REPUBLIC OF THE PHILIPPINES
THE PROVINCIAL
GOVERNMENT OF BOHOL

SUSTAINABLE ENVIRONMENT PROTECTION PROJECT FOR PANGLAO IN PHILIPPINES

PROJECT COMPLETION REPORT

NOVEMBER 2015

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.
NJS CONSULTANTS CO., LTD.

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EXCHANGE RATE

(As of September 2015)

US Dollar (US$) 1.00 = Philippines Peso (PHP) 46.65
Philippines Peso (PHP) 1.00 = Japanese Yen (¥) 2.611

Location Map

Sustainable Environment Protection Project for Panglao

Project Completion Report

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List of Abbreviations

ABR	Anaerobic Baffled Reactor
ARS	Advance reservation system
BFAR	Bureau of Fisheries & Aquatic Resources
BEMO	Bohol Environment Management Office
BISU	Bohol Island State University
BTO	Bohol Tourism Office
CCL	Carrying capacity limit
CLUP	Comprehensive Land Use Plan
C/P	Counterpart
CRAB	Committee to Restore Amazing Balicasag
DENR	Department of Environment and Natural Resources
DOLE	Department of Labor and Employment
EIMC	EUF Implementation and Monitoring Council
GIZ	Gesellschaft für Internationale Zusammenarbeit
Ic/R	Inception Report
IRR	Implementing Rules and Regulations
JET	JICA Expert Team
JICA	Japan International Cooperation Agency
LGU	Local Government Unit
MAFC	Municipal Agriculture and Fishery Council
MDRRFO	Municipal Disaster Risk Reduction Management Office
MFARMC	Municipal Fisheries and Aquatic Resources Management Council
MOU	Memorandum of Understanding
MS	Marine Sanctuary
MSSMO	Municipal Sewage and Septage Management Office
NBA	New Bohol Airport
O&M	Operation and Maintenance
OJT	On the Job Training
OPA	Office of the Provincial Agriculturist
PADO	Panglao Association of Dive Operators
PDM	Project Design Matrix
PENRO	Provincial Environment and Natural Resource Office
PGSO	Provincial General Cervices Office
PHO	Provincial Health Office
PIEC	Panglao Island Executive Committee
PPDO	Provincial Planning and Development Office
SPIM	Systematic/Point Intercept Method
ST	ST
STEP	Special Terms for Economic/Partnership
STFs	Sewage Treatment Facilities
SUAKCREM	Silliman University Angelo King Center for Research and Environmental Management
TCWG	Tourism & Nature Conservation Working Group
TIEZA	Tourism Infrastructure and Enterprise Zone Authority
UC	Usage control
UNDP	United Nation Development Program
USAID	United States Agency for International Development
WG	Working Group
WMWG	Waste Management Working Group

Attachments:

Attachment-1	Project Design Matrix (PDM)
Attachment-2	List of Major Activities of Output 1-3
Attachment-3	List of Major Activities of Output 4-7
Attachment-4	Memorandum of Understanding on Road Map
Attachment-5	List of Collected Information and Materials

Technical Cooperation Products in CD-ROM:

1. Provincial Ordinance No. 2014-002
2. IRR of Provincial Ordinance No. 2014-002
3. The Survey on Baseline for Tourism Resources in Pagnlao Island and Balicasag Island
4. Periodic Monitoring Manual for the Adaptive Management of Tourism Resources
5. Monitoring Report of Tourism Resources in 2015
6. Panglao Municipal Ordinance No.12 Series of 2014
7. Bingag Barangay Ordinance No.1 Series of 2015
8. Instruction Manual for the Snorkeling Activitiy in Balicasag Island
9. Constitution and By-law of BISGA
10. Carrying Capacity Training Program
11. Hinagdanan Cave Guide Training Program
12. Snorkeling Guide Training Program
13. GIS Training Program
14. Modified Bohol Sanitation Code
15. Proposed Municipal Ordinances
16. Training Records and Recommendations
17. Required work for LGUs
18. Check list for Design and Construction Stages
19. Check list for Final Inspection
20. Data base on ST
21. Study of Pilot ST
22. Standard Design of Modified ST
23. Modified ST Manual
24. Sewage Quality Examination Manual
25. Sewage Quality Examination Results on Pilot ST
26. F/S for Construction of a Septage Treatment Plant
27. Plan of Solid Waste Management

1. OUTLINE OF THE PROJECT

1.1. Background of the Project

Located at the heart of Central Visayas, the Province of Bohol is highly visited by tourists and in fact has quadrupled over the last nine years from 81,040 in 2001 to 334,212 in 2010. This is probably due to the variety of natural features of the place from mountainous areas to soothing surrounding seas. Accordingly, the number of passengers in Tagbilaran Airport is rapidly rising and appropriate measures such as airport expansion to resolve such increase is necessary and urgent. However, extension of the airport is made difficult because its runway is located at the center of Tagbilaran City, which is surrounded by residential areas and thus limiting its improvement.

