a protection wall is constructed along the road and a plan in which a tide embankment is constructed along the shoreline. A comparative study is made of the three alignments shown below.

- ✓ Case-A : Road heightening plan (proposed initial alignment)
- ✓ Case-B : Tide protection wall plan (alignment along the seaward side of the road in Case A)
- ✓ Case-C : Tide embankment plan (alignment along the shoreline)

Table 2.1-1 shows the other alignments compatible with the issues of the proposed initial alignment.

Table 2.1-1	The Other Alignments	Compatible with	n the Issues of t	he Proposed	Initial Alignment
	The Other Highlight	Companyie with		ne i roposeu	

		Alignment plan capable of coping			
Issue	s of the proposed initial alignment	with the issue			
		Case-B	Case-C		
Issue-a	Coping with traffic measure under construction	Possible	Possible		
Issue-b	Coping with transition sections in the intersection	Possible ^{**}	Possible		
Issue-c	Coping with houses built next to the road	Impossible	Possible		
Issue-d	Coping with extension of protection area	Impossible	Possible		
Issue-e	Coping with "NO BUILD ZONE"	Impossible	Possible		

Note \circledast) In order to decrease the impact in the connecting road to heightened road, it is necessary to set a gate in the intersection.

(2) Alternative Alignment

Based on the study of the existing conditions, alignment for Case-A, Case-B and Case-C was set for each of the section 3 and section 4.

1) Section 3

Alternative alignments (Case-A, Case-B and Case-C) were studied for the whole section 3, taking existing condition into consideration. The section is subdivided into 3 sections, from section 3-1 in the north to section 3-3 in the south.



Source: JICA Study Team

Figure 2.1-3 Alternative Alignments for Section 3

2) Alternative Alignments for Section-4

Alternative alignments (Case-A, Case-B and Case-C) were studied for the whole section 4, taking existing conditions into consideration. The section is subdivided into 7 sections, from section 4-1 in the north to section 4-7 in the south.



Source: JICA Study Team

Figure 2.1-4 Alternative Alignments for Section 4

(3) Structure Types for Alternative Alignment

Based on the result of existing conditions study, the structure type for 3 alternative alignments including the initial alignment was studied. The basic idea on the structure type of 3 alternative alignments, which is named Case-A, Case-B and Case-C, is summarized as follows.

1) Case-A

Case-A is the proposed initial alignment which will utilize the existing road. Structure type corresponding to Case-A is shown in Figure 2.1-5 and Figure 2.1-6. Embankment structure shown in Figure 2.1-5 is the standard structure of road heightening, whereas concrete wall structure shown in Figure 2.1-6 shall be applied when removal of existing buildings along the road is not possible..



Source: JICA Study Team

Figure 2.1-5 Structural Type of Case-A (Embankment)



Source: JICA Study Team

Figure 2.1-6 Structural Type of Case-A (Concrete Wall)

2) Case-B

Case-B is basically parallel to proposed initial alignment (Case-A), and it runs alongside of the existing road. As shown in the below tidal protection wall will be installed on the sea side of the road so that the existing road and surrounding buildings on the land side will not be affected.



Source: JICA Study Team



3) Case-C

Case-C is embankment within the NBZ, centerline of the embankment being 30 meters from the shoreline so that the structure itself lies inside the NBZ, which is 40 meters from the shoreline. This case does not affect the existing road, or the buildings alongside of the road.



Source: JICA Study Team

Figure 2.1-8 Structural Type of Case-C (Embankment)

(4) Comparison of Alternative Cases

The 3 cases in terms of alignments with combination of structure type have been discussed so far in this report.

For the definitive plan setting, the comparison of alternative Cases were made by several viewpoints,

such as viewpoint of accessibility of existing road or house, viewpoint of traffic condition during construction, viewpoint of number of households outside the protection, an esthetic viewpoint and viewpoint of construction cost. Figure 2.1-9 and Figure 2.1-10 shows the results of comparison of alternative Cases for Section 3 and 4, respectively.

In the Section 3, considering the viewpoint of accessibility of existing road or house and traffic condition during construction, Case-A whose structural type is road heightening plan and Case-B whose structural type is tide protection wall plan show poor evaluation for these viewpoints as shown in Figure 2.1-9. Furthermore, in consideration of the protection effect, the protection area of Case-A and Case-B is less than that of Case-C in the section 3.

While the rough estimate of construction cost of Case-C is slightly higher than Case-B, from the comprehensive viewpoint, Case-C which structural type is tide embankment plan will be the most desirable plan. The construction cost shall be estimated in the course of the basic design and detailed design phase.

Therefore in Section 3, basically the Case-C concept is preferable.

In the Section 4, due to the site condition, the comparison for Case-A and Case-C was made as shown in Figure 2.1-10. The considered viewpoints are same as in the Section 3. In all viewpoints, Case-C can be regarded as better evaluation than Case-A. The construction cost of Case-C is much cheaper than Case-A.

Therefore in Section 4, the Case-C concept is preferable.

Based on the above evaluation, the basic plan for Section 3 and 4 was made applying Case-C concept as shown in next Chapters.

Case-C	Tide embankment plan	toronal and the second se	Not Affected	***	 Not Affected , 	***	881households in section 3 will be affected.	***	• Totally good and Maintenance road to be used for Cycling road and esplanade.	***	New ROW for Tide Protection Dike is necessary, but it falls within no dwelling zone. P 8 Thousand /m (A = 20.0 st /m)	P 354 Thousand /m	P 362 Thousand /m	**	First Place
Case-B	Tide protection wall plan	(neward)	 No Change of Road Elevation. Height between top of Tole Protection Wall and Lot of House is m and access to House can be provide by Gate Wall but it is difficult to maintain of this Gate. 	\$	 Occupied only Road side area during construction and minimized traffic congestion. 		 2616 households in section 3 will be affected. Large facilities (factories) will not be affected, because the iggment will be shifted to shoreline near the facilities (factories). 	*	Tide Protection Wall is no good view.		●Not necessary for additional ROW. P 0 Million (A = 0 m2)	P 296 Thousand /m	P 296 Thousand /m	***	Second Place
eA	Road heightening plan (proposed initial alignment)		 Connecting from heightened road to exting road is needed at least tess than 5% slope adjustment and length of adjustment slope is 80m. Height between Road and Lot of House is 4m and access to House can not be provide for each house 		 Detour Road is rieeded during construction but very difficult to make detour road and very traffic congestion is occurred. 		 2616 households in section 3 will be affected. Besidas that, large facilities (factories) will be affected as well. 	**	 Tide Protection Wall is not so good view along Road Side. 		 Not recessary for additional ROW. Tide Protection wall can be constructed within ROW P 0 Thousand /m (A = 0.0nf /m) 	P 512 Thousand /m	P 512 Thousand /m	*	Last Place
Cas	Road heightening plan (proposed initial alignment)		 Connecting from heightened road to exiting road is needed at least least them 5% slope adjustment and length of adjustment slope is 80m. Am and Height between Road and Lot of House is 4m and access to House can not be provide for each house 		 Detour Road is needed during construction but very difficult to make detour road and very traffic congestion is occurred. 		 2616 households in section 3 will be affected. Besides that, large facilities (factories) will be affected as well. 		High slope along Road is not so good view along Road Side.	**	Additional ROW is necessary for both side P 160 Thousand /m (A = $20.0 \mathrm{m^2}\mathrm{/m}$)	P 343 Thousand /m	P 503 Thousand /m		Last Place
Alignment Case	Structural Type	Cross Section	Accessibility of Comment Fishing Road or House	Evaluation	Traffic Condition Comment	Evaluation	Number of Number of households Comment outside the	protection Evaluation	Esthetic View Comment	Evaluation	ROW Condition (per Meter)	Constructio Cost n Cost (per Meter)	Total	Evaluation	Recommendation

Figure 2.1-9 Comparison for Alternative Cases for Section 3

Note) Symbol of evaluation column means as follows: the $\star \star \star \star$ is good, $\star \star$ is fair, \star is bad

Alignment Case		Case A	Case-C		
Structural Type		Road heightening plan (proposed initial alignment)	Tide embankment plan		
Cross Sect	ion		(SEAMARD)		
Accessibility of Existing Road or House	Comment	 Connecting from heightened road to exiting road is needed at least less than 5% slope adjustment and length of adjustment slope is 80m. Height between Road and Lot of House is 4m and access to House can not be provide for each house 	Not Affected .		
- A.	Evaluation		***		
Traffic Condition	Comment	Detour Road is needed during construction and very traffic congestion is occurred.	Not Affected .		
During Constitution	Evaluation	*	***		
Number of households	Comment	750 households in section 4 will be affected.	Not Affected .		
protection	Evaluation		***		
Esthetic View Point	Comment	High slope along Road is not so good view.	Totally good and Maintenance road to be used for Cycling road and esplanade.		
	Evaluation	*	***		
	ROW Condition (per Meter)	●Additional ROW is necessary for both side P 132 Thousand /m (A = 20.0 m² /m)	New ROW for Tide Protection Dike is necessary, but it falls within no dwelling zone. P 8 Thousand /m (A = 20.0 n ² /m)		
Cost	Construction Cost (per Meter)	P 314 Thousand /m	P 249 Thousand /m		
	Total	P 446 Thousand /m	P 257 Thousand /m		
	Evaluation		***		
Recommend	ation	Last Place	First Place		

Note) Symbol of evaluation column means as follows: the $\star \star \star$ is good, $\star \star$ is fair, \star is bad

Figure 2.1-10 Comparison for Alternative Case for Section 4

2.2 Basic Planning for Section 3 and 4

2.2.1 Outline of the Structure Proposed in the Basic Planning

The main structure is tide embankment which is, as a result of the study and discussion between LGUs, has a shifted alignment towards the sea compared to the originally proposed alignment of road heightening. The type of the main structure is shown in Figure 2.2-1 as well as Design conditions. The selection of type of structure and comparative study of the alignment was explained in the precedent chapter.

Tide embankment is accompanied by a new road and a road widening in the middle part of Section 4. Totally 8 river gates are identified in Section 3 and Section 4, whereas 27 sites to be provided with a box culvert equipped with a flap gate. 2 intersections are proposed where as the number and location of access road shall be designated in the detailed design, although typical structure is proposed in the basic planning.

	Section 3 (5.5km:Tacloban)	1	Section 4 (7.5km:Tacloban, Palo)						
Main Structure	Tide Embankment (5.5km)	Tide Embankment (2.7km)	Tide Embankment + new road (1.5km)	Tide Embankment + road widening (0.9km)	Tide Embankment (2.4km)				
Access road	To be designed	To be designed	To be designed	To be designed	To be designed				
Intersection	1 site -Crossing with airport road	None	1 site -North of Payapay bridge	None	None				
Flood Gate	4 sites -Tanghas-Lirang creek -Sagakahn creek -Mahayahay creek -Burayan River	None	l sites -Kilot creek	l sites -Binok creek (No.1)	2 sites -Binok creek (No.2) -Bangon River Appendix				
Box culvert + flap gate	17 sites	2 sites	5 sites	None	3 sites				

Table 2.2-1 Structures Proposed in the Basic Planning

Prioritized Sections

Source: JICA Study Team

Protection Level: Storm Surge of 50 years return periodType of Structure: Tide EmbankmentTop Elevation: MSL+4.0m (Section 4) and MSL+3.5m (Section 3)



Source: JICA Study Team

Figure 2.2-1 Design Conditions and Type of Main Structure



Source: JICA Study Team

Figure 2.2-2 Structures Proposed in the Basic Design

2.2.2 Tide Embankment

(1) Top Elevation

Top elevation of the embankment is set at MSL+4.0m in section 3 and MSL+3.5m in section 4. The height is based on the results of simulated 50 years return period storm surge deviation in each section. The maximum storm surge height in section 3 is MSL+3.8m, which is rounded up to set the design top elevation of MSL+4.0m. The maximum storm surge height in section 4 is MSL+3.2m, which is rounded up to set the design top elevation of MSL+3.5m.

(2) Crest Width

The crest width is set at 4 meters so that it can be used as a cycling road considering an official vehicle parked on it. The widths of 2.0 and 1.5 meters, is for official vehicles and bicycles respectively. In addition, 0.25 meters for shoulders where railings will be installed at both sides (shoulders).

(3) Structural Parameters

Structural specifications for tide embankment are listed in the table below. The specifications are based on Technical Standards and Commentaries for Coastal Protection Facilities (2004).





Table 2.2-2

Structural Specifications of Tide Embankment¹

Items	specifications	explanation
Seaward slope gradient	1:1.0	Steepest case-based gradient for
		concrete-protected embankment. Lowering the
		gradient facilitates overtopping, thus unsafe.

¹ Technical Standards and Commentaries for Coastal Protection Facilities (2004)

Landward slope gradient	1:1.5	Typical case-based gradient for
		concrete-protected embankment.
Seaward slope protection	Concrete (50cm)	Typical case-based protection for tide
	Lean concrete (10cm)	embankment.
	Crushed stone (20cm)	
Landward slope protection	Concrete (20cm)	Typical case-based protection for tide
	Lean concrete (10cm)	embankment.
	Crushed stone (20cm)	
Crest protection	Concrete (20cm)	Typical case-based protection for tide
	Lean concrete (10cm)	embankment.
	Crushed stone (20cm)	
Sheet pile (seaward)	L=3.0m	Standard length needed for water cutoff and soil
		draw-out prevention. The length shall be
		determined by seepage analysis
Base concrete (seaward)	1m x 1m (1 unit)	Typical case-based protection for tide
		embankment.
Embedded depth (seaward)	D=1.0m	Standard length needed for erosion protection
Embedded depth (landward)	D=1.0m	Standard length needed for erosion protection
Foot protection	2 lines of base concrete	Typical case-based protection for tide
	(1m x 1m)	embankment.

(4) Access ramp and stairs

Access road to the top of embankment as well as to the other side of the embankment shall be secured by installing an access road wherever necessary. Depending on its usage, whether it's for vehicle (for official use for maintenance), bicycles or pedestrians, the size of the slope must be chosen.





Figure 2.2-4 General Image of Access Road for Vehicles

2.2.3 Road

(1) Road Alignment

1) Extension of Service Road (Baybay Road) in Section 4-2

Existing Baybay road at around Sta. 2+400 in Section 4-2 was washed out during Typhoon Yolanda. The construction of a 6.1 meter width of new road from Sta. 1+840 up to Sta.3+720 (at Section 4-2 of Tide Embankment) will provide continuous vehicular access connecting the existing roads (Baybay Road and Manlurip Road).

Description of new road:

- Road classification
- Type of Pavement
- Number of Lanes/ width of carriageway
- Shoulder width
- Typical Pavement Structure
 - wearing/surface layer (PCCP)
 - Base course
 - Subbase course
 - Improved subgrade*

- : Secondary Road (upgraded)
- : Portland Cement Concrete (PCCP)
- : One lane, each way/ 6.01 meters
- : 1 meter, both sides

*Note: on instances wherein the subgrade level of the proposed new pavement structure is unstable (i.e. low CBR, on swampy area, etc.), subgrade needs to be improved and stabilized to sufficient depths.

2) Road Widening in Section 4-3

Existing road (Manlurip Rd.) of 760 m in length at Sta. 3+500 \sim Sta. 4+260 based on stationing of tide protection dike in Section 4-3 is proposed to be widened to satisfy the clearance between the proposed tide embankment formation and the existing revetment wall. Further, the pavement type shall be similar to the existing concrete pavement.

(2) Intersections

1) New Intersection for Starting Point of Section 4 at San Jose Airport Road

Existing San Jose Airport Road will be crossing Tidal Protection Dike alignment at starting point of section 4. Therefore existing San Jose airport road height shall be adjusted to Tidal Protection Dike elevation to make new intersection, but normally public car cannot enter dike road. This dike road is for only pedestrian, bicycle and maintenance car use.

Alignment of San Jose Airport road is same as existing alignment. Below Figure 2.2-5 shows schematic plan for intersection of San Jose Airport road and Tidal Protection Dike.



Figure 2.2-5 Intersection of San Jose Airport Road and Tidal Protection Dike

2) New Intersection for Extension of Baybay connected to Manlurip Road in Section 4

Existing Baybay road from Sta. 2+400 in Section 4 will be extended to Manlurip Road at Sta. 3+700 and this connection point is a T type intersection. Below Figure 2.2-6 shows schematic plan for intersection of Baybay road and Manlurip Road.



Figure 2.2-6 Intersection of Baybay Road and Manlurip Road at Section 4

2.2.4 River Crossing Structure

1) Catchment Area

Based on collected information (e.g. JICA M/P in 1995, topographic condition, existing drainage coverage, proposed drainage plan, existing heightened road), catchment area for each river/creek and dominant drainage channel in the Project Area was delineated as shown in Figure 2.2-7.



Figure 2.2-7 Catchment Area (1/2)



Figure 2.2-8 Catchment Area (2/2)

2) **Rivers and Creeks**

Based on catchment area study of rivers and creeks, the two (2) rivers and one (1) creek were selected for river study, whose topographic information are summarized as below.

No.	St. No.	River/Creek name	Catchment Area (km ²)	Channel Length (km)	Topographic Slope	Flood concentration time* (min)
1	Sec3-1K-200	Tanghas-Lirang Creek	4.26	4.6	1,120	54
2	Sec3-2K-516	Sagkahan Creek	0.55	0.47	340	15
3	Sec3-2K-930	Mahayahay Creek	2.62	1.17	460	36
4	Sec3-4K-268	Burayan River	5.27	3.3	1,250	54
5	Sec3-4K-800	Kilot Creek	0.2	0.5	-	-
6	Sec4-4K-250	Binog (1) Creek	4.34	0.8	320	36
7	-	Bangon River	224	38	50 - 800	117

 Table 2.2-3
 Summary on Target Rivers and Creek for Runoff Analysis

* Kraven's formula was employed.

c) SCS Method plus Water Storage by Swamp and Paddy Areas

In addition to SCS method, retarding function by swamp and paddy field were taken into account in hydrological process. Retarding volume such as by swamp and paddy field were estimated based on site investigation, inundation survey in 2014 JICA Study and satellite image which are apparently identified as water retarding area such as paddy and swamp area.

				w/o Retardir	ng by swamp	Cut	w/ Retarding	by swamp
No.	River/Creek name	SCS No.	Imper vious rate (%)	10yr probable peak discharge (m3/s)	5yr probable peak discharge (m3/s)	Discharge by swamp storage** (m3/s)	10yrs probable peak discharge (m3/s)	5yrs probable peak discharge (m3/s)
-	Mangonbangon River	80	21	28	24	13	15	11
1	Tanghas-Lirang Creek	80	28	22	19	3	20	17
2	Sagkahan Creek*	-	-	3	2	0	3	2
3	Mahayahay Creek*	-	-	14	12	3	11	9
4	Burayan River	79	49	29	25	14	15	11
5	Unknown (Payapay Brd.)*	-	-	-	-	0	1	1
6	Unknown	-	-	23	20	10	13	10

 Table 2.2-4
 Calculation Result (SCS Unit-hydro Graph Method)

* Probable discharge were estimated based on the average of specific peak discharges of Mangonbangon River, Tanghas-Lirang Creek and Bureyan River that SCS method was employed for runoff calculation.

**0.3 m of retarding depth was applied based of site investigation and physical inundation survey. As for No2, 3, 5 and 6, amount of cut discharge by swamp storage were estimated based on correlation between calculated swamp area and cut discharge on the three (3) rivers od No.1, 4 and Mangonbangon River.

c) Summary

The calculation results of three (3) methodologies explained above are summarized below.

							Unit: m³/s	
No	River/Creek name	Rational	formula	SO	CS	SCS plus Water Retarding		
110.		10 years	5 years	10 years	5 years	10 years	5 years	
1	Tanghas-Lirang Creek	57	46	22	19	20	17	
2	Sagkahan Creek	17	14	3	2	3	2	
3	Mahayahay Creek	48	39	14	12	11	9	
4	Burayan River	70	57	29	25	15	11	
5	Unknown (Payapay Brd.)	4	3	1	1	1	1	
6	Unknown	73	59	23	20	13	10	

Table 2.2-5 Summary of Runoff Analysis

Source: JICA Study Team

3) Evaluation of Discharge Capacity of Existing Outlets

Discharge capacities of outlets of the rivers and creeks analyzed in this study were estimated. Manning's uniform flow was employed for calculation of discharge capacity. The calculation results are summarized in Table 2.2-6.

No.	River/Creek name	Probable Discharge* (10years) (m ³ /s)	Probable Discharge* (5years) (m ³ /s)	Structure type of existing outlet	Dimension of existing outlet	Slope	Discharge (m ³ /s)	for 10 years return period flood	for 10 years return period flood
1	Tanghas Lirang Creek	20	17	Bridge	H=1.1m, W=4m	1,120	3	No	No
2	Sagkahan Creek	3	2	Box Culvert	H=1.1m, W=2.6m	340	3	No	Yes
3	Mahayahay Creek	11	9	Box Culvert	(H=1m, W=1m) x 2	460	2	No	No
4	Burayan River	15	11	Bridge	H=3m, W=10m	1,250	29	Yes	Yes
5	Payapay Brd.	1	1	Bridge	H=2.8m, W=25.6m	500	286	Yes	Yes
6	Unknown*	13	10	Box Culvert	(H=2m, W=4m) x 2	320	31	Yes	Yes

 Table 2.2-6
 Discharge Capacity of Outlets

* SCS plus water retarding was applied.

**Applied roughness coefficient was 0.03

Source: JICA Study Team

(2) Recommended Hydraulic Dimension to be Secured for Outlet Treatment

In order to drain the estimated discharges, the hydraulic dimensions listed in the table below are recommended for their outlets, which are obtained by try and error method using Manning's uniform flow formula so as calculated discharge of the dimension are larger than estimated discharge. Considering current situation that has a little tide difference between high and low tides, gate height was fixed with 2m. It is confirmed by Non-uniform flow calculation that the obtained hydraulic dimension can discharge 10 years return period flood without reaching top of their dimensions.

No	River/Creek	Structure type of	Dimension of	Design	Probable Discharge* (m ³ /s)		Recommended Hydraulic Dimension			
	name	existing	existing outlet	Slope	10	5	10 y	vears	5 ye	ears
		outlet			years	years	Width (m)	Height (m)	Width (m)	Height (m)
1	Tanghas Lirang Creek	Bridge	H=1.1m, W=4m	1,000	20	17	9.0	2.0	8.0	2.0
2	Sagkahan Creek	Box Culvert	H=1.1m, W=2.6m	1,500	3	2	3.0	2.0	2.0	2.0
3	Mahayahay Creek	Box Culvert	(H=1m, W=1m) x 2	250	11	9	3.0	2.0	3.0	2.0
4	Burayan River	Bridge	H=3m, W=10m	2,000	15	11	10.0	2.0	9.0	2.0
5	Kilot Creek (Payapay Brd.)	Bridge	H=2.8m, W=25.6m	2,000	1	1	2.0	2.0	1.0	2.0
6	Binog(1) Creek	Box Culvert	(H=2m, W=4m) x 2	1,500	13	10	8.0	2.0	6.0	2.0

 Table 2.2-7
 Recommended Hydraulic Dimension

* SCS plus water retarding was applied.

**Applied roughness coefficient was 0.03

(3) River Gate Design

1) **Proposed Locations of river gate**

River gate facilities are proposed to build at the spots where the rivers/creeks would cross the proposed tide embankment for the purpose of protecting the landside against the sea water.

2) Design and operational water levels and depths

In the sections 3 and 4, the reevaluated flow discharges conducted by this Study at the existing bridges and culverts closest to the outfalls are summarized as following Table 2.2-8.

 Table 2.2-8
 Reevaluated Flow Discharges at the Existing Bridges and Culverts

No	tions	Rivers/	Located	Current opening size of the existing bridges and culverts	1/10 year estimated discharge	Recommended hydraulic dimensions at the locations of the existing bridges and culverts		
1.0.	Sec	Creeks	LGUs	closest to the outfalls	at outfalls	Width	Height	Total area
					(m^3/s)	(m)	(m)	(m^2)
1	S-3	Tanghas- Lirang creek	Tacloban city	Aslum bridge Beam type B4.5m×H1.5m	20	9.0	2.0	18.0
2	S-3	Sagakhan creek	Tacloban city	Box culvert B3.5m×H1.0m	3	3.0	2.0	6.0
3	S-3	Mahayahay creek	Tacloban city	Box culvert B1.0m×H0.8m×2	11	3.0	2.0	6.0
4	S-3	Burayan river	Tacloban city	Burayan bridge 1 span I girder type B10.0m×H2.0m	15	10.0	2.0	20.0
5	S-4	Kilot creek (Payapay)	Palo municipality	Payapay bridge 3 span I girder type B(7.8m+10.0m+7.8 m) ×H3.5m	1	2.0	2.0	4.0

6	S-4	Binog creek	Palo municipality	Box culvert No.1 B2.5m×H1.8m×2	13	5.0	2.0	10.0
7	S-4	Binog creek	Palo municipality	Box culvert No.2 B2.7m×H1.7m	As auxiliary of No.1	-	-	To be not smaller than current
8	S-4	Bangon river appendix	Palo municipality	No structure	-	-	-	To be not smaller than current

Source: JICA study team

Thus in sections 3 and 4, the design & operational water depths and the dimensions of gate leaves are proposed as Table 2.2-9 in order to proceed to the Basic Design stage for conducting mechanical, electrical, structural and foundation design.

Table 2.2-9

Design & Operational Water Depths and Dimensions of Gate Leaves

				Proposed dimensions of gate leaves							
		Provisional names of gates		Tentative (To be determined in B/		in B/D)					
No.	Section		Design sea water level	Gate sill elevation	Design water depth	Opera- tional water depth	Width (Clear span)	Height	Nos.	Total area	Туре
			(m MSL)	(m MSL)	(m)	(m)	(m)	(m)	-	(m^2)	
1	S-3	Tanghas- Lirang creek Gate	+4.0	-0.5	4.5	4.5	3.0	2.6	3	23.4	Fixed wheel
2	S-3	Sagakhan creek Gate	+4.0	-0.5	4.5	4.5	3.0	2.6	1	7.8	Fixed wheel
3	S-3	Mahayahay creek Gate	+4.0	-0.5	4.5	4.5	3.0	2.6	1	7.8	Fixed wheel
4	S-3	Burayan river Gate	+4.0	-1.0	5.0	5.0	3.5	2.6	3	27.3	Fixed wheel
5	S-4	Kilot creek Gate	+3.5	-0.5	4.0	4.0	3.5	2.6	1	9.1	Fixed wheel
6	S-4	Binog creek Gate No.1	+3.5	+0.3	3.2	3.2	3.0	2.0	2	12.0	Fixed wheel
7	S-4	Binog creek Gate No.2	+3.5	-0.5	4.0	4.0	3.0	2.6	1	7.8	Fixed wheel
8	S-4	Bangon river appendix Gate	+3.5	-1.0	4.5	4.5	3.0	2.6	2	15.6	Fixed wheel

Source: JICA study team

3) Layout of river gates

At the Basic Planning stage, rough layouts of the proposed river gates are shown as follows.

a) Kilot creek Gate in Palo Municipality



Source: JICA Study Team

Figure 2.2-9

Plan of Kilot Creek Gate



Source: JICA Study Team

Figure 2.2-10 Profile of

Profile of Kilot Creek Gate

(4) Back Water Dike Design

In terms of the tide embankment design, Outlet treatment at river mouth has several options (e.g. flood gate, backwater dike), that will be determined based on river scale, construction cost, workability, social background and so on. As for Bangon River, back water dike will be applied at downstream because DPWH has already started constructing flood protection dike between Bernard Reed Bridge 2 and Bernard Reed Bridge. This flood protection dike targets 50 years return period flood.

1) Design Concept

a) Target Return Period

According to the collected drawing proposed by DPWH, designed flood protection dike aims to mitigate the flood impact that on the scale as such that occurred on March 16 of 2011. DPWH also mentioned that target return period is 50 years.

b) Structure Type

The structure type is earth embankment (unknown height) with forty five (45) degree of slope which is covered with revetment and 60 cm parapet of concrete. Reinforced concrete sheet pile is installed into river bed with 10m depth.

2) Cross Section Design

Figure 2.2-11 shows general design cross section. Basically the river improvement plan designed by DPWH doesn't assume river widening. According to designed plan, river width ranges between forty (40) and fifty (50) meters, which seems to depend on the width of the existing channel. Flood maximum level is fixed with 17.79m though its datum is unknown.



Figure 2.2-11 River Cross Section Designed by DPWH

2.2.5 Box Culvert

(1) Allocation of Drainage Outlet and Discharge Flow (For section 3 and 4)

1) **Policy of Allocation of Drainage Outlets**

Basic policy of drainage outlet allocation is to compensate the current function of drainage outlet. And there are four options for allocation of drainage outlets as follows.

• Option 1: To keep the location and design discharge of existing outlets for the newly installed ones

- Option 2: To keep the location of the existing outlets for the new ones, but to increase the design discharge for the newly installed ones

- Option 3: To combine some existing outlets into new one
- Option 4: To add an outlet for each existing swamp area/ pond along the shoreline and the new tide embankment

Considering the basic policy, the option 1 shall be considered at the first.

2) Necessary Function

The planned drainage outlet should have a function to prevent backwater into landside when the storm surge in addition to drain the rainwater from landside to sea side.

3) Design Discharge for the Drainage Pipe Outlets

The design discharge for the planned drainage pipe outlet shall be equal to or more than the existing one based on the basic policy and the option 1 mentioned above.

The flow capacity for the existing largest drainage RCPCs was calculated using uniform flow calculation method and the result was $1.161 \text{ m}^3/\text{s}$.

Rectangular Box Culvert with 1.0 meter width and 1.0 meter height can accommodate this flow discharge by using a uniform flow calculation method.

(2) Determination of Gate Type

1) Flap Gate

Considering the ease of operation of the gate, flap gate is the most appropriate gate type for prevention of entering sea water to the inland side. However, the maximum size of flap gate procured in the Philippines local market should be researched and considered.

2) Lift Gate

If the outlet dimension is larger than the maximum size of flap gate, lift gate should be considered.

(3) Basic Plan of Drainage Outlet (Number, Location, Dimension and Gate Type)

List of the planned drainage outlets in Section 3 and 4 and flood protection dike section of Bangon River is shown in the following. 42 drainage outlets including rivers, creeks and swamps were listed.

N O.	SE C.	LG U	STATI ON	PRESENT STRUCTURE	PLANNED STRUCTUURE	REMARKS
1	3-1	TC	0+046	1 ROW – 0.610 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
2	3-1	TC	0+131	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
3	3-1	TC	0+307	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
4	3-1	TC	0+378	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
5	3-1	TC	0+430	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
6	3-1	TC	0+492	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
7	3-1	TC	1+364	Aslum Bridge	River Gate	Tanghas-Lirang Creek
8	3-1	TC	1+930	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
9	3-1	TC	2+123	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
10	3-1	TC	2+393	Box Culvert	River Gate	Sagkahan Creek
11	3-1	TC	2+441	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
12	3-1	TC	2+562	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
13	3-1	TC	2+681	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
14	3-2	TC	2+877	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
15	3-2	TC	2+922	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
16	3-2	TC	3+100	Box Culvert	River Gate	Mahayahay Creek
17	3-3	TC	4+382	Burayan Bridge	River Gate	Burayan River
18	3-3	TC	5+493	Open Lined Canal 0.9m(W)x0.8m(H)	1.0m(W)X1.0m(H) RCBC + Flap Gate	
19	3-3	TC	5+422	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
20	3-3	TC	9+702	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
21	3-3	TC	9+748	1 ROW – 0.910 m Ø RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
22	4-1	TC		Box Culvert 2m(W)x0.5m(H)	1.0m(W)X1.0m(H) RCBC + Flap Gate	
23	4-1	TC		Swamp (1)	2X1.0m(W)X1.0m(H) RCBC + Flap Gate)
24	4-2	TC		Swamp (2)	2X 1.0m(W)X1.0m(H) RCBC + Flap Gate	
25	4-2	TC		Swamp (3)	2X 1.0m(W)X1.0m(H) RCBC + Flap Gate	Derrhle (2) Derrole
26	4-2	PL		Swamp (4)	2X 1.0m(W)X1.0m(H) RCBC + Flap Gate	> Double (2) Barrels
27	4-2	PL		Swamp (5)	2X 1.0m(W)X1.0m(H) RCBC + Flap Gate	
28	4-2	PL		Swamp (6)	2X 1.0m(W)X1.0m(H) RCBC + Flap Gate	J
29	4-3	PL	8+850	Payapay Bridge	River Gate	Kilot Creek
30	4-3	PL	9+222	2 Barrel - 2.5m(W)x1.8m(H)x15m(L) RCBC	River Gate	Binog Creek
31	4-4	PL	10+150	1 Barrel - 2.7m(W)x1.7m(H)x12.80m(L) RCBC	River Gate	Binog Creek near Mac Arthur Park
32	4-5	PL		RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
33	4-5	PL		RCPC	1.0m(W)X1.0m(H) RCBC + Flap Gate	
34	4-5	PL	10+893	Swamp (RCBC in the upstream)	1.0m(W)X1.0m(H) RCBC + Flap Gate	
35	4-7	PL		Channel from a Fish Pond	River Gate	Bangon R. left bank
36	NA	PL		Confluence of a Tributary	River Gate	Bangon R. left bank
37	NA	PL		Natural Channel from a Swamp	1.0m(W)X1.0m(H) RCBC + Flap Gate	Bangon R. right bank
38	NA	PL		1 ROW -0.6m Ø RCPC	To Add Flap Gate	Bangon R. right bank
39	NA	PL		1 ROW - 0.910 m Ø RCPC	To Add Flap Gate	Bangon R. right bank
40	NA	PL		1 ROW - 0.910 m Ø RCPC	To Add Flap Gate	Bangon R. right bank
41	NA	PL		1 ROW - 0.910 m Ø RCPC	To Add Flap Gate	Bangon R. right bank
42	NA	PL		1 ROW - 0.910 m Ø RCPC	To Add Flap Gate	Bangon R. left bank
-						

Table 2.2-10	List of the Planned Drainage Outlets of Section 3 and 4
	0

* TC: Tacloban, PL: Palo

2.3 Basic Design for Prioritized Sections

2.3.1 Selection of Prioritized Sections

The section 3 and section 4 have been divided into some sections. In terms of implementation sequence, the selection of leading section that should be started at first within 2015 is required.

In order to select such leading section, Table 2.3-1 was prepared to indicate basic feature of subsections in Section 3 and 4.

			-	
Section	Sub-section	Social Aspect	Technical Aspect	Prioritized
				Sections
	3-1	Many houses within the	No major problem.	
3	3-2	NBZ, and relocation by		
	3-3	Tacloban city is needed.	Deviation of airport road	
	4-1	Land acquisition takes time.	needed during construction	
Prioritized	4-2	No houses, land acquisition	No major problem.	Selected
Sections	4-3	by DPWH is easy		Selected
	4.4	Few houses, land acquisition	From the End of existing ros	Selected
	4-4	by DPWH is easy	to the limit of MacArthur Pa	ark
4	4-5	Few houses, land acquisition	Topographical survey /	
	4-6	by DPWH is easy. Alignment	geological survey is needed	
		exceeds NBZ in some part.	to judge the implementability	
	4-7	Land acquisition time	Technical coordination on the	
		depends on the alignment.	connection of Section 5 is	
		(Alignment not confirmed)	necessary.	

Table 2.3-1Basic Feature of Subsections in Section 3 and 4

Source: JICA Study Team

Based on the above Table, it is recommended the prioritized section is about 2,500m in Section 4. The outline of the prioritized section is explained in the next section.

2.3.2 Prioritized Sections

Prioritized sections selected by DPWH is as follows.

(1) Outline of the Prioritized Sections

The outline of the prioritized sections is shown in **Figure 2.3-1**. Prioritized sections are the sections whose implementation leads among the whole sections. It should be noted that implementation of all sections should be done for the benefit of the project.



Figure 2.3-1 Outline of Prioritized Sections (Leading Sections)

2.3.3 Structures Included in the Prioritized Sections

(1) General Outline of Prioritized Sections

The general outline of the prioritized section is summarized in Table 2.3-2. The prioritized section can be divided into 3 subsection according to their main features. The main features are tide embankment with new road, tide embankment with existing road widening and tide embankment only. They are corresponding to Section 4-2, 4-3 and 4-4, respectively. Regarding the related structures, there are road intersection, flood gate and drainage box culverts, and they are all included in Section 4-3.