Under these circumstances, the Government of the Philippines requested a Special Term for Economic Partnership (STEP) yen loan from the Government of Japan in October 2012 for the construction of the New Bohol Airport (NBA). The implementation of the project by the yen loan was scheduled and the "New Bohol Airport Construction and Sustainable Environment Protection Project" is scheduled to be completed by 2016. The NBA is to be constructed in Panglao Island in the Province of Bohol and shall be within the international safety standards. The project shall improve regional safety and convenience and shall contribute also to the economic growth of the Province of Bohol. However, as the number of tourists is anticipated to increase after the construction of the NBA, adverse impacts may occur in and around Panglao Island such as contamination of wastewater from sub-standard sewage treatment systems, improper dumping of solid waste due to the lack of environmental policies and load control system, degradation of the different marine ecosystem such as coral reefs impacted by divers and snorkelers and deterioration of natural landscapes and amenities which ultimately degrades the tourism resources. Such problems could result in the deterioration of a regional economy and leads to poverty. In order to prevent such environmental degradation, it is crucial that a system to control environmental load be introduced, taking into consideration the increase in the number tourists by the construction of the NBA.

The Government of the Philippines has requested technical cooperation with Japan for the project called "Sustainable Environmental Protection Project (SEPP) for Panglao" (hereinafter referred to as the Project) in order to have environmental sustainability even after the increase in the number of tourists brought in by the NBA. The Provincial Government of Bohol (PGBh) and the Japan International Cooperation Agency (JICA) signed a memorandum of understandings (MOU) for the implementation of the Project last November of 2012. The Project commenced in May 2013.

1.2. Structure of the Project

The Project comprises of two components i.e. "development of sustainable tourism resource use"

and "Improvement of on-site STFs". The former achieved three outputs in a step-by-step manner and the latter achieved four outputs in a parallel scheme. The Project achieved its purpose through the accomplishment of the following outputs as shown in Figure 1-1. This figure shows the relationship among overall goal, project purpose and outputs.