Access over the dike will be included in each section according to the basic design.

Section	Length	Main Feature	Road Intersection	Flood Gate	Drainage: Box culverts	Access	
4-2	1.4 km	Tide embankment with new road	N/A	N/A	5 sites	To designed	be
4-3	0.9 km	Tide embankment with road widening	1@North of Payapay Bridge	1@Kilot creek 1@Binok creek	N/A	To designed	be
4-4	0.3 km	Tide embankment	N/A	N/A	N/A	To designed	be
Total	2.6 km		1	2	4		

 Table 2.3-2
 Structure Included in the Prioritized Sections

Source: JICA Study Team

(2) Structures Included in the Prioritized Sections

Structures included in the prioritized sections is listed in the following. River dikes and bridges are not included in the prioritized sections.

Type of structure	Number / Length	Note
Tide embankment	about 2.6 km	Whole sections
Access road	To be designated	Whole sections
Road: New road	about 1.4 km	North of Payapay Bridge
Road: Road widening	about 0.9 km	South of Payapay Bridge
Road: Intersection	1 site	North of Payapay Bridge
Flood gate	2 sites	Kilot creek, Binok creek
Drainage: Box culverts	5 sites	Outlets for swamps

 Table 2.3-3
 Structure Included in the Prioritized Sections

Source: JICA Study Team

2.3.4 Basic Design for Prioritized Sections

Basic design for prioritized sections was finalized by DPWH and contracted local consultant (RASA and DCCD), which was submitted to DPWH HQ on 18th August 2015. Although the scope of JICA's support for the basic design was limited to the prioritized sections, DPWH R8 outsourced the design for the whole stretch of Section 3 and Section 4 to local consultants. The basic design, was therefore prepared for the Section 3 and Section 4, integrating the prioritized sections supported by JICA Study Team.

2.4 Technical Advice for Detailed Design

The detailed design was prepared by DPWH for the prioritized sections described in 2.3.1. The prioritized sections consist of Section 4-2 to Section 4-4 as shown in the Figure 2.3-1. The Section 4-2 was subdivided in 2 subsections, Section 4-2A and Section 4-2B for budgetary constraint.

During the detailed design of the prioritized sections, DPWH had to review the result of basic design to fit the particular conditions of the place where each structure will be located, and to provide the complete set of information needed for the bidding and construction in compliance with their standards. JICA Study Team assisted DPWH in advising technically for the questions asked from DPWH to solve the problem they have encountered. Some of the problems had to be solved only by coordinating with relevant LGU and stakeholders. Thus, JICA Study Team assisted all the meetings between DPWH and LGUs, where other stakeholders were also invited for assistance. Issues assisted by JICA Study Team are explained in this chapter.

2.4.1 Alignment of the Tide Embankment around Macarthur Park and Related Facilities

(1) Promoting Discussion with Palo and Related Stakeholders

The alignment and related structures of, the tide embankment around MacArthur Park required close coordination with Palo Municipality and related stakeholders, since the construction of the embankment will affect not only the scenery of the park as a tourist attraction, but also the future land use and development of the surrounding areas.

JICA Study Team assisted DPWH, Palo Municipality and other stakeholders such as barangay leaders, DOT and Leyte Province, etc. in holding a weekly meeting so that DPWH can present their design and concerns. Projects and plans of each stakeholder are presented likewise to DPWH, which made possible to incorporate tide embankment to other stakeholders' projects and vice versa.

The meeting was chaired by Palo Municipality and co-chaired by DPWH.

(2) The Alignment of Tide Embankment

Concerns arose from Palo Municipality and other stakeholders to DPWH, how the tide embankment will affect the scenery of the Park, since it was not obvious for them the relationship between the height and location of each structures. JICA Study Team assisted DPWH in facilitate the explanation to the stakeholders in helping make the figures and perspectives of the Park to show that the embankment behind the MacArthur park is lower than the shrine and it does not stand as a noticeable wall.

(3) Location of Related Facilities

1) Cycle Lane

It was confirmed by Palo Municipality and other stakeholders that they do not allow cycling within the Park area. JICA Study Team assisted DPWH in proposing the location of the cycle lane, before and after the Park, where the top of the embankment shall not be utilized for this purpose.

2) Ramp for Fishermen

There are many bancas (small boat) for fishery docked on the seashore in Section 4-3. It was discussed during the area management meeting that construction of tide embankment will hamper accessibility to the shore and ramp for fishermen was requested from Palo Municipality and barangay leaders.

2.4.2 Drainage of the Swamp Areas

(1) Design Conditions of Box Culverts in Swamp Area

1) **Design Discharge**

Regarding the swamp area, topographic survey and bathymetric survey were not employed. The volume and extent of the swamp area were not confirmed correctly. Therefore, it is impossible to determine the discharge from the swamp area by using discharge runoff analysis.

JICA Study Team advised DPWH to estimate the discharge from the swamp area by using the specific discharge of six rivers/ creeks calculated in the Basic Planning.

2) Cross Sectional Profile and Invert Elevation

Small-scale sand dunes have been formed at the outlet points from swamps. When the water level of swamp becomes high, swamp water will flow over the sand dune and drain into the sea. Conversely, when the sea water level becomes high, sea water will go into the swamp. For that reason, swamp area has a brackish water environment.

If the invert elevation is set lower than the present top elevation of the sand dune, sand may be piled up as same as the present condition. JICA Study Team advised the invert elevation to be set as the same elevation as the highest point of a river/creek/swamp outlet channel.

2.5 Construction and Procurement Planning

2.5.1 Procurement Planning

The procurement of the Project shall be implemented in the manner prescribed by R.A. 9184, otherwise known as the "Government Procurement Reform Act, and its IRR-A". According to the Act, the Project Procurement Management Plan (PPMP) to be prepared by DPWH shall include the decisions as to the type of contract, the extent/size of contract scopes, the procurement method, along with the expected time schedule for each procurement action.

(1) Phasing of the Project

The Project will be implemented in phases as shown in the Table 2.5-1. Each section will be further subdivided to facilitate implementation and to speed up completion of the Project.

Phase	Contents	Procurement method	Expected time
	(Outline of scope of works)		schedule
2016	Prioritized parts (approx. 5.1 km)	Competitive bidding,	Assumed construction
	among Section 4	Single stage bidding with	period: 12 months
		post-qualification for	from 2016/01
		limited-source bidding	
2017	Remained parts (approx. 3.4 km) of	Ditto	No information
	Section 4		
2018	Sections 3, 5 & 6	Ditto	No information
2019	Sections 1, 2 & 3	Ditto	No information

Table 2.5-1Project Implementing Phase

Source: DPWH

2.5.2 Implementation Schedule

The procurement schedule is prepared in consideration of the followings. The issuance of "Notice To Proceed" for the prioritized parts in Section 4 is assumed at early January of 2016.

- 1) Current progress of the Project (based on monthly status report)
- Necessary time for the remaining works including the prospective issuance of ECC and other licenses/permits procedures
- Necessary time for activities on the bidding and contracting procedures prescribed in Annex "C" of IRR-A,.

2.6 Environmental Aspect

2.6.1 Legal Framework

In the Philippines, any project or activity that may potentially have a negative impact on the environment is subject to an Environmental Impact Assessment (EIA) under the Philippine Environmental Impact Statement System (PEISS).

2.6.2 EIS Report on the Project

EIS report necessary for ECC for this project was submitted to EMB Region 8 on 30th September, 2015, and the ECC was issued on 13th November, 2015 through 3 time deliberations from the end of October to the beginning of November.

2.6.3 Findings and Recommendations

The EIS report was submitted to DENR-EMB on 30th of September 2015, and ECC was issued on 13th of November 2015, through 3 time deliberations from the end of October to the beginning of November. The study team will support DPWH to comply with the terms of license containing environmental management, general conditions, restrictions, etc., such as;

- The proponent shall ensure that appropriate mitigating/enhancement measures and monitoring requirements especially those contained in the EIMP in the EIS Report shall be instituted and strictly implemented throughout the project implementation.
- That should the implementation of the project cause adverse environmental impacts and pose nuisance to the public health and safety, as determined by the DENR-EMB and other concerned agencies, the operation shall be temporarily suspended.
- The project operation shall conform to the applicable provisions of Toxic and Hazardous Waste Act, Clean Air Act, Ecological and Solid Waste Management Act, Clean Water Act.
- The proponent shall designate an Environmental Officer to competently handle environment related aspects of the project.
- Just compensation shall be made to the owner of the property affected by the project.
- The implementation of the Road Heightening and Tide Embankment Project of Tacloban City area shall be held in abeyance until the issue on Resettlement/Relocation of affected settlers shall be resolved.

Chapter 3 Assistance for Updating CLUP Focusing on Building Safer Cities

3.1 Summary of Assistance

Assistance for updating the Comprehensive Land Use Plan (CLUP) considering hazards or natural disasters was implemented as technical advice activity, targeting Tacloban City, Palo Municipality and Tanauan Municipality.

3.1.1 Tacloban City

The assistance was implemented according to the new guidebook issued by HLURB, through several workshops that involves the different stakeholders. Coordination with other donors was established and the approach in building safer city was an input.

(1) **Preparation for Workshop**

Tacloban City was giving considerations on updating CLUP according to the guidelines of HLURB. However, updating all processes incurs a large burden in terms of time, labor, and cost, and the JICA Study Team recommended efficient updating after giving considerations on the minimum steps and participants necessary for updating CLUP. In addition, regarding the 12-step CLUP updating process, examples of ideal steps based on the results from previous fiscal year were given. According to the concept of Building Safer City (BSC), a recommendation was made to adopt a method to proceed with the updating by constantly reviewing and correcting from the viewpoint of DRRM, instead of giving considerations by a simple one-way process from hazard analysis, through spatial planning and to land use planning.



Figure 3.1-1 Conceptual Diagram of Reviewing the CLUP Updating Steps by the BSC Approach

Discussions were held with HLURB as the consultant of Tacloban for preparation for workshops. Donors like USAID, Oxfam, etc. where confirmed regarding the contents necessary for updating CLUP, initiatives Tacloban is willing to implement, and the mission and necessary outputs of each donor, as well as, deliberations were made on the ideal WS and role sharing for the CLUP updating in a short period of time.

In addition, JICA Study Team provided the following technical support to reflect in the CLUP.

- The Tacloban North Master Plan
- Building Code

Tacloban City organized a Technical Working Group (TWG) to explain CLUP updating process and the content on December 8, 2015. JICA Study Team provided explanations with presenting the conceptual diagram of CLUP updating process.



Figure 3.1-2 Conceptual Diagram of Correction and Updating Process

In addition, JICA Study Team shared the Build Safer City (BSC) approach and provided explanations on the content and limits of the hazard map, as well as, safety measures based on the understanding of hazard is important for building a safe city.

(2) Implementation of a Series of Workshop

A series of workshop was held in the following schedule and at the following outline.

Date	Workshop	Outline
January 6-8,	Workshop I	⁻ Finalization of CDRA
2016		⁻ Assessment of the current development plans and the current situation
		of the city
January 13-	Workshop II	⁻ Collection of barangay data
15 and 20- 22		- Area discussion on land use plan
		-

February 1-3,	Workshop III	⁻ Sector analysis
2016		⁻ Deliberation on the direction of land use plan from the viewpoint of
		the sector
February 4- 5, 2016	Workshop IV	⁻ Setting of development policy
February 22 to 24 and March 29 to 31, 2016	Workshop V, Workshop VI	 Detailing of development thrust and land use plan Zoning ordinance

At workshop I, mainly hazard risk assessment was discussed, in order to finalize the Climate and Disaster Risk Assessment (CDRA). The JICA Study Team provided the following technical review.

- How to make hazard maps, how to use them and how to plan the land use in vulnerable areas by introducing the example of Japan.
- Considerations on disaster prevention measures and land use from short-term viewpoint
- Considerations on long-term land use



Figure 3.1-3 Overlay Map of Future Land Use Map with Storm Surge Hazard Map



Figure 3.1-4 Risk Mitigation Measures of Structure/ non-structure Measures

Workshop II was held to share the content of CDRA, assess the current status of the area and review the plans of the barangays. The JICA Study Team explained that discussions for the CLUP by area instead of as each barangay are important, and gave example measures depending on the hazard risk, and recommended to give thoughts on the concept of future disaster prevention measures and reflection on the land use.



Figure 3.1-5 Examples of Plans Presented at the Barangay WS (Photograph)

At workshop III, sector analysis was taken and hazard risks were assessed. In addition, the vision of land use resulted into "A globally competitive, resilient, green City propelled by God-loving, gender-responsive leaders and empowered citizenry." For the discussion on the development policy and spatial strategy, JICA Study Team shared their review of the direction of development and local issues.



Current and future development (3)

Basic View for Future Land Use in Tacloban

- 1. The growth direction of Urban area is Southward.
- Since the South boundary of the City is Palo, where the residential area is dominant, Tacloban's growth will encounter a limitation.
- In terms of the Balanced Development and Disaster Prevention for Tacloban, the development in North Area has been prioritized.
- 4. The sustainable development of the existing downtown is also required.
- 5. Reallocation of the urban function in Coastal Zone such as Cancabato Bay should be considered. Some function of the coastal zone should be transferred to the inland area.

Figure 3.1-6 Analysis by the JICA Study Team on Direction of Development and Vulnerable Areas

Workshop IV focused on the discussion on preferred development thrust, development strategies for the preferred development thrust, preferred development spatial strategies and structure plan map and discussion. JICA Study Team shared their review to the previous workshops and proposed future land use conceptual map.



Figure 3.1-7 Proposed Future Land Use Conceptual Map
Workshop V and workshop VI were aimed at detailing development thrust and land use plan and the zoning ordinance, monitored by JICA Study Team. As a result, Tacloban City decided to make land use plan based on structural measure of embankment and the regulation of the high risk areas that was proposed by the JICA Study Team and was considered as a buffer zone.

(3) Discussion on Area Management

From April to August in 2015, a series of area management meetings were carried out, targeting San Jose area, the land use and strategies to revitalize the local economy were discussed considering the plan of tide embankment project of DPWH. In the meetings, examples in Japan and image or perspectives in Tacloban were shared by JICA Study Team so that participants could have concrete image in making the plan. The process and output of area management was shared with the City Planning office after a series of workshop.



Figure 3.1-8 Image Perspectives Shared for the Plan of Tide Embankment



Figure 3.1-9 Image of Future Zone Use Discussed in Area Management Meetings

(4) Output

Under the CLUP updating work policy of Tacloban to strictly complying with the HLURB guidelines, the planning departments of the city learnt from the JICA Study Team the importance of discussions of the direction of the future land use --viewing from the entire city area, which is a fundamental matter in updating the CLUP and also taking into account the disaster risks.

Tacloban hosted the series of WS, with all the city employees for a deeper understanding on the original objectives for the CLUP updating. This led to the development of ownership of the inputs into the plans of the city and formulate plans by themselves, which brought valuable results. Furthermore, they learned how to make plans based on scientific analysis, which were provided by the JICA Study Team, including the method of combining the scientific and field survey based hazard maps, the screening method for risk lands based on the experience of the Great East Japan Earthquake, and the ideal vertical land use at risk regions. For the barangays, deliberations were made in the future image by including the entire surrounding area, and by capturing the situation of the whole city instead of just looking at the viewpoint of each individual barangay.

As above, the CLUP updating work of the city progressed steadily. The final summarization is expected to be issued in May 2016.

3.1.2 Palo Municipality

Area management approach was introduced and the draft CLUP prepared by the consultant team under the ASEAN project was reviewed. Finally, the area management output was advised to reflect in the CLUP.

(1) Area Management and Formulation of Dream Plan

At first, considerations and realizing the detailed plans was made by the region, then area management was introduced as a method in planning that was agreed by the municipality. An official organization or committee was started, for which an agreement or resolution was created that was initiated by the municipality.



Figure 3.1-10 Palo Area Management Committee

Confirmation and adjustment were made to the DPWH Plan to satisfy the regional requests (e.g., To make it useful in improving the livelihood, addressing of the issue of drainage of inner basin, and enhancement of the rivers) as much as possible instead of a simple tide embankment structure, so that the establishment of tide embankments does not give a negative impact on the region from the viewpoints of BBB.

The meeting of the Committee has been continually held from 14:00 to 17:00, every Wednesday since May. At each meeting, constructive proposals to make the region better from the viewpoints of BBB were presented, based on the structural measures of DPWH. Finally, the Dream Plan was enhanced as Figure 3.1-11 and the combined vision was established.



Figure 3.1-11 Dream Plan Formulated in Area Management Committee in Palo

To realize the Dream Plan formulated by the area management committee, a profile list was made to note the details such as implementer, function, and construction period of each facility. Moreover, a Dream Plan video was made to share a more concrete image of the plan. This video was created for information dissemination to the public.

In addition, based on the idea given by the Mayor, it was proposed to carry out dissemination and public relations along with the customary event of MacArthur Landing that is held in October 20th of each year. As a result, the plan became well known to many domestic and overseas participants of the event, and attracted major attention at the event preparation stage, during the event and even after the event. It was a new dissemination and public relations method with a great impact to the local residents.



Figure 3.1-12 Dissemination and Public Relations about the Dream Plan at the Event of MacArthur Landing

(2) Reflection of the Output of the Activities into CLUP

The direction of the Dream Plan formulated in the area management committee was aimed to be harmonized with draft CLUP. Both of the plans in the coastal areas was considered as an eco-tourism zone, and recommendations were given to promote the tourist development based on its direction. Additionally, instructions were given to propose a plan in the target area including the policies and combined as a Master Plan, so that the plan doesn't end up with becoming a mere compilation of ideas and existing plans.

Because the plan would remain imperfect without any of the results of discussions at the meetings of the Area Management Committee being reflected on the CLUP report, indications were made on the specific items and contents that require additions and corrections, and recommendations were made on the content plans. At a coordination conference inside the Town Hall in which the Mayor participates, a presentation was given on the content of additions and corrections in an attempt to obtain approval from the Mayor and dissemination to and understanding from the relevant representatives.

With covering specific sentence ideas and corrections for the drawings, considerations were also given on enabling swift revisions and corrections.

(3) Output

By introducing the method of area management, opportunities for the relevant parties in the area to gather were regularly held as a meeting for Committee, where discussions were actively held on

various issues that need to be resolved, including the conservation of the historic value of the MacArthur Landing Memorial Park and the ecosystem value of mangrove forest, establishment of rainwater drain facilities as the living environment, and securing the livelihood of the fishermen.

Discussions were comprehensively held on the issues above, the Dream Plan was formulated. It will be reflected on the CLUP of the Municipality that will be updated in the near future. The Dream Plan includes development of service roads associated with the construction of tide embankments by DPWH, establishment of bicycle roads, and establishment of recreational facilities (e.g., sporting facilities, observation towers, and parks (MacArthur Landing Memorial Park)) at areas protected from high tides by the tide embankments. It also includes considerations to the effect of the construction of tide embankments on the livelihood of fishermen, and establishment of promenades that safely enable the preservation of the mangrove forest and for people to enjoy the nature. PR video clips and brochures of the Dream Plan were created, and it is expected that many more relevant parties will come to know about the plan.

3.1.3 Tanauan Municipality

Area management approach was introduced and the output and the plan on road heightening and tide embankment project by DPWH was advised to reflect in the CLUP considering the revitalization of local economies from the view of building back better.

(1) Area Management

For Tanauan, projects were first picked up with designating the area management plan of Palo as the model, centering on measures to improve the livelihood of residents and promotion of tourism associated with establishment of tide embankments. The Area Management Committee started to progress and deliberations of the system below was agreed.



Figure 3.1-13 Deliberation System of Area Management

Regarding tide embankments, adjustments are currently made on paying attention to the continuity with Palo, establishment of flap gate for the estuary, and establishment of river levees such as backwater dikes. The establishment image of the Dream Plan is as shown below, and visual PR materials (video clips) are created separately.



Figure 3.1-14 Conceptual Diagram of the Dream Plan

(2) Reflection of the Output of the Activities into CLUP

The establishment of tide embankments and the specific Area Management Committee induced a major impact on the land use plan, which led to the CLUP update as shown below. It was decided to include these findings into the Handbook as they would serve as a reference for other regions.



Figure 3.1-15 Conceptual Diagram of Land Use Plan Update of CLUP based on Area Management Committee Meeting

(3) Output

Referencing the output of area management at Palo and Tanauan swiftly started up the Area Management Committee under the leadership of the Mayor, and established regular opportunities for the relevant parties in the region to officially gather. It also formulated the Dream Plan with incorporating existing regional plans.

3.2 Formulation of the Handbook as Output of the Activities

(1) Background to Formulate the Handbook

- According to the CLUP Guidebook by HLURB, there are data and additional assessments that are required in updating the CLUP. Therefore, it's challenging for LGUs to update the plan on their own.
- Through the activities related to CLUP updating with some of the LGUs, the JICA Study Team can share the situation and issues of the LGUs above with the central office of HLURB. It was advised that in the Guidebook the whole process is indicated, but the LGU doesn't need to always cover all the contents. According to the meeting, LGU should proceed their planning depending on their situation.
- In addition, the JICA Study Team had supported LGUs for their planning, focusing on "building safer cities." By utilizing the hazard maps as scientific data which shows the vulnerability of the Yolanda affected areas, there were also discussions on the structural and non-structural measures to individual disaster, and by analyzing the proposed land use. The knowledge is expected to be used for not only Yolanda affected LGUs but also other LGUs.
- As a result, the central offices of HLURB and DILG asked the JICA Study Team to share their issues, challenges and recommendations for improvement of the CLUP Guidebook. Therefore, JICA Study Team aimed to formulate a handbook to introduce their activities which worked with Tacloban City and Palo Municipality for the other LGU's planning officer in charge of updating CLUP reference.

(2) Value of the Handbook

- In the case of Tacloban City, the planning officers proceeded in updating their CLUP, by arranging the process in the CLUP guidebook according to their situation and through conducting workshops. Their issues and challenges in the planning are expected to be referred by other LGUs to update their CLUP.
- In the case of Palo Municipality, the municipality applied the area management approach to enhance the area. The land use will be changed integrating the development projects and the tide embankment that will have a huge impact in the land. Their activity can be referred by other

LGUs in order to resolve their local issues, and simultaneously update their CLUP. This is a good example as well, to plan in revitalizing the local economy and to achieve build back better.

• It is expected that the handbook is referred to fine tune the revision of the CLUP Guidebook by applying the different approach and in the mainstreaming DDR in the planning.

(3) Expected Manner of Utilization of the Handbook

- It is expected that planning officers in charge of updating the CLUP who are hesitant and cannot proceed with their activity due to big loads of work can understand visually each step of CLUP revision and proceed in the planning of building safer cities.
- The handbook is handy, therefore, it is assumed that the users can bring anywhere to confirm the contents during workshops or meetings.
- It is expected to be used in the internal meetings of LGU for updating their CLUP or workshop for Barangay, or as a material to explain the planning process or in building consensus.
- It is expected that the users can get advice and resource persons, from Tacloban City or Palo Municipality to introduce advance examples.
- For Tacloban City and Palo Municipality, they can confirm the previous process and share with other officers for the future updating or their capacity building.

3.3 Lessons Learnt from CLUP Update Support Activities

- Lessons
- On updating of CLUP, LGUs require a substantial amount of labor. Formulation of plans based on the guidelines of HLURB basically requires a wide range of activities, including holding of numerous WSs, data collection for updating, deliberations on the policy with all sectors being involved, planning, and application to the land use as a result of planning.
- Therefore, in order to hold WS by itself, LGU will require an immeasurable amount of efforts in terms of the know-how, implementation cost and time.
- This time, the subject LGU was Tacloban, one of central cities of Leyte, which had a certain level of capabilities in the aspects of administrative capabilities and human resources, and implementation by itself would have been possible to a certain extent.
- For other small- and medium-sized local governments, implementation of plan update with strictly complying with the guidelines of HLURB may be considerably difficult.
- Meanwhile, there is a possibility of implementation at a small- or medium-sized LGU for the advantage of the ease of making coordination within the administration for the small number of

sectors involved. However, it still requires human resources to lead the administrative sectors, for which the implementation at Tanauan may serve as a good example.

- Additionally, like Palo, there is a method to outsource the preparation of CLUP and make adjustment based on it. However, it requires thorough adjustment and correction thereafter, or in some cases even considerations on changing the direction. It is desirable to tailor into a characteristic plan by proceeding under strong leadership and wisely adjusting the entirety. Palo is a good example of successfully achieving it.
- Furthermore, it was confirmed at Palo and Tanauan that the Area Management Committee leads not only to CLUP considerations but also to CDP. High expectation can be placed on future utilization. However, continually holding meetings is vitally important for the Area Management Committee, and attention needs to be paid on the fact that staying at the stage of planning considerations will not lead to CDP. It was observed at Palo that gathering of the Committee was poor after formulation of the Dream Plan; Targets are required for continual holding of meetings in the future.
- Looking at the results and output of barangay WS at Tacloban, deliberations were made on contents comparable with the results and output of the Area Management Committee meetings at Palo and Tanauan. At places with such barangay-level planning capabilities or problem solving capabilities, it may be possible to implement barangay area management by advancing one step forward.

	Way of proceeding	Measure	Planning process
Tacloban	• WS based on the guidelines of	Structural	Practice of hazard analysis
	HLURB was held	+	CLUP update plan was considered
		 Non-structural 	by integrating sectoral WS and
			cross-sectoral WS
			Barangay deliberation was held
Palo	• Consultant was entrusted with	 Structural 	 Area Management Committee was
	preparation of CLUP		established
	The CLUP plan above was		
	corrected based on the results of		
	Area Management		
Tanauan	Municipality itself considered	Structural	Area Management Committee was
	updating of CLUP		established
	The CLUP plan was corrected		
	based on establishment of		
	embankments by DPWH and the		
	results associated with Area		
	Management		

 Table 3.3-1 Characteristics of CLUP Update at Each LGU

Improving Disaster Risk Reduction Management Plan

Chapter 4 Activities for Improving LDRRMP

4.1 Summary of Assistance

Assistance for evacuation planning was implemented as technical advice activity, targeting Tacloban City, Palo Municipality and Tanauan Municipality.

4.1.1 Tacloban City

Data related to evacuation center and evacuation centers map were updated and timeline action plan during disasters was formulated.

(1) Monitoring of Evacuation Plan

As a result of monitoring of evacuation plan, data gathering of ECs was completed and the evacuation center map was formulated. Finally, it was validated the shortage of the capacity of ECs compared with the number of evacuees. The need to increase the capacity of ECs or reduce the number of evacuees through pre-emptive evacuation was shared. These data and evacuation center map will be combined into DRRMP of City, but should be updated periodically.



Figure 4.1-1 Updated Evacuation Center Location Map of Tacloban City

In addition, JICA Study Team joined in evacuation drills carried out by CDRRMO on July 25 and August 29 in 2015. Then, JICA Study Team prepared the timeline chart of the evacuation drill on July 25 and shared with the CDRRMO after the drill. The time-series activity and the relation of each activity were confirmed and this chart contributed to introduce the procedure to formulate the timeline action plan as the first step.



Figure 4.1-2 Timeline Chart of Evacuation Drill on July 25

(2) Formulation of Timeline Action Plan

As the result of the prior meeting with CDRRMO, it was decided that the timeline action plan will be formulated by the 11 clusters of the City Disaster Risk Reduction Management Council (CDRRMC). Timeline action plan is the action plan to be taken before and after disasters. Question such as When, How, What are the actions and who among stakeholders will take action were planned in advance. It is expected that the action plan contributes that each stakeholder can take prompt and appropriate actions with close coordination during disaster. Council meeting was held with the participation of JICA Study Team on August 12 in 2015, and the timeline action plan was introduced. The procedure on how to formulate the plan and the process and importance, was presented to the representatives of each cluster by the CDRRMO. During this meeting, the City DILG also introduced the Operation Listo Manual. The timeline action plan was strengthened to harmonize the actions with the DILG manual to ensure consistency with the instruction of the Mayor, coordination within cluster members and with other clusters.

The JICA Study Team and DRRMO discussed the contents of the timeline action plan based on the edited action points and then the draft action plan of 11 clusters was formulated. In addition, some cluster submitted their updated time line action plan and cluster meetings were held, coordinated by CDRRMO and JICA Study Team. Then, the contents of their timeline action plan and the coordination points with the cluster member were discussed.

The draft timeline action plan was validated using the flowchart of DILG manual, utilizing the checklist prepared by JICA Study Team in Figure 4.1-3. After deciding the actions and the particular cluster in charge, it's confirmed by the CDRRMO and their timeline action plan was enhanced by integrating the DILG manual action points. Through these processes, the actions of the various cluster were confirmed and the coordination points for the detailed actions was made.

Check list of	Disaster Preparedn	ess Manual (DILG)														
					Clus	ster 0		C	luster 1		Clu	ster 2	Cluster 3		Others	
		Activity list of the manual	Box	Mayor	A. CDRRM	D. LOGISTICS	B. SEARCH & RESCUE	F. PEACE & ORDER	G. SHELTER/ INFRASTRUCTURE	H. MANAGEMENT OF DEAD BODIES	C. CAMP MANAGEMENT	E. HEALTH & NUTRITION	L PRICE CONTROL & PUBLI INFO CONTROL	J. LIVELIHOOD	K. ECONOMIC	L. LOCAL PEOPLE
Betore	Prepare				<u>^</u>											
(48 nours)	1	Issue directives	A	0	0				<u> </u>							
	2	Convene LDRRMC	D	9		+		+				+				
	3	Prenare administrative and logistical support			<u>0</u>				0		0				0	0
	31	Supply/ seet management			<u> </u>	······	······	+			······	+	Ŭ	· · · · · · · · · · · · · · · · · · ·	ÿ	
	311	Check list of resources needed	CDE	0	0	+										
	312	Check inventory of relief goods/ supplies	0,0,2	ŏ	Ŏ	0					0			0	0	0
	3121	Procure		Õ	Ő	0	0				0	0		······································		
	3.1.2.1.1	Deploy		Ő	Ö	· · · · · ·	Ö	0			Ö	Ő	0			
	3.2	Budget and finance		0	0	0			0	0	Ō	0		0	0	0
	3.2.1	Prepare cash advance/ Vouchers	F	0	0	0						0		0	0	
	Respond	}														
	Cluster 1	Security, lifeline, SRR														
		Search, rescue, and retrieval teams/ Security teams/														
	C1-1	Medical teams/ Clearing operations teams		0	<u> </u>		0	0		0		0				0
	C1-1.1	Mobilize teams and enlist volunteers		0	0		0	0	<u> </u>	0	0	0				
	C1-1.2	Check functionality of equipment	C,D,E		0	0	0	0	0	0	0	0	0			0
	C1-1.2.1	Preposition teams & their equipment	C,D,E		0	0	0	0			0	0				
	<u>C1-1.2.1.1</u>	Deploy teams for operations	Н	0	0	<u> </u>	<u> </u>	<u> </u>				+				l
	C1-1.2.1.2	Secure power, water supply, and communications			0	0	0	0	0	0	0					0
	01-1.2.1.2.1	Chart and water supply lines		0	0		1									
	01-1.2.1.3	Start preemptive EVAC	G	~	0	0	0	0			0		0			
	C1 4 2 1 4	Top the AED, seent quark and manine for assistance		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u>0</u>	Q	Q	1								
	Cluster 2	Humanitarian			Q			······	1							
	C2.1	Evacuation/ camp management						+								
	C2-1 1	Prenare evacuation centers			0						0	+				
	C2-111	Prenosition relief goods to the evacuation centers			0						ő	0				
	C2-1111	Prepare listing/ profile of the evacuees									õ	·····				
	C2-1.1.1.2	Distribute relief packs and conduct mass feeding						0	1		0	0			1	1
	C2-2	Mass feeding and relief distribution						0			Ō	0				
	C2-2.1	Estimate No. of evacuees			0	1					0					1
	Cluster 3	Information and awareness														
	C3-1	Warning, alerts and announcements		0	0								0			
	C3-1.1	Issue alert and warn communities	J		0			0					0			
	C3-1.1.1	Preemptive EVAC			<u>Q</u>	0	Q	0			0		O			
	C3-1.1.1.1	Announce forcible EVAC		0	0	0	0	0								
		Suspension of classes & work														
	C3-1.1.2	Fishing & sea travel ban	J	0												
	C3-1.1.2.1	Stop traffic in landslide prone areas			0				0							
	Monitor/ Report	Manitar alarta	×									+				
	M2	Coordinate operations with clusters 1, 2,8,3	K	~~~~	0											
	M3	Gather reports	K	ŏ	0											
During and	Prepare			- ×	Ŭ							1				1
After	3.1.2.1.1.1	Buy additional resources as needed	F			0					0				0	
	3.1.2.1.1.1.1	Deploy		0	0	0		0]							
	Respond															
	Cluster 1	Security, lifeline, SRR														
		Standby search, rescue, and retrieval teams/ security teams/			_											
	C1-1.2.1.1.1.1	medical teams/ clearing operations teams		0	0		0	0								
	C1-1.2.1.1.1.1.1	Continue operations	Н	0	0		0	0								
	C1-1.2.1.1.1.1.2	Restore power, water supply, and communications		0	0	0	0	0								
	CI-1.2.1.1.1.1.3	Unerrine salety of communities		<u> </u>	Q	<u> </u>	+¥	+¥	↓¥							
	Cluster 2	Humanitarian														
	02-1.1.1.1.1.1	Procure additional relief goods, if needed				+	+					+				
	C2-1.1.1.2.1	Continue relief packs distribution and mass feeding					+					+				1
	Cluster 3	Information and awareness				+		t		+	+	+				
	C3-11111	Advise the public to stay indoors		0	0	+		+	1			1	0			
		Consider lifting:				+		1				1				1
	C3-1.1.1.1.1	Suspension of classes and work Fishing & sea travel ban		0	0								0			
1	Monitor/ Report]				[]			1			[[
	M1.1	Monitor alerts	K	0	0											
	M2.1	Coordinate operations with clusters 1, 2 & 3	K	0	0											
1	M3.1	Gather reports	ĸ	0	0		1					1				

Figure 4.1-3 Check List for Validation by DILG Manual

A Workshop was held to involve related agencies of the 9 clusters to set control action. The control actions of the time series which are prioritized and the important actions for the preparation for the coming of the disaster discussed between February 1st and 5th in 2016 (Figure 4.1-4).



Figure 4.1-4 Example of Workshop Result (Camp Management and Relief Operations Cluster)

As a result, it was ensured that additional revision is necessary because some control actions did not get along with the policy of the City— the evacuation is expected to be completely done 48 hours before typhoon landing. In addition, logistic concern such as, information dissemination and preparation for equipment were not properly allocated. Supported by JICA Study Team, the action plan was revised again by CDRRMO and the importance to share the feedback from the workshop with 11 clusters was confirmed.

The details of the preparation for the DIG, was discussed in the various times of meeting. In the preparation for the DIG, it is assumed that typhoon with the same scale of pressure and maximum wind speed lands by the same route as Typhoon Yolanda.

Under this process, the timeline action plan of Tacloban City was formulated (Figure 4.1-5).

			EMERGENCY SUPPORT FUNCTION (WHO?)											
TIMELINE	ALERT LVL	MAYOR	CLU	JSTER		CLUSTER 1				CLUSTER 2 CLUSTER 3				
Standard time (WHEN?)			A. CDRRM	D. LOGISTICS	B. SEARCH & RESCUE	F. PEACE & ORDER	G. SHELTER/ INFRASTRUCTURE	H. MANAGEMENT OF DEAD BODIES	C. CAMP MANAGEMENT	E. HEALTH & NUTRITION	I. PRICE CONTROL & PUBLI INFO CONTROL	J. LIVELIHOOD	K. ECONOMIC	L. LOCAL PEOPLE
			COMMUNICATION & TRANSPORTATION	MOTOR POOL, PRIVATE CONT &TRANS, PROCUREMENT	TACRU, BFP, TCPO, Green, Delta, Chamber and others, PARA, PRC, AFP, PCG, Coast Guard	TCPO, TACLOBAN SEC, TOMECO BJMP, AFP), CITY HOUSING, CFO, CAO, CPDO CEO	, CITY DILG, CSWD, CHO	CSWD, BRGY. AFFAIRS, CITY DEPED, CSO/FBO, TOMECO	WASH, NUTRITION EMERGENCY, DISEASE PREV, MENTAL HEALTH, GAD	MARKET COMM, CIO, MEDIA RELATION CMO, DTI	PESO, MARKET, CITY VET , CHO CAO, CITY COOP, CLEP	CBO, CITY ACCOUNTING, CTO CPDO	, VULNERABLE AND NOT VULNERABLE
3 days		- Supply assest management	- Prenare Administrative and Ionistic support	rt - Prenare Administrative and Ionistic sunnor	- Secure first respective families	Traffic Control Regulation	Ston Traffic in landslid prone areas	- Prenare Administrative and Ionistic	- Renacking	Prenare Administrative and Ionistic support	-lesue alerts and warns communities	Check inventory of relief goods	Disseminate information to the husiness	- Check inventory of relief anads
(72-48H)		- Chack kills of Resources needed - Chack kills of Resources needed - Chack kills of Resources needed - Nearen - Waming, alerts and announcemen - Issue alerts and warms communite	Supply assessmentagement Checkids of Resources needed Checkinenby orfelief goods the Procure Budget and finance Prepare cash advance / Vouchers Prepare cash advance / Vouchers Standa the number of Barangay Winning, alerts and announcement Issue alerts and warms communities	-Procure - Buy additional resources as needed - Prepare evacuation centers	Take lead in the mobilization and deployment of response learns in the city Prepare Administrative and logistic support Check functionality of equipment Procure other needs	- Warn Residentsbusiness establishment to avoid parking in downtown area and tother low-lying prone to flood -Issue alefs and warns communities - Stop Traffic in landslid prone areas (TOMECC)	Operation 'bakas-billboard Operation 'bakas-billboard Operation 'bakas-billboard Operation 'bakas bakas	support I - Mobilae teams and entist volunteers -Prepare listing/ profile of the executees	Prepare Administrative and logistic suppor - Check inventory of relief goods Procure Purg additional resources as needed - Mobilize teams and enlist volunteers (Youth) - Prepare evacuation centers - Estimate the number of Barangey	Supply asset management Oreckist of Resources needed Procure Mobilize teams and enlist volunteers Skeletal force of hospital: emergency needs and genesis ready - Activation of referral system POR WSA: ensure water and the supply Comfort rooms ready and available	- Buy additional resources as needed		sector or plans of CDRRMC related to imoending hazard	- check stability of structure - reinforce weak infrastructure - secure house before exclusion - prepare GO BAG
2 days (48H)	(Pre-emptive Evacuation) -Coastal or Danger Zones	- Suspension of classes & work - Deploy (shifting to secure family) - Budget and finance -Prepare cash advance / Vouchars - Mobilize Itams - Tap the AFP, coast guard, and marina for assistance	Deploy (shifting to secure family) Mobilize teams and entist volunteers: Check functionality of equipment Give pre-emptive evacuation advice Tap the AFP, coast guard, and marina for assistance - Evacuation' Camp Management - Preposition relief goods to the evacuation centers	- Budget and finance -Prepare cash advance / Vouchers -Check functionality of equipment -Assist in the pre-emptive evacuation	Deploy (shifting to secure family) - Mobilize teams and entity voluntiers: - Check functionality of equipment - Assist in the pre-emptive evacuation - evacuation/ Camp Management - Fishing & sea travel ban (Coast Guard)	Monitor food and landslide prone areas Monitor roads, bridges and other areas for flooding and landslides Deploy (shifting to secure family) Mobilize teams and entist volunteers Oneck functionality of equipment -Assist in the pre-emptive evacuation -Tap the AFP, coast guard, and marina br assistance	- Budget and finance -Check functionality of equipment	Coordinates with NBI (in cases of natural disasters) or PNP Crime Laboratory (in cases of mass stellarly incidents caused by tumma generated cervities) (or Dasater Victim Identification (DVI), NBI or PNP must provide Local Health Officer an official list of identified and unidentified victims - Budget and finance - Perpare cash advance / Vouchers -Check functionality of equipment	Record individuals with disabilities and ensures heir accessibility to use facilities at the evacuation center -Coordinate the operations of the different task forces relative to transport and evacuation needs - Conduct pre-emptive evacuation before impact the evacuation before impact to evacues - Deptory (shifting to secure family) -Budget and finance -Check functionality of equipment -Assist in the pre-emptive evacuation -Preposition relief goods to the evacuation centers	- Deploy (shifting to secure family) -Budget and finance -Obeck functionality of equipment -Preposition relief goods to the evacuation centers	Responders and department heads must be present in pressoons and media briefings - Furnish CIO with updates by the clusters on proposed, orgoing and completed activities - Deploy (shifting to secure family) - Check functionality of equipment - Warning, alerts and announcement	- Budget and finance	-Budget and finance proposed - advice business sector to provide services as long as they can	
< 2 days (36H)		- Preposition team and their	Preposition team and their equipment Delow teams for operations	Preposition team and their equipment Deloy teams for operations	- Preposition team and their equipment	-Provide security PNP personnel in matters of official dispatch such as: force evacuation and	- Secure power, water Supply, and communications	- Secure power, water Supply, and communications	Preposition team and their equipment Secure power water Supply and	Preposition team and their equipment Secure power water Supply, and	-Disseminate information on the pre-		coordinate with TCPO regarding	- Secure power, water Supply, and
2H 50M	1	- Deloy teams for operations	Coordinate power, water supply, and communications	- Secure power, water supply, and communications	 Secure power, water supply, and communications 	other related activities Schent timely situational report to CDRRIKO Baveise he Regional Headquarters - Provide immediate assistance to other concerned agencies as the need arises - Confluxe monitoring in all areas of concerned area at a ba accounting of personnel delotyed - Proposition team and heir equipment - Deloty teams for operations - Secure power, water supply, and communication - Secure power, water supply, and communication	4		communications	communications				emptive evacuation
1 day (24-19H) 1H 50M	Alert Level 2 (Forcible Evacuation)	Order or assist in Forcible Evacuation Go to the field to survey the danger zones	-Announce/assist in forcible evacuation	-Assistin fre forcible evacuation	Assist in the forcible evacuation	-Assist in the forcible evacuation	Deliver potable water to the evacuation center(CEO)		- Conduct brobble evacuation in coordination with the PNP and P A	Provide medical teams strategically with EC	s Brings the quilie to give induce			Stay indoors in sturdy houses or evacuation center
(18H) 1H 10M	3	- Advise the public to stay indoors	- Advise the public to stay indoors						Supervise all evacuation centers - assist individuals/ families at EC - provide and hourly state report if		- Advise the public to stay indoors		all business establishment should prepare or close secure basic commodities	Stay indoors in sturdy houses or evacuation center
(0-12h) D U R I G	4 (STAND BY)	- Standby	- Standby	- Standby	- Standby	- Standby			possible					Stay indoors in sturdy houses or evacuation center

Figure 4.1-5 Formulated Timeline Action Plan of Tacloban City

(3) Output

The outputs of these activities are noted below:

1. Location and safety of evacuation centers were confirmed and evacuation center map was formulated.

2. Timeline action plan was formulated.

The data collection related to evacuation center was continued as part of the activities of the first year, and there were various activities for recovery and reconstruction that was carried out. In line with this, the situation drastically changed from the time the City was affected by Typhoon Yolanda. From the series of changes, especially before and after Typhoon Ruby, there were continuous data collection and revision, until finally the list of evacuation centers and evacuation map was enhanced to fit the current situation. As a result, the issues were addressed and further preparation was visualized.

In addition, there was a progress in the DRR management of the city, it's not anymore focused on the implementation of the evacuation drill, because the preparation activities from disaster includes actions that are not just focused on evacuation. The timeline action plan enhanced the contingency plan of the City, and helps in utilizing the existing system of the DRRMC and 11 clusters in the LGUs.

In the process of formulation of timeline action plan, the discussion about control actions as an important action in the coordination between clusters were conducted. It was shared that regarding preparation during disaster, it's important that these actions are not only understood by the CDRRMO but all the cluster members should know these actions to have a common goal. This is also considered, as a useful output for the future update of the DRRMP. In addition, preparation for Disaster Imagination Game is expected to contribute to the detailed coordination between clusters for the further revision of a more realistic plan.

Through these activities, regular meetings to convene the cluster member must be established. It's an effective way for the preparation of activities for the disaster risk reduction management.

(4) Challenges, Elaboration and Lessons Leant during the Assistance

- Constant updating of the progress and information sharing
- Coordination and involvement with various related persons and prioritization of the control action points.

The timeline action plan should be harmonized with existing city plan, such as, CDRRMP. The actions considered should be based on the existing plan, experiences, and lessons learned. In particular, the action points in the Timeline Action Plan was formulated based on existing system and experience of CDRRMC that was fined tuned continuously. There were opportunities for the CDRRMO to promote and present the progress periodically with the cluster members, using occasion such as workshop for the CLUP revision.

CDRRMC is composed of 11 clusters and there are a number of agencies of cluster member. In the council meetings, only representatives from each cluster joined, during the workshop participants from many agencies were convened, and for the cluster meeting the member of each cluster joined. These meetings were conducted, coordinated and facilitated by the CDRRMO. In addition, control actions which are important for preparation for disasters were focused and prioritized so that necessary coordination can be effectively discussed.

4.1.2 Palo Municipality

Assistance for updating evacuation plan was implemented, focusing on evacuation in coastal barangays.

(1) Confirmation of ECs

Palo Municipality continued in updating the ECs' data from 2014. DRRM officers (DRRMO) in Palo visited Barangay captains and asked their cooperation to identify buildings to be able to use as ECs. And with their cooperation, they also discussed an agreement with owners and managers of the buildings for the use of their buildings as EC. JICA Study Team proposed to identify the location of ECs on the maps, and location-maps of ECs in the Barangay were prepared in cooperation with the Barangay captains.



Figure 4.1-6 Sample of Location Map of ECs in Barangay (San Joaquin)

The mapping was prepared for the Barangays located in the coastal area, these areas are known as the inundation area during storm surge from the experience of Typhoon Yolanda. Therefore, ECs for coastal Barangays should be located outside of the storm surge hazard area. JICA study team advised to find ECs in the neighbor Barangays that is located outside of the hazard area, and reviewed the steps of evacuation planning with the Technical Working Group (TWG).

(2) Confirmation of Procedure for Evacuation Planning

Based on the proposal and coordination by CRS, Palo Municipality arranged a TWG monthly meeting for DRRM every first Friday of the month at 2:00 pm. JICA Study Team explained and confirmed the evacuation planning policy and procedure during this meeting.

The first meeting of DRRM was held on 6th November, 2015. The new DRRM officers of Palo that was assigned on August and all the members involve with DRR were introduced first in this meeting. JICA study team presented the supported activities of 2014. The contents are shown below.

- Outline of JICA support through this project.
- Confirmation of evacuation planning procedure
- Confirmation of contents which was done
- Confirmation of target hazard and evacuation planning policy
- Explanation of contents of evacuation planning
- Present the important points of evacuation planning for LGU

Typhoon was confirmed by the members, as the target disaster for the evacuation plan during the meeting.

The second TWG meeting of DRRM was held on 4th December, 2015. The progress and contents of the evacuation planning was reviewed and next steps were confirmed.

In Palo Municipality, since the coastal Barangays and flood prone Barangays were already designated, character of storm surge and flood were analyzed and evacuation policy during typhoon was established.



Figure 4.1-7 Target Brgys in Palo for Evacuation Planning

Figure 4.1-8 Evacuation Planning Policy of Palo

From the experience of Typhoon Yolanda, coastal Barangays were recognized as the barangays that needs to evacuate outside of the storm surge hazard area. On the other hand, inundation depth by flood is mostly less than 1 meter and the inundation speed is slow over time, it means mostly it is not flash flood. Therefore if there is no possibility of flash flood, it seemed that staying on the 2nd floor of a strong building can be done against flood in case of Palo. Since PAGASA will issue storm surge alert, the evacuation policy for coastal Barangay is decided;

When the storm surge alert is issued, immediately evacuate outside of the hazard area.

JICA study team pointed out that LGU should support the evacuation plans of the Barangays which needs to evacuate outside of their Barangays. Therefore, Palo Mayor instructed the DRRMO to focus the technical support of coordination between coastal Barangays and receiver Barangays

(3) Coordination with Evacuation Plan of LGU and Coastal Barangays

Though the third TWG meeting of DRRM was supposed to be held in January, it was canceled due to difficulty of schedules with the Mayor and DRRM Officers. Therefore, the progress was confirmed in individual meeting with DRRM Officers.



Figure 4.1-9 Evacuee BRGYs and Receiver BRGYs

The DRRM Office confirmed safety and capacity of ECs located outside of the storm surge hazard and designate Barangays which can receive evacuees from coastal Barangays. The Mayor instructed that one receiver Barangay is assigned for one evacuee Barangay to avoid confusion of evacuation. Finally, following combination was proposed considering distance and capacity of ECs.

Based on this proposal, LGU continuously discuss with the Barangays to coordinate the details. As for the next steps, Barangays need to prepare evacuee's list for each EC, coordinate plans of camp management, formulate evacuation plan and conduct evacuation drills etc. And these contents are expected to reflect to their BDRRMP. LGU is expected to support Barangays effectively with cooperation of CRS and Handicap International who are supporting Barangays in their individual projects.

Evacuee Brgy.	No. of Household	Receiver Brgy.
Candahug	377	Pawing
San Fernando	391	Campetic
Baras	980	Guindapunan

 Table 4.1-1 Evacuee Barangays with Household Numbers and Receiver Barangays

Salvacion	550	Arado
Cogon	754	Cavite East
San Joaquin	531	Cavite West

Table 4.1-2 ECs for Brgy. San Joaquin (in Brgy. Cavite West)

Coastal Brgy.	Population (Household)	Receiving Brgy. Cavite West	Capacity (Household)	Distance (from the coastal brgy. To receiver brgy.)
San. Joaquin	531	Palo National High School (ICOT Bldg.)	135	2.9 km.
		Palo National High School (Academic Bldg.)	200	-do-
		Palo National High School (Gym)	150	
		Palo National High School (USAID Bldg.)	50	
		Total	535	



Figure 4.1-10 Sample of Evacuation Route (From Brgy. San Joaquin to Brgy. Cavite West)

(4) Output

As output of these activities, following are found:

- 1. The draft evacuation plan was formulated with LGU policy which was shown clearly
- 2. Evacuation planning beyond Barangay boundary started to formulate as the LGU plan.

Before typhoon Yolanda, LGU had never experienced such as a huge disaster which affected beyond the Barangay boundaries. Therefore, the evacuation plan of LGU did not consider the situation as a whole area of one Barangay affected or several Barangays affected at the same time. However, through

the experience of typhoons and understanding the hazard map, the LGU was able to confirmed that most of the coastal Barangay will be inundated more than 1m in case of worst scenario, so the need to evacuation beyond Barangay boundary was considered.

Palo Municipality understood that coastal barangays need to find inland barangays which can accept evacuees. LGU needed to show the policy for arrangement among Barangays, and to support coordination between evacuee barangays and receiver Barangays and the appropriate allocation.

Through these activities, LGU can visualize the whole picture of the Municipality, and show the evacuation direction to the Barangays. Then LGU could instruct the evacuation plan to the Barangays ---these results can be said important outputs. Furthermore, it is significant output that LGU proposed concrete combination between evacuee Barangays and receiver Barangays utilizing the EC lists which were collected and organized by much effort of DRRM Officers.

(5) Challenges, Elaboration and Lessons Leant during the Assistance

Through the support in 2014, the LGU recognized the image of evacuation plan, so they've started to collect detailed data in the ECs such as location, safety and capacity by communicating with Barangay captains and building owners. At first the view of the municipality was focused on the actual number of evacuees per barangay, but as LGU they should focus more on the whole picture of the evacuation plan, one important point to consider is identifying the barangays that are capable in receiving different barangays during disaster. Therefore, the whole picture of the plan was confirmed several times using the map of municipality.

In 2015, Barangays had listed up ECs inside of their Barangays. They are considering strong building with second floor as ECs. However, some ECs located in the inundation area and can experience more than 4m depth based on the hazard map. Therefore, the JICA study team utilized the opportunity of TWG meeting and explained that in the coastal area, people the need to evacuate outside of the Barangay for safety, and tried to make all members of TWG to have consensus for the evacuation plan. Through this meeting, all the members including INGOs were able to recognize the Barangays which are vulnerable, not safe and needs to evacuate outside of their Barangay.

The above TWG meetings was proposed and coordinated by CRS, and held at the Municipal Hall. Through this meeting, all related people had an opportunity to know each other and share same information among the members, and also the Mayor could instruct and decide the next actions during the meeting, which was very efficient. The periodical TWG meeting and coordination was indeed useful and one of the important lesson learned.

(6) Issue and Recommendation for Future

At the current moment, combination between evacuee barangays and receiver barangays were proposed. As next step, LGU will continue to discuss with the Barangays and aims to make agreement officially as receiver Barangays.

After sealing the receiver Barangay, the evacuee Barangay prepare lists of evacuees from each EC, and confirm the evacuation route. In this stage, disaster experience and social situation etc. in both Barangays should be considered. It needs to be arranged so that the plans would not become too heavy for each barangays. Based on the basic plan, Evacuation for PWD should also be considered. So the evacuee Barangay and receiver Barangay needs to link their plan and camp management plan. LGU needs to support Barangays so they can prepare their evacuation plan considering good coordination between the two (2) barangays.

As LGU level planning, after preparing the basic plan such as "Where to go?", LGU formulates can proceed to Timeline Action Plan (TAP) and identify "When," "Who (including organization)" and "How" to act during disaster. This is important in order to prepare concrete plans to know "how to support" the evacuation of Barangays. Since the timeline action of LGU and Barangay needs to be linked well, the coordination and instructions from the LGU need be included as well.

For the efficient implementation, it is recommended that the plan of LGU links with the activities of CRS and other INGO etc., for example, the training of B-DRRM will be conducted together with evacuee Barangay and receiver Barangay to provide chance of coordination with the each plan, and also if the evacuation drill will be conducted together with these Barangays, it is helpful to coordinate their evacuation plan.

According to the monitoring interview on March 2016, LGU already started coordination with Barangays. And evacuation drill with evacuee Barangay and receiver Barangays has been planned on 24th April, 2016 to be conducted.

4.1.3 Tanauan Municipality

(1) Confirmation of Evacuation Centers

Tanauan Municipality has been updating the EC data continuously since 2014.. Through JICA workshop in 2014, Tanauan confirmed that the capacity of the ECs is not enough wholly. Therefore, they considered the 12 newly constructed buildings donated from different government and non-government agencies as ECs with preparation of camp management responsibilities.

BARANGAY /LOCATION	FROM WHAT BARANGAYS ARE THE EVACUEES	ESTIMATED NO. OF EVACUEES	HAZARD	DONOR OF EC
CALOGCOG	Calogcog & Sta. Cruz	500 people	Super Typhoon, Flood, Storm Surge	UMCOR
ΜΟΗΟΝ	Mohon	500 people		UMCOR
EVSU-TC	San Miguel	500 people		UMCOR

Table	4.1-3	List	of	New	ECs
Lanc		LISU	UI.	11011	LUS

CANRAMOS ELEMENTARY SCHOOL	Canramos & Bilsig	500 people 400 people	UMCOR & RED CROSS
CABUYNAN	Cabuynan	500 people	ITALIAN (construction on-going)
CAMIRE (2 Bldgs)	Camire	350 people	JICA
BRGY. HALL – SAN ROQUE	San Roque	350 people	Fuji Oil Co., Ltd., Japan
CABUYNAN ELEM. SCHOOL	Cabuynan	400 people	
ASSAC	Magay	300 people	
TNHS	Sto. Nino	1000 people	
TSCHI	San Roque	1000 people	
TAN I CENTRAL SCH.	Buntay	1000 people	
TOTAL ESTIMATEL BE ACC	O NO. OF EVACUEES TO OMODATED	7,300	

However, since DRRMO of Tanauan did not grasp detailed situation of ECs in the Barangay level, they did not consider the coordination between ECs of LGU and ECs of Barangays. Therefore blank map of the Barangays and list were provided to Barangay chairman through the periodical assembly of the chairman, and requested to plot the location and condition of ECs on the map. However, only 8 Barangays were submitted. (in October, 2015) The submitted lists of evacuation centers of the Barangay chairmen also specified the camp manager, capacity, safety of the building, kind of facilities and identified Barangay evacuees.

From this situation, the data of the location based map from eight (8) Barangays and from the LGU was prepared by JICA study team. A narrow showed where the evacuation centers direction, and the evacuation planning situation was confirmed on the map.





Figure 4.1-11 Brgys Submitted List of ECs in Tanauan

Figure 4.1-12 ECs Location and Evacuation Direction in Tanauan

As a result, since the unclear evacuation direction was shown, the target hazard for the evacuation plan would be confirmed again. And it was confirmed that the evacuation plan of LGU and Barangay were not coordinated and was prepared individually.

JICA study team recommended to the DRRMO that it is better to confirm the policy and priority of evacuation planning with the Mayor and with the Municipal Planning Office for better coordination.

(2) Confirmation of Steps for Evacuation Planning

Through a presentation made by JICA Study Team during the TWG meeting on 9th of December, in which JICA incorporating the activities that were completed already and confirmed the activities for next steps.

At first, types of the existing hazards in the Municipality were confirmed, and then priority hazard for evacuation planning were also confirmed. In the case of Tanauan, flood occurs frequently, nevertheless the affected area is huge, and however the depth of the inundation is mostly less than 1 meter only. On the other hand, for storm surge case, it does not occur frequently but the inundation depth is deeper. Some Barangays are inundated more than 1m. . These situations confirmed the type of hazard present in the Municipality. Yet, evacuation planning in all types of hazard that might occur in the Municipality should be prepared considering different strategy to avoid confusion. Therefore, as a first step in planning, the LGU focused on a typhoon hazard, prioritizing the selection of the Barangays which are needed to evacuate outside of their Barangay.



Table 4.1-4 Hazard and the Character in Tanauan

Figure 4.1-13 Hazard and Evacuation Policy of Tanauan



As the result of this input, following policies were systematized by the LGU.

- Coastal Barangays are prioritized and designated to evacuate outside of their Barangay.
- In flood prone Barangays, those in a higher risk, evacuate to the ECs which is outside of their Barangay or designated ECs.
- In middle or low risk area of the flood prone Barangays, they evacuate to the 2nd floor or designated ECs.
- Against landslide, evacuate to the designated ECs.

It was reported from DRRMO that when typhoon Yolanda occurred, the area from 1.5 km from the shoreline was inundated by the storm surge, therefore the "Coastal Barangays" were estimated 2.0km from the shoreline considering the worst case scenario.

It was confirmed that MDRRMO has discussed this with the Barangay chairmen based on this policy, and then after having an agreement between the LGU and Barangay, they will officially create an MOU (Memorandum of Understanding). However, the concrete lists of evacuation centers are still under preparation, it is necessary to confirm the coordination between the Plan of the LGU and the Barangay plans.



Figure 4.1-15 Evacuation Planning Policy

(3) Timeline Action Plan of LGU Level

JICA study team suggested the necessity of planning in terms of "when, who and what to do" if in case there is an upcoming calamity, this kind of planning is called "Timeline action plan", since this kind of planning has already been introduced to the City of Tacloban, the Municipality Mayor of Tanuan decided to adopt this kind of planning and requested to JICA to share the process and asked for a technical support from the study team.

Therefore, JICA study team introduced the "Importance of Timeline Action Plan" to the MDRRMOs, and suggested to hold a cluster meeting as soon as possible. The first cluster meeting was held on 14th of December, 2015. MDRRMO explained the importance of "Timeline Action Plan" to the cluster members, and elucidated the roles of each cluster.

The second TWG meeting was held last14th of January. Prior to the meeting on January 14th, the JICA study team had a meeting with MDRRMO on 13th, January. During the meeting, it was confirmed that

only three clusters who submitted their draft of timeline action plan. As the result of the meeting with MDRRMO on that day, it was decided that DRRMO would make a follow up to appeal to the clusters to urgently submit their action plan. JICA study team proposed to DRRMO that the importance of "Timeline Action Plan" will be explained again during the cluster meeting since cluster members are expected to attend the TWG meeting on 14th January,

During the TWG meeting, following planning points were laid out;

- It is better to visualize Cluster relationship in a diagram method, and analyze each relation.
- LGU showed the actions as control point.
- Movement will be organized through each perspective on how to let the "people, things and information" mobilize smoothly.
- Arrange actions of each cluster considering the control action points mentioned above.
- Since DRRMO is the controller and logistics is the system that supports the "mobilization", action plan of these two clusters should come first.

The example contents of "Control action point" are as follows

- a. When to establish the DRRMC?
- b. When to start the evacuation,
- c. When to finish the evacuation etc.,

(4) Output

Out puts of these activities are listed up in following.

- 1. LGU decided evacuation planning policy
- 2. Draft of the Timeline Action plan of LGU level is formulated.
- 3. Control action points were shown.

Prior to the Typhoon Yolanda, flooding is the most serious and frequent disaster in the Municipality of Tanauan. As a result of the experience of the typhoon, LGU had to prepare flood and storm surge evacuation plan. In case of typhoon, since it has possibility to occur storm surge and flood at the same time, the evacuation policy mentioned previously was set through the activities. It is valuable that LGU made clear of the policy that those areas that is in a high risk should evacuate outside of the hazard area.

Regarding "timeline action plan", the action plan of each cluster was submitted. Each cluster considered their action plan with time frame as a significant result. Though the timeline action planning just started, the action plans of all clusters were drafted in one table is one of the important steps.

(5) Issues, Challenges and Lesson Learns for Implementation.

• As a Municipality, they had basic idea such as: area is in a coastal or in a flood prone; however they had not taken effective planning procedure based on this idea. Therefore, types of hazard and the evacuation policy shown to the Barangay was reconfirmed Prioritized Barangays and evacuation planning steps were made clear based on the above policy.

In the Municipality of Tanauan, "disordered evacuees" arisen during Typhoon Ruby last Dec. 2014, and the importance of evacuation planning was recognized at that time. Because of this experience, each Barangay addressed in identifying additional evacuation centers in their own Barangays. However, DRRMO and Barangay chairmen can only identify the estimate number of evacuees, it only means that evacuees have to find by themselves their own evacuation center, and also the LGU did not grasp in supporting the evacuees the proper evacuation planning.

In this situation, since the "unsystematic evacuation process" cannot be resolved it is needed that the LGU understand the importance to have a policy on evacuation planning, and roll it out to the Barangays. Therefore the process of evacuation planning and actual plan was anticipated through utilization of the map, and the issues will be addressed easily.

Visualizing the issues on the maps is an effective way in showing spatial situation. It can be understood easily just at a glance, e.g. classification of types of hazard each area. Therefor maps were utilized.

(6) Issues and Recommendation for the Future

Worst case scenario should be considered in evacuation planning against typhoon. Therefore, it should be considered that storm surge and flooding will occur at the same time. Some of the Evacuation route passes along the coastal and flood prone areas in which this should be taken into consideration in planning. Therefore the LGU should give proper orientation to the evacuees on the safe evacuation route.

The evacuation planning of coastal Barangays were taken over by some of the INGO's. Since, their target area are those in the coastal and flood prone only, LGU have to include the receiver Barangay assigned for the evacuees from the coastal and flood prone areas in planning for better coordination and smooth evacuation process.

For timeline action plan, all of the clusters already submitted their action plans. Next step is to identify the coordination of each cluster and understand each relation by considering the mobilization of "People, Things and Information"

4.1.4 Utilization of Knowledge and Output of the JICA Project

The knowledge and output obtained in Tacloban City, Palo Municipality and Tanauan Municipality through the JICA Project were compiled as support document for DILG manual and shared with relevant agencies. DILG manual notes the preparation action of 48 hours before and after typhoon coming. It is expected the document will be shared with other LGUs so that they can refer to the

document to formulate detailed action plan of preparation for disasters and coordinate with relevant agencies in advance. The presentation materials used for input by JICA Study Team were mainly compiled in the document.

Quick Impact Projects

Chapter 5 Quick Impact Projects

5.1 Objectives

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.

5.2 Project Formulation

In terms of project formulation, 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.

Principle 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				
(2) Utilization of Knowledge and Technologies of Japanese Skilled Builders				
(3) Synergetic Effect with Grant Aid projects				
Principle 2 Supporting the Regeneration of Livelihood Activities and the Community				
(1) Regenerating Livelihoods of Coconut Farmers				
(2) Regenerating Livelihood of Fisherfolk				
(3) Regeneration of Local Small-Scale Industries				
Principle 3 Strengthening Public / Community Facilities and their Disaster Resiliency				

Table 5.2-1Principles of QIPS

Source: JICA Study Team
5.3 QIPs Outline

5.3.1 QIPs Phase One

The location and contents of prioritized QIPs selected in the first phase are indicated in Figure 5.3-1. and Table 5.3-1, respectively.



Figure 5.3-1 Location of QIPs in the First Phase

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QIP No.	Priority Group	Municipality	Project Name	Main Counterpart Agency	Supporting Agency	Remarks
QIP-1	Ι	Basey	Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish Culture)	BFAR		
QIP-2	Ι	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	Ι	Tanauan	Integrated Culture of Oyster and Milkfish Improvement for Sustainable Aquaculture and Livelihood	Municipal Govt. of Tanauan	BFAR	

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: Visayas State University

List of Selected QIPs

Note:

5.3.2 QIPs Phase Two

Priority projects selected for implementation as QIP phase two are as listed below. Furthermore, the locations of individual QIPs are indicated in Figure 5.3-2.

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

The QIP is an extension of the activities of Phase 1.

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.

Site / Main Counterpart: Basey / Basey LGU

Expected Output:

- 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

(2) QIP-3: Regenerating Local Livelihoods through Processing of Agriculture and Fishery Products by Small-Scale Community Groups

The QIP is an extension of the activities of Phase 1.

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.

Site / Main Counterpart: Tolosa / Tolosa LGU

Expected Output:

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.

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

The QIP is an extension of the activities of Phase 1.

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.

Site / Main Counterpart: Guiuan / Guiuan LGU

Expected Output:

- > 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

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

The QIP is an extension of the activities of Phase 1.

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.

Site / Main Counterpart: Mercedes / Mercedes LGU

Expected Output:

- > 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.
- 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.

(5) QIP-15: Integrated Culture of Oyster and Milkfish Improvement for Sustainable Aquaculture and Livelihood

The QIP is an extension of the activities of Phase 1.

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.

Site / Main Counterpart: Tanauan / Tanauan LGU

Expected Output:

- > 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) QIP-16: Training on Disaster Resilient Construction Technologies through Reconstruction of Elementary School

The QIP is newly formulated for implementation in Phase 2.

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.

Site / Main Counterpart: Tanauan / TESDA

Expected Output:

- 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

(7) QIP-17: Training on Disaster Resilient Construction Technologies Through Reconstruction of National Agriculture School (Phase 2)

The QIP is newly formulated for implementation in Phase 2.

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.

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.

Site / Main Counterpart: Balangiga / TESDA

Expected Output:

- > 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.

(8) QIPs-18: Recovery of Rural Health Service Through Reconstruction of Rural Health Unit (Abuyog)

The QIP is newly formulated for implementation in Phase 2.

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.

Site / Main Counterpart: Abuyog / Abuyog LGU

Expected Output:

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

(9) QIPs-19: Recovery of Rural Health Service Through Reconstruction of Rural Health Unit (Dulag)

The QIP is newly formulated for implementation in Phase 2.

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.

Site / Main Counterpart: Dulag / Dulag LGU

Expected Output:

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

(10) QIPs-20: Construction of Processing Plant for integrated Culture of Oyster and Milk Fish Improvement for Sustainable Aquaculture and Livelihood

The QIP is newly formulated for implementation in Phase 2.

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 are not able to get approval for the fishery products processing facility from BFAR, and therefore they cannot 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.

Site / Main Counterpart: Tanauan / Tanauan LGU

Expected Output:

- ➤ 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.

(11) QIPs-21: Construction of Processing Plant for Regenerating Livelihood Through Introduction of Disaster Resilient Submersible Fish Cage (Milkfish)

The QIP is newly formulated for implementation in Phase 2.

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 are not able to get approval for the fishery products processing facility from BFAR, and therefore they cannot 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.

Site / Main Counterpart: Basey / Basey LGU

Expected Output:

- 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.

(12) QIPs-22: Improving Municipal Capacity for Disaster Resilient Construction Management Through Reconstruction of Slaughter House (Recover of Access road and pavement in the compound)

The QIP is newly formulated for implementation in Phase 2.

The road between the meat processing plant, 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 meat processing plant. 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.

Site / Main Counterpart: Dulag / Dulag LGU

Expected Output:

- 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.



Figure 5.3-2 Location of QIPs in the Second Phase

5.4 Input and Achievements

The input and achievement of QIPs are summarized in Table 5.4-1.

5.5 Evaluation of QIPs

In terms of relevance, effectiveness and impact, efficiency, sustainability, the implemented QIPs can be justified as follows (refer to Main Report Volume 2 Chapter 3).

Item	Rating
relevance	High (Rating: ③)
effectiveness and impact	High (Rating: ③)
efficiency	Fair (Rating: 2)
sustainability	Fair (Rating: 2)
	a

Table 5.5-1Evaluation Rating of Overall QIPs

QIPs Name	Input	Achievement
Regenerating Livelihood through Introduction of Disaster Resilient Submersible Fish Cage (Milk Fish) (QIP-1)	 Design of Submersible Cage Environmental Survey Construction of Submersible Cages Formation of Fish Farming Associations Training on Operation of Submersible Cage Supply of Fingerlings and Feeds Market Survey on Milkfish Training on Pressure Cooked Milkfish with Supply of Equipment Training on submersible fish cage maintenance Provision of materials for improvement of submersible fish cage postharvest activities Strengthening of Groups producing Pressure Cooked Milkfish Product Preparation of Business Plans Participation in the Value Chain Analysis Workshop and Follow-up Meetings 	 Strengthening Typhoon Resilience of Cage Culture System by Introduction of Japanese Submersible Cage Technology Organizing Beneficiary Fisherfolk through Establishment of Fish Farming Associations Technology Transfer on Operation of Submersible Cage Supply of Fingerlings and Feeds to Recommence Fish Farming Operation by Fisherfolk Determination of Product Form for Processed Milkfish Based on Market Survey Transfer of Processing Technology from QIP-15 to QIP-1 Learning on the Maintenance of Grid Mooring Structure for Submersible Cages Improvements of Submersible Cage Facility Improvement in Harvested Fish Quality and Reduction in Harvesting Operation Cost Self-motivated Development for Solution of Operational Issues on Milkfish Cage Farming Analysis for the Delay on Fingerlings Stocking and Efficiency in Fish Farming Operation Awareness on Efficiency on Fish Farm Management by Assigning a Single Fish Farmer Responsible for Operation of an Entire Production Period Establishment of Fisheries Cooperative for Improvements in overall Fish Farming Management Production and Sales of Processed Products by the Women's Associations Skills for Accounting Keeping Preparation of Business Plans Participation in the Value Chain Analysis Workshop and Follow-up
Recovery of Rural Health Service Support System through Reconstruction of Provincial Health Office (QIP-2) Regenerating Local Livelihood	 Design of Reconstruction of Provincial Health Office (hereafter called PHO) Bidding and Contracting for Reconstruction of PHO Reconstruction of PHO Equipment for Reconstruction of PHO Design of Reconstruction of Multi-purpose Livelihood Publication 	 Revising Design of PHO for Disaster Resilient Reconstruction Bidding/Contract of Reconstruction of PHO Reconstruction of PHO in a Disaster Resilient form through Appropriate Construction Management Support for Resuming Operation through Equipment Procurement Revising Design of Multi-purpose Livelihood Building for Disaster Pacilient Pacement
Fishery Products by Small-Scale Community Groups (QIP-3)	 Bidding/Contract of Reconstruction of Multi-purpose Livelihood Building Reconstruction of Multi-purpose Livelihood Building 	 Bidding/Contract of Reconstruction of Multi-purpose Livelihood Building Reconstruction of Multi-purpose Livelihood Building in a Disaster Resilient Form through Appropriate Construction Management

QIPs Name	Input	Achievement
	 Technical Transfer to LGU Engineer Guidance for the women's groups (processing techniques and management) Procurement of equipment for restarting processing activities by local women's groups Promotion of processed products Identification of Target Sales, Market and Sales Strategies Continued Production and Sales based on Identified Strategies Preparation of Business Planes based on experiences obtained during QIP Period Support for Package Improvement and Acquisition of LTO for Market Development Participation in the Value Chain Analysis Workshop and Follow-up Meetings 	 Technology Transfer to LGU Engineer Initial Arrangements with Participant Women's Groups Support for Resuming Processing Activities through Procurement of Equipment Restarting of Processing Activities Restarting of Production and Sales of Processed Products Training Activities Identification of Target Sales, Market and Sales Strategy Continued Production and Sales based on Identified Targets and Strategies Preparation of Business Plans Improvement of Product Labels and Support for LTO Application Participation in the Value Chain Analysis Workshop and Follow-up Meetings
Training on Disaster Resilient Construction Technologies through Reconstruction of National Agriculture School (QIP-4)	 Design of Reconstruction of NAS Bidding/Contract of Reconstruction of NAS Reconstruction of NAS Equipment of reconstruction of NAS Training of Construction Technology 	 Revising Design of NAS for Disaster Resilient Reconstruction Bidding/Contract of Reconstruction of NAS Reconstruction of NAS in a Disaster Resilient form through Appropriate Construction Management Support for Resuming Operation through Procurement of Equipment for Food Processing Technology Transfer to Relevant Workers, Engineers and TESDA Trainers
Training on Disaster Resilient Construction Technologies through Reconstruction of National High School (QIP-5)	 Design of Reconstruction of National High School (hereafter called NHS) Bidding/Contract of Reconstruction of National High School Reconstruction of NHS Training of construction technology 	 Revising Design of NHS for Disaster Resilient Reconstruction Bidding/Contract of Reconstruction of NHS Reconstruction of NHS in a Disaster Resilient Form through Appropriate Construction Management Technology Transfer to Relevant Workers, Engineers and TESDA Trainers
Reconstruction of Daycare Center for Community Rehabilitation (Vitalization of Peoples' Dialogue) (Salcedo) (QIP-6)	 Design of Reconstruction of Daycare Center Bidding/Contract of Reconstruction of Daycare Center Reconstruction of Daycare Center Equipment of Reconstruction of Daycare Center Orientation of Prefabricated Method 	 Designing of Daycare Center for Improving Disaster Resiliency Bidding/Contract of Reconstruction of Daycare Center Reconstruction of Daycare Center in a Disaster Resilient Form through Appropriate Construction Management Support for Resuming Operation through Procurement of Equipment Disseminating Information on Emergency Recovery Model for Public Facilities through Orientation of Prefabricated Daycare Center (main characteristics, procurement process and work period)
Reconstruction of Daycare Center for Community Rehabilitation (Vitalization of Peoples' Dialogue) (Guiuan) (QIP-7)	 Design of Reconstruction of Daycare Center Bidding/Contract of Reconstruction of Daycare Center Reconstruction of Daycare Center Equipment of Reconstruction of Daycare Center Orientation of Prefabricated Method 	 Design Reconstruction of Daycare Center for Improving Disaster Resiliency Bidding/Contract of Reconstruction of Daycare Center Reconstruction of Daycare Center in a Disaster Resilient Form through Appropriate Construction Management

QIPs Name	Input	Achievement
		 Support for Resuming Operation through Procurement of Equipment Disseminating Information on Emergency Recovery Model for Public Facilities through Orientation of Prefabricated Daycare Center (main characteristics, procurement process and work period)
Regenerating Livelihood through Introduction of Disaster Resilient Submerged Fish Cage (Lapu-Lapu Culture) (QIP-8)	 Designing Submerged Grouper Cage Construction and Delivery of Grouper Cages Training of New Grouper Cage Supply of Improved Diving Equipment Supply of Hatchery-bred Grouper Fingerlings and Machinery for Producing Moist Feeds Training on Operation of SASUBA and Diving Risks Design of Artificial Feed Preparation Facility Bidding/Contract for Construction of Artificial Feed Preparation Facility Construction of Artificial Feed Preparation Facility 	 Formulation of Operational Guidelines for Sustainable Grouper Culture Construction and Delivery of Typhoon Resilient Grouper Cages Acquirement of Installation and Operation Techniques on the Introduced Grouper Cage through Participatory Training Installation of Grouper Cages with Fisherfolk Supply of Improved Diving Equipment Use of Hatchery Produced Fingerlings for Demonstration a Sustainable Grouper Farming Practices with Lessor Dependency to Natural Resources Introduction of Moist Feeds for Demonstrating Sustainable Fish Farming Practices with Lessor Dependency to Natural Resources Analysis on the Economics Performances of Suno Grouper Farming Lobbying Stakeholder for Amendment of Guiauan Fisheries Ordinance and Advocating the Importance of Sustainable Aquaculture Development Design of Artificial Feed Preparation Facility Bidding/Contract of the Construction of Artificial Feed Preparation Facility
Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market (Guiuan) (QIP-9)	 Design of Reconstruction of Guiuan Public Market Bidding/Contract of Reconstruction of Guiuan Public Market Reconstruction of Guiuan Public Market Technical Transfer to LGU Engineer 	 Revising Design of Guiuan Public Market for Disaster Resilient Reconstruction Bidding/Contract of Reconstruction of Guiuan Public Market Reconstruction of Guiuan Public Market in a Disaster Resilient Form through Appropriate Construction Management Technical Transfer to LGU Engineer
Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Slaughter House (QIP-10)	 Design of Reconstruction of Slaughter House Bidding/Contract of Reconstruction of Slaughter house Reconstruction of Slaughter house Equipment of Reconstruction of Slaughter house Technical Transfer to LGU Engineer 	 Revising Design of Slaughter house for Disaster Resilient Reconstruction Bidding/Contract of Reconstruction of Slaughter house Reconstruction of Slaughter house in a Disaster Resilient form through Appropriate Construction Management Support for Resuming Operation of Slaughter House through Procurement of Equipment Technical Transfer to LGU Engineer
Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market (Mercedes) (QIP-11)	 Design of Reconstruction of Mercedes Public Market Bidding/Contract of Reconstruction of Mercedes Public Market Reconstruction of Mercedes Public Market Equipment of Reconstruction of Mercedes Public Market Technical Transfer to LGU Engineer 	 Revising Design of Mercedes Public Market for Disaster Resilient Reconstruction Bidding/Contract of Reconstruction of Mercedes Public Market Reconstruction of Mercedes Public Market in a Disaster Resilient Form through Appropriate Construction Management Support for Resuming Operation of Mercedes Public Market through Procurement of Equipment Technical Transfer to LGU Engineer

QIPs Name	Input	Achievement
Improving Municipal Capacity for Disaster Resilient Construction Management through Reconstruction of Public Market (Mayorga) (QIP-12)	 Design of Reconstruction Mayorga Public Market Bidding/Contract of Reconstruction of Mayorga Public Market Reconstruction of Mayorga Public Market Technical Transfer to LGU Engineer 	 Revising Design of Mayorga Public Market for Disaster Resilient Reconstruction Bidding/Contract of Reconstruction of Mayorga Public Market Reconstruction of Mayorga Public Market in a Disaster Resilient Form through Appropriate Construction Management Technical Transfer to LGU Engineer
Promotion of Local Products to Improve Livelihoods for the Survivors of Typhoon Yolanda (QIP-13)	 Study of the Framework of Promotion Activities for the Processed Products with the Task Force Implementation of the Framework of Promotion Activities for the Processed Products Examine Possibilities of a Promotion Center Determination of Further Approaches for Sales Promotion 	 Selection of Task Force Members and Topics to be Discussed Discussions for Sales Promotion of Processed Products in 1st Task Force Meeting Further Activities Determination of the Directions for Sales Promotion and Preparation of Business Plans
Regenerating Livelihood through Production of Coco Charcoal Briquette (QIP-14)	 <u>Charcoal Production</u> Invitation of Participant Farmers and Group Formulation Provision of Necessary Tools Provision of Training Examine Possibilities for Charcoal Briquetting <u>Intercropping of participating farmers</u> Selection of Participating Farmers Designing of Intercropping with Horticultural Crops and Techniques to be Introduced Procurement of Agricultural Inputs and Materials Implementation of Horticulture Production and Sales (with technical training) Evaluation of Economic Efficiency and Feedback Preparation of Manual for Intercropping 	 <u>Charcoal Production</u> Selection of Target LGU and Barangay Formulation of Production Groups Support for Initiating Charcoal Production through Installation of Kiln and Provision of Material Production of Coco-Trunk Charcoal Sales of Coco-Trunk Charcoal Possibilities for Marketing of Charcoal Briquettes Intercropping of participating farmers Creation of Organization Awareness Understanding and Practice of the Coconut Intercropping Model Procurement of Input and Materials with Understanding of Cost Efficiency Establishment of Agricultural Techniques Suitable for the Local Environment Efforts to Attain Profitable Cultivation Fixation of the Coconut Intercropping and Formulation of a Farming Model
Integrated Culture of Oyster and Milk Fish Improvement for Sustainable Aquaculture and Livelihood (QIP-15)	 Cash for Work Environmental Survey and Planning Farm Layout Layout Fish Pens and Oyster Rack according to the Plan Supply of Materials for Constructing Fish Pens Supply of Materials for Construction of Oyster Seed Collection Facilities in Leyte Bay in cooperation with Leyte Municipal Government Visit to Higashi Matsushima Town in Japan for Exchange of Experiences and Series of Training Support for Developing Pressure Cooked Milkfish Product Support for Developing Aquaculture Insurance Supply of Laboratory Equipment to Leyte Marine Biotoxin 	 Recovery of Main Livelihood Support Facility for Fisherfolk by Construction of Farming Facilities Technology Acquirement and Improved Project Participation through Training Including Visit to Higashi Matsushima City in Japan Recovery of Main Livelihood Means by Harvesting Milkfish from Reconstructed Cages Strengthening Quick Recovery Capacity from Disasters by Development and Subscription of Aquaculture Insurance Development of Pressure Cooked Milkfish Product as a New and Sustainable Livelihood Means for Fisherfolk Women Establishment of Production Base of SCWFA for Pressure Cooked Milkfish through Equipment Supply and Training Implementation

QIPs Name	Input	Achievement
	 Testing Center and Commencement of Plankton and Water Quality Monitoring 10. Supply of Aeration System 11. Cost for Completion of Printed Package for Softbone Bangus 12. Sales Promotion of Produced Pressure Cooked Milkfish Products 13. Preparation of Business Plan based on experiences obtained during QIP period 14. Participation in the Value Chain Analysis Workshop and Follow-up Meetings 	 Technical Improvement in Production of Pressure Cooked Milkfish Reduction of Mass Mortality Risk of Overcrowding by Laying out Fish Farming Facilities based on Licenses Issued Collection of Oyster Seeds and Transplantation for Expansion of Livelihood Potential by Oyster Farming 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 Progress on Milkfish Pen Farming Reduction of Mass Mortality Risk by Aeration Systems Milkfish Pen Farming as an Alternative Livelihood Source for Capture Fishing Management Reform of Milkfish Pen Farming in QIP-5 for Improvement of Livelihood Condition of Fisherfolk Progress on Milkfish Processing Activities Obtaining a Patent for Softbone Bangus and Registration of Trademark Completion of Printed Vacuum Bag Establishment of Processing Women's Federation Supporting Applications for Funding Assistance to Increase the Production Capacity Soliciting Government Supports for Improvement of Product Quality and Product Development Progress on Oyster Farming and Processing Activities Test Production of Processed Oysters by Vacuum Frying Participation in the Value Chain Analysis Workshop and Follow-up Meetings
Training on Disaster Resilient Construction Technologies Through Reconstruction of Elemental School(QIP-16)	 Design for Reconstruction of Camire Elementary School Bidding/Contract of Reconstruction of Camire Elementary School Reconstruction of Camire Elementary School Training of Construction Technology 	 Revising the Design of Camire Elementary School Bidding/Contract of Reconstruction of Camire Elementary School Reconstruction of Camire Elementary School Technology Transfer of Construction Technology
QIP-17 Training on Disaster Resilient Construction Technologies Through Reconstruction of National Agriculture School (Phase 2)	 Design for Reconstruction of National Agriculture School (NAS) – Phase 2 Bidding/Contract of Reconstruction of NAS-Phase 2 Reconstruction of NAS-Phase 2 Equipment for Food and Beverage services curriculum and Construction Technology Workshop Training on Construction Technology 	 Revising the Design of NAS-Phase 2 Bidding/Contract of Reconstruction of NAS-Phase 2 Reconstruction of NAS-Phase 2 Support for Resuming Operation through Procurement of Equipment for Construction Technology, Food and Beverage Services Technology Transfer on Construction Technology

QIPs Name	Input	Achievement
QIPs-18	1. Design for Reconstruction of RHU in Abuyog	1. Design for Reconstruction of RHU in Abuyog
Recovery of Rural Health Service	2. Bidding/Contract of Reconstruction of RHU in Abuyog	2. Bidding/Contract of Reconstruction of RHU in Abuyog
Through Reconstruction of Rural	3. Reconstruction of RHU in Abuyog	3. Reconstruction of RHU in Abuyog
Health Unit (Abuyog)		
QIPs-19	1. Design of Reconstruction of RHU in Dulag	1. Design for Reconstruction of RHU in Dulag
Recovery of Rural Health Service	2. Bidding/Contract of Reconstruction of RHU in Dulag	2. Bidding/Contract of Reconstruction of RHU in Dulag
Through Reconstruction of Rural	3. Reconstruction of RHU in Dulag	3. Reconstruction of RHU in Dulag
Health Unit (Abuyog)		
QIPs-20	1. Design for Processing Plant in Tanauan	1. Design of Processing Plant in Tanauan
Construction of Processing Plant for	2. Bidding/Contract of Processing Plant in Tanauan	2. Bidding/Contract for Construction of Processing Plant in Tanauan
integrated Culture of Oyster and Milk	3. Construction of Processing Plant in Tanauan	3. Construction of Processing Plant
Fish Improvement for Sustainable		
Aquaculture and Livelihood		
QIPs-21	1. Design for Construction of Processing Plant in Basey	1. Design of Reconstruction of Processing Plant in Basey
Construction of Processing Plant for	2. Bidding/Contract of Construction of Processing Plant in	2. Bidding/Contract of Reconstruction of Processing Plant in Basey
Regenerating Livelihood Through	Basey	3. Reconstruction of Processing Plant in Basey
Introduction of Disaster Resilient	3. Construction of Processing Plant in Basey	
Submersible Fish Cage (Milkfish)		
QIPs-22	1. Design of Access Road to Slaughter House	1. Design of the paving of the access road to the Slaughter House
Improving Municipal Capacity for	2. Bidding/Contract of Concreting of Access Road to	2. Bidding/Contract of Concreting of Access Road to Slaughter House
Disaster Resilient Construction	Slaughter House	3. Concreting of Access Road to Slaughter House
Management Through Reconstruction	3. Concreting of Access Road to Slaughter House	4. Technical Transfer to LGU Engineer
of Slaughter House (Recover of	4. Technical Transfer to LGU Engineer	
Access road and pavement in the		
compound)		

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							l	Building Safe	r Cities		Recovering Peo	ple's Daily L	ife	Restori	ng Regional E	conomy
QIP No.	Name of Municipality	Project Name	Major C/P Agency	Facility	Project Purpose	Target Group	Introducing Technologies in Japan	Structural Measures	Non-Structural Measures	Healthcare	Education	Social Welfare	Livelihood Improvement	Agriculture	Fishery	Services and Industry
Type A: `	Type A: Training/Capacity Development for Disaster Recilient Construction Technologies/Manegement & Function Recovery															
QIP-02	Palo	Recovery of Rural Health Service Support System Through Reconstruction of Provincial Health Office	PHO	PHO Reconstruction	Recovery of PHO System	PHO, RHU, PHO Users		Disaster Recilient Building	Function Securing at Disaster	Function Recovry						Local Industry Vitalization
QIP-04	Balangiga	Training on Disaster Resilient Construction Technologies Through Reconstruction of National Agriculture School	TESDA	National Agriculture School Reconstruction	Training on Construction Technologies	TESDA graduates/trainers, School teachers/trainees	Training by Japanese Skilled Worker	Disaster Recilient Building	Function Securing at Disaster		Training on Japanese Technology					Local Industry Vitalization
QIP-05	Dulag	Training on Disaster Resilient Construction Technologies Through Reconstruction of National High School	TESDA	National High School Reconstruction	Training on Construction Technologies	TESDA graduates/trainers, School teachers/students	Training by Japanese Skilled Worker	Disaster Recilient Building	Function Securing at Disaster		Training on Japanese Technology					Local Industry Vitalization
QIP-10	Dulag	Improving Municipal Capacity for Disaster Resilient Construction Management Through Reconstruction of Slaughter House	Municipality of Dulag	Slaughter House Reconstruction	LGU Capacity Development	LGU, House users		Disaster Recilient Building	Function Securing at Disaster		Capacity Development of LGU Staff					Local Industry Vitalization
QIP-09	Guiuan	Improving Municipal Capacity for Disaster Resilient Construction Management Through Reconstruction of Public Market	Municipality of Guiuan	Pablic Market Reconstruction	LGU Capacity Development	LGU, Market tenants		Disaster Recilient Building	Function Securing at Disaster		Capacity Development of LGU Staff					Local Industry Vitalization
QIP-11	Mercedes	Improving Municipal Capacity for Disaster Resilient Construction Management Through Reconstruction of Public Market	Municipality of Mercedes	Pablic Market Reconstruction	LGU Capacity Development	LGU, Market tenants		Disaster Recilient Building	Function Securing at Disaster		Capacity Development of LGU Staff					Local Industry Vitalization
QIP-12	Mayorga	Improving Municipal Capacity for Disaster Resilient Construction Management Through Reconstruction of Public Market	Municipality of Mayorga	Public Market Reconstruction	LGU Capacity Development	LGU, Market tenants		Disaster Recilient Building	Function Securing at Disaster		Capacity Development of LGU Staff					Local Industry Vitalization
Type B: I	Introduction of	Disaster Recilient Technologies & Comm	unity Rehal	bilitation												
QIP-06	Salcedo	Reconstruction of Daycare Center for Community Rehabilitation (Vitalization of Peoples' Dialogue)	Municipality of Salcedo	Daycare Center Reconstruction	Vitalization of Community Dialogue	Center users, Community People	Prefabricated Building	Disaster Recilient Building	Function Securing, Disaster Prevention Education			Function Recovery				Local Industry Vitalization
QIP-07	Guiuan	Reconstruction of Daycare Center for Community Rehabilitation (Vitalization of Peoples' Dialogue)	Municipality of Guiuan	Daycare Center Reconstruction	Vitalization of Community Dialogue	Center users, Community People	Prefabricated Building	Disaster Recilient Building	Function Securing, Disaster Prevention Education			Function Recovery				Local Industry Vitalization
Type C:	Introduction of	Disaster Recilient Technologies and/or S	ustainable	Livelihood Improv	ement											
QIP-03	Tolosa	Regenerating Local Livelihoods Through Processing of Agriculture and Fishery Products by Small-Scale Community Groups	Municipality of Tolosa	Construction of Livelihood Activities Support Facility	Livelihood Improvement	Community group		Disaster Recilient Building					Promotion	Production Prosessing	Production Prosessing	Sales and Marketing
QIP-01	Basey	Improving Livelihood Through Introduction of Disaster Resilient Submersible Fish Cage	BFAR, Municipality of Basey	Submersible Fish Cage for Milkfish	Livelihood Improvement	BFAR, Fishermen's families	Submresible Fish Cage	Disaster Recilient Facility	Function Securing at Disaster				Promotion		Fishery Cultivation	Prosessing and Sales
QIP-08	Guiuan	Introduction of Disaster Resilient Submersible Fish Cage for Lapu-lapu Culture	BFAR, Municipality of Guiuan	Submerged Fish Cage for Lapu-Lapu	Livelihood Improvement	BFAR, Fishermen's families	Submresible Fish Cage	Disaster Recilient Facility	Function Securing at Disaster				Promotion		Fishery Cultivation	Sales and Marketing
QIP-15	Tanauan	Community Aquaculture Resources Management by Re-establishment of Oyster Farming	BFAR, Municipality of Tanauan		Livelihood Improvement & Resources Management	BFAR, Fishermen's families	Oyster Culture		Function Securing at Disaster		Resource Management		Promotion		Fishery Cultivation	Prosessing and Sales
QIP-14	Mercedes	Regenerating Livelihood Through Production of Coco Charcoal Briquette	Municipality of Mercedes		Livelihood Improvement	Farmers' families							Promotion	Production Prosessing		Sales and Marketing
QIP-13	Tacloban	Promotion of Local Products to Improve Livelihoods for the Survivors of Typhoon Yolanda	City of Tacloban		Livelihood Improvement & Market Promotion	Production/sales workers (QIPs-1, 3, 14, 15)							Promotion			Sales and Marketing

Table 5.5-2 Relevance of QIPs to Recovery and Reconstruction Policy

5.6 Lessons Learned from the Implementation of QIPs

Table 5.6-1 is an overview of lessons learned from the QIPs (for the detailed description, refer to Main Report Volume 2 Chapter 3).

Objectives	Lessons Learned
(1) Regenerating Livelihood	 Cooperation with Local Institutions and People in Solving a Conflict in Installation of Cages with Local Fish Owners
	2. Holistic Approach to Restore the Agricultural and Fishery Production and Practical Countermeasures to Prevent Delay in Stocking Fingerlings
	 Flexible Implementation to Countermeasure Unexpected Shortage of Fingerlings by Supply of Change Net Materials of Smaller Mesh Size
	4. Communicating with Target and Other Local Population in Organizing Fish Farming
	5 Raising Awareness of Women's Association Members
	6 Utilization of the Tolosa Multi-Purpose Livelihood Center for Increased Production
	7. Effect of Political Conflicts
	8. Supporting Locally Developed Technology for Long Term Sustainability
	 Make Haste Slowly in Mitigating a Conflict Between Utilization and Conservation of Natural Resources
	10. Tasting and Sales of Processed Products in Local Events
	11. Access to External Supporting Schemes
	12. Duplication with other Supporting Activities
	13. Developing Ownership for the Activities through Obtaining Cash Benefit
	14. Utilization of Coconut Fields after Clearance of Debris
	15. Regulation on the Logging of Coconut Trees and Replantation
	16. Introduction of Technology in Consideration of the Natural Environment and Farm Management and Improvement by Farmers
	17. Working with Other Institutions for Finding Financial Partners for Operation of Fish Farming
	 Solving Problems by Active Participation of Beneficiaries in Control of Culture Area and Spacing Between Milkfish Pens
	19. Increased Cost in Procurement of Construction Materials from Local Market
	20. Practical Details for Developing an Insurance Package for Milkfish Farming Operation to Complement the Physical Structural Weakness
	21. Modification in the Oyster Seed Collection Activity that could Result in an Expansion of Impacts
	22. Potential Economic Impact of Milkfish Production for Future Planning
	23. Future Potentials in Integration of Milkfish Farming and Processing and Required Continuous Supports for the Women's Association
	24. Self-sustaining Development of Establishment of Fisheries Cooperative for Operation of Milkfish Cage Farming
	25. Issues and Measures for Sustainable Operation of Milkfish Pen Farming
	26. Mindset of Producers Groups Engaged in Small-Scale Livelihood Activities
	27. Access to Supporting Schemes
	28. Limitations in Government Support
	29. Administrative Constraints for Promotion of Small-Scale livelihood Activities
	30. Milk Fish Value Chain Analysis Workshop
	31. Establishment of Women's Federation in milkfish processing activities (QIP-1& QIP-15)
	32. Changes in Management System in QIP-15 Milittish Pen Farming at Tanauan
	55. Renabilitation component in QIP-8 grouper farming at Guiuan and its relation to the project framework
	34. "Recovery" to "Rehabilitation" phases in emergency disaster assistance
	35. Timing for Termination of Emergency Disaster Assistant Project

Table 5.6-1 Lessons Learned from QIPs

Objectives		Lessons Learned
(2) Construction	1.	Quality Identification of Steel Material
Work	2.	Concrete Aggregate
	3.	Quality Assurance of Welding Works
	4.	Control of Concrete Workability
	5.	Support Installation
	6.	Foundation Works and Installation of Scaffolding
	7.	Fixing of Column Formwork
	8.	Site Inspection
	9.	Safety Management
	10.	Alternative procedures for Important Works
	11.	Payment Condition
	12.	Contractor's Skill for Documentation
	13.	Technical Transfer to LGU Engineer
	14.	Contract Category
	15.	Counter-Measure against Seawater
	16.	Soil Investigation
	17.	Demolition Permission
	18.	Skills Enhancement in TESDA Training
	19.	Aggregates of Concrete
	20.	Splice Position
	21.	Transformer Capacity
	22.	Land Acquisition
	23.	Concrete Block
	24.	Specification of the Design for Processing Plant
	25.	Soil Condition of the Site
	26.	Water for Concrete Mixing
	27.	Pavement Concrete

Chapter 6 Recommendations

6.1 Recommendations for Development of Structure Measure

Some of the items remained unsolved as of December 2015, end of on-site assistance by JICA Study Team for structural measure. Those items are described below with recommendations.

(1) DD Drawings and Bidding Documents to be Completed by DPWH R8 Except the Items Related to Flap Gate / slide Gate

JICA Study Team has assisted DPWH R8 in preparing the specifications of the gate as well as quotations from Japanese manufacturers for reference. DPWH R8 will have to finalize the method of procurement and accordingly the drawings and documents. DCCD, the contracted consultant may not have experiences in gate design and coordination with other consultants shall be considered.

(2) Approval by NEDA ICC (Outside the Scope of JICA Study Team)

Among the documents required for NEDA ICC approval, the resolution of the project from Tacloban City is not yet collected and RAP is still being prepared by DPWH R8. There may also be a perception gap between DPWH and NEDA, because NEDA is requesting F/S Study of the project although this DPWH project was started as the project of the upmost emergency to be implemented.

Coordination among relevant stakeholders should be continued to find common ground and solve the problem.

(3) Land Acquisition (Outside the Scope of JICA Study Team)

Parcellary survey is still ongoing by outsourced survey firm and negotiation to affected lot owners have not yet started by DPWH R8.

The problem has to be addressed promptly and properly.

6.2 Recommendations based on Comprehensive Planning Activities

- 1. Consideration of the ideal Building Code assuming vertical land use
- From the findings obtained in Japan, it is considered possible to set No-Build-Zone or No-Dwelling-Zone, with setting the standard inundation height due to high tide to 2 m. Even for areas where the inundation height become 2 m, it is considered possible to apply vertical land use, for instance, designating the sections above the inundation height of 2 m habitable for sturdy buildings (except wooden building). By giving considerations for the future, on the ideal Building Code assuming such vertical land use, it becomes possible to effectively utilize the limited coastal zone.
- It is recommended to reconsider the ideal land use from the temporal and spatial viewpoints by utilizing the JICA hazard map.



Figure 6.2-1 Image of Utilization by Vertical Land Use

- 2. Continuous updating of CLUP to always aim at building a safe city from the viewpoint of DRRM
- After the Great East Japan Earthquake, area management is carried out in each region, and various considerations have been gradually put into practice inside the area. Especially, efforts are made beyond the boundary of areas, such as formulation of regional evacuation plans and solving the matter of concern, i.e. drainage of inner basin, by the region. Like these examples, it is vitally important to always aim at building a safe, secure and livable city without being limited to the update of CLUP or formulation of simple plans of area management.



Lessons learned from the Great East Japan Earthquake

Both Comprehensive Master Plan and Area Management Plan are very important .

Figure 6.2-2 Example of Regional Evacuation Plans and Utilization Plans as Area Management (Example of Great East Japan Earthquake)

3. Development of the process and outcome of CLUP formulation into the comprehensive plan of LGU

- In Japan, there are not only land use plans but also comprehensive municipal plan for planning the general municipal administrative policies. In the Philippines, while there are nation-level and region-level plans, they are not put down to plans at each LGU.
- CLUP is a comprehensive city building plan, and its consideration process and outcome themselves are considered to become a comprehensive municipal plan.
- Data collection is to be maintained and managed as the basic statistics to be updated every year, every three years, every five years, etc., and considerations at each sector can be utilized as the mainstay of the plan for the sector in a comprehensive municipal plan. The restoration and revitalization plan proposed by the JICA Study Team is the very plan that is related to all sectors, leading to a comprehensive municipal plan.
- Like these examples, it is considered desirable to develop CLUP into a comprehensive plan of LGU without limiting it to a mere land use plan.
- In Japan, 5 years have passed since the Great East Japan Earthquake, and the restoration and revitalization plan is currently being revised into a comprehensive plan of municipality. It is recommended to use these activities in Japan as reference.



Lessons learned from the Great East Japan Earthquake

Figure 6.2-3 Relationship Diagram between the Restoration and Revitalization Plan (General Plan) and the Area Management after the Great East Japan Earthquake

6.3 Recommendation through the Activities for Evacuation Planning

6.3.1 Evacuation Plan of LGU

Through the activities of this project, it was ensured that the LGU could not instruct the barangays to formulate their own evacuation plan without the evacuation plan of LGU. It is necessary to formulate first the evacuation plan of LGU, to have a more suitable instruction to the barangays and lead to a smooth coordination between several barangays in the evacuation.

For the evacuation plan of the LGU, evacuation to ECs in the neighbor Barangays should be considered in the event of impending or giant scale of disaster such as Typhoon Yolanda. As of now, the disasters which affect the entire area of some barangays have been not considered in the evacuation planning. Therefore, the necessity of evacuation between several barangays was not fully understood.

In addition, concrete steps and contents for formulation of evacuation center and additional guideline should be prepared in the Local Disaster Risk Reduction and Management (DRRM) Planning Manual. The existing manual notes necessity of preparation for evacuation plan, but there is no guideline and instruction for the evacuation planning.

6.3.2 Capacity Development of LGU

The planning procedure is not difficult, but the geographic condition, disaster to be assumed and social structure such as population are different. The plan, therefore, should be formulated depending on the characteristics of the area. The LGU have to deal with numerous detailed aspects, that's why capacity development is needed to enhance their knowledge and skills to distinguish applicable strategies in the evacuation planning.

6.3.3 Coordination of Evacuation Plan between LGU and Barangays

The evacuation plan of the LGU focuses on the whole boundaries of the LGU, that's why the evacuation plans of the barangays should also be compiled including the actions in the community level, in order to achieve a smooth evacuation. The evacuation plans of the barangays should be formulated by each barangay, but their plan should be based on the evacuation plan of LGU. It's important that the evacuation plans of LGU and barangays are coordinated and shared.

In addition, evacuation action points going to the ECs of the neighboring Barangays of all the barangay, and the plan of the evacuee barangay and the receiver barangay should be coordinated. The LGU needs to give an instruction to them so that they can make a consistent plan for each other.

In the actual situation, CRS has been supporting to formulate evacuation plan in the Barangay level, by conducting a training adopting the Community Based DRRM Basic Instructor's Guide (CBDRRM BIG) prepared by OCD with the support from JICA. The LGU should conduct a training for both the evacuee barangay and receiver barangay at the same time. Through the training, the basic idea of evacuation or camp management planning is expected to be prepared and well-coordinated.

6.3.4 Timeline Action Plan and DILG Manual

The DILG manual called "Local Government Unit Disaster Preparedness Manual," shows the actions to be taken 48 hours before the landfall of typhoons. These actions should be clarified depending on "who will do" and "when to activate the actions," so that concrete action plan with timeframe can be formulated. Once the action plan is prepared by the LGU, they can present their available support and suitable instruction to the barangay for better coordination and smooth evacuation planning.

This DILG Manual focuses on the typhoon hazard only, but it should also be taken into consideration to formulate a Timeline action plan for the different kinds of hazards such as flood, tsunami and etc. after the preparation of Typhoon Timeline Action Plan. It is also important to enhance the response capacity of the LGU against the hazards to be considered.

6.4 Recommendations based on QIPs Implementation

The recommendations based on the implementation of QIPs are the following items (refer to Main Report Volume 2 Chapter 4.2). The recommendations are categorized into mainly 2 items such as "Regenerating Livelihood" and "Construction Work".

(1) Regeneration of Livelihood

1) Working with the People in Emergency Livelihood Support Projects

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

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.

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.

4) Follow-up supports

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

For introducing business activities involving local groups, 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

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

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'

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. 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

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". 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. 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.

- (2) Construction Work
 - 1) Payment Condition

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

To improve deficiencies of LGU Staff 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

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. Shop drawings for the placement of re-bars and truss diagrams, and details of welding works are very useful for the procurement and fabrication of materials. 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

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. 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. 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. It is 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. This may be no problem if only shallow excavation is required for the foundation, but in case of deep excavations, workability using machines will be interrupted. 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

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

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. 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

Local contractors were found to 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

To avoid any accidents at high places, 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. It is a must that safety officers will be deployed in every construction sites for safety management.

13) Counter-measure against Seawater

The presence of seawater in the foundation would greatly affect the quality of the structure. 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

A site for a two-story building to be constructed under a QIP was found with extremely low bearing capacity. Considering long term settlement, the design was modifies from two-story to one-story building and this involves additional construction period and budgetary requirement. 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

Some contractors were not familiar with proper concrete mixing. 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

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.

6.5 JICA Forum in February 2016 and Recommendations based on JICA Forum

(1) JICA Forum in February 2016

A series of JICA Fora were held in Tacloban and Manila on February 9 and February 11, 2016 the Fora to end the 2nd year of the Study. This forum aimed to share the outcome and lessons learned from the JICA Project, introduce the progress of QIPS and report the result of the technical support on the

planning for recovery and reconstruction in the model areas and confirm how the outputs of the JICA Project can be sustainable after the end of the Project.

(2) Tacloban Forum

The Tacloban Forum was held in February 9, 2016 at the Multi-purpose hall in DPWH Region 8 inviting key officials from eighteen LGUs and regional representatives from line agencies and international NGOs. The program was composed of presentations and panel discussions on the outcome and lessons learned from the JICA Project by the counterparts from the LGUs and NGA.

The outputs of the JICA Project were shared in the Forum:

- The LGU understood the hazards and plans for building safer cities, using the hazard maps provided by JICA.
- Barangay and relevant NGAs were effectively involved in the planning process and effective non-structure and structural measures were discussed, as a result, the process which then led to capacity building for the LGUs.
- The Japanese strategies, such as, timeline action plan and disaster resilient construction technologies, was effectively shared and utilized.
- For the livelihood activity of QIPs, various activities of production, such as, fishery and intercropping, were introduced and the activities of value adding including processing, promotion, and creating value chain were also introduced.

At the panel discussion, challenges of the JICA Project and necessary activities after the end of the Project were discussed. At the session of planning, it was discussed how to implement measurements such as relocation and structural measure as the next step of planning. At the session of livelihood, necessity of capacity building, financial management and support of funding from the government was discussed to maintain and expand their activity. The JICA Project was the start and to maintain each activity is important for building back better. Therefore, it is concluded that building relations between LGU and NGA and collaborators to the activities are necessary.

(3) Manila Forum

The Manila Forum was held on February 11, 2016 at the St. Giles Hotel inviting key officials from central governments such as DILG, NEDA, HLURB and international NGOs. The forum program was composed of presentations of outputs of the JICA Project by the JICA Study Team members, LGUs, and round table discussions.

The JICA Study Team introduced their activities for the first year of the Project and shared the output and lessons learnt noted in the Tacloban Forum. In addition, next necessary steps were shown to achieve build back better. An introduction on how the detailed plans, such as, drainage plan, evacuation plan was formulated also, various plans was reviewed for sustainable development during area management in Japan as examples. At the session of DRRMP, necessity of caring for people with disability during evacuation was pointed out. For the future reconstructions, the involvement of the central office NGAs, management of the hazard maps provided by JICA and how to share with relevant agencies including LGUs was discussed. Furthermore, necessity of sharing actual cases of planning was recognized because each LGU faces a different situation for planning. It was emphasized that feedback from LGUs should be shared with the central office NGAs including HLURB, then to use the handbook formulated by JICA Study Team, to show the different cases of CLUP updating in Tacloban City and Palo Municipality were proposed.