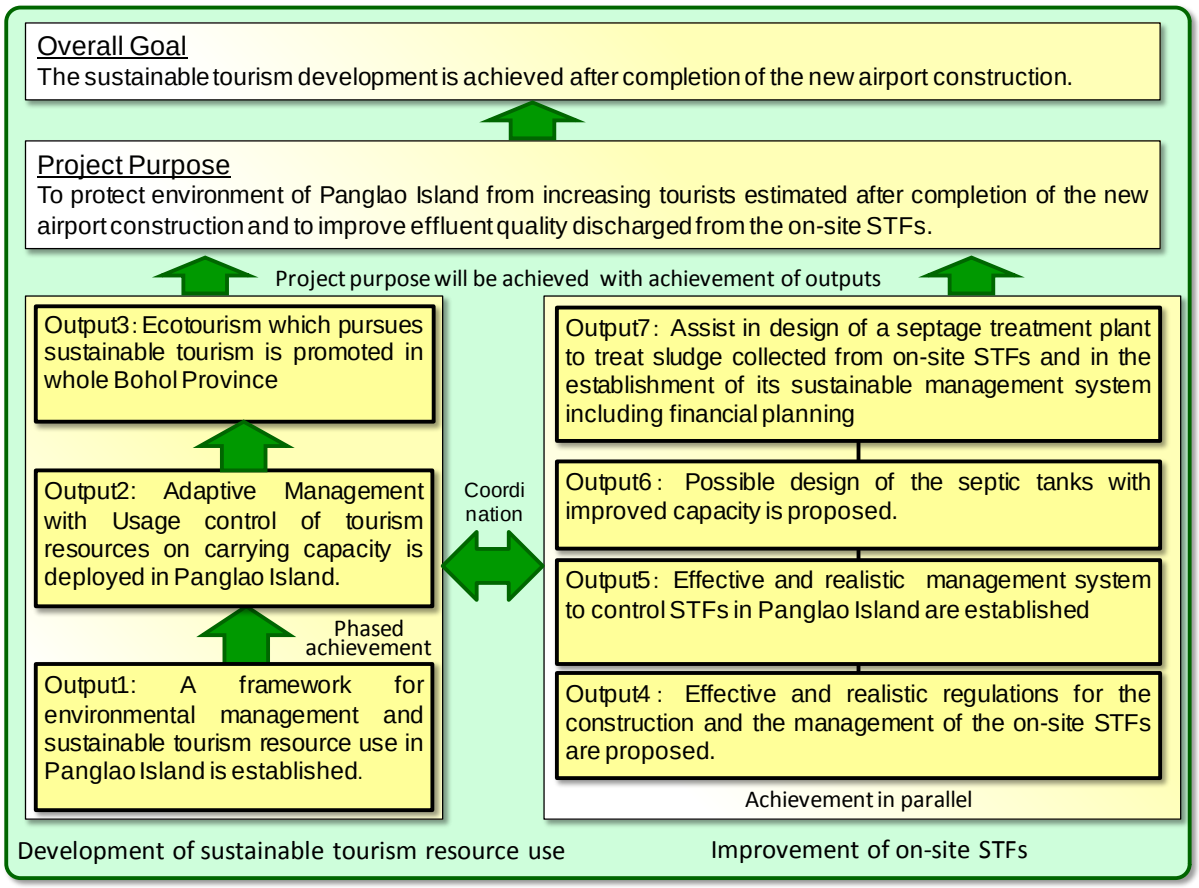


Figure 1-1. Project Structure

1.3. Project Area

The Project focal areas are the two municipalities of Panglao Island consisting of Dauis and Panglao Municipality including Balicasag Island. Output 1-7 is exclusively for Panglao Island except for Output 3, whose scope is beyond Panglao Island but the whole Province of Bohol. By doing so, the Project promotes the other potential ecotourism sites in the province and will positively minimize environmental pressure in the island through dispersal of tourists to other neighboring towns of the province as well.

Target areas are Output-dependent in the "development of sustainable tourism resource use" component. Output 1 target areas were in Panglao Island and Balicasag Island while Output 2 mainly focused in Balicasag Island, especially on the carrying capacity threshold for divers as

well as in the Hinagdanan Cave carrying capacity for visitors in Dauis Municipality. Output 3 on the other hand is Province-wide as mentioned above. Output 4-7 on the "Improvement of on-site STFs" component were both in Dauis and Panglao LGU except Balicasag Island.

1.4. Project Design Matrix

1.4.1. PDM version 01

JICA Expert Team (JET) and Bohol Project Team (Counterpart: C/P) had discussed on PDM ver.1 based on PDM ver.0 attached on MOU to implement the Project between JICA and Province of Bohol, and prepared in May 2013. JET and C/P revised the project descriptions to achieve the outputs with specific activities.

1.4.2. PDM version 02 (Amended in July 2014, final version)

C/P and JET had worked for the Project to achieve the project purpose since May 2013. However, some issues surfaced such as rapid increase of tourists and residents even before the construction of new airport and no septage treatment facility to treat the discharges from sewage treatment facilities (STFs). Hence, the Project understood that the measures initially planned were not adequate to protect the environment. Therefore, additional outputs were necessary to achieve the project purpose. Accordingly, C/P , JET and JICA discussed the issue and decided to add two more outputs i.e. "ecotourism which pursues sustainable tourism is promoted in whole Bohol Province" and "assist in design of a septage treatment plant to treat sludge collected from on-site STFs and in the establishment of its sustainable management system including financial planning" and related activities. C/P and JET revised the PDM ver.1 and prepared the PDM ver.2 (attachment-1) and both the Province of Bohol and JICA signed a MOU as an amendment of PDM vr.1 last July 2014.

2. ACTIVITIES AND ACHIEVEMENT OF EACH OUTPUT

Activities of each output have been implemented almost on schedule. Activities and achievement of each output are as follows.

[Development of Sustainable Tourism Resource Use]

2.1. Output 1: A Framework for Environmental Management and Sustainable Tourism Resource Use in Panglao Island is established

2.1.1. Outline of Activities

Outline of the Output 1at the end of the Project is as follows.

(1) **Deliverables:**

- Provincial Ordinance to establish the Panglao Island Executive Committee (PIEC) including its implementing Rules and Regulations (IRR)

(2) **Knowledge and capacity to be acquired by the local government staff**

- Understanding the outline of adaptive management
- Skills on how to share information among stakeholders
- Convene in a regular manner (at Understanding importance of consensus building and strategies in consensus building

(3) **Final targets upon completion of the Project:**

- Province of Bohol, Municipality of Panglao, and Municipality of Dauis commit to establish and operate the Panglao Island Executive Committee (PIEC) regularly.
- The plenary meetings of Panglao Island Executive Committee will be convened once in a year, and the rest of the working group meeting, scientific council meeting, and board of directors meeting at least more than one meeting per year per group.

2.1.2. Activities

(1) **Collection of Information and Analysis (Activity 1-1 in PDM)**

Counterparts (C/P) and JICA Expert Team (JET) visited various stakeholders and collected information on the current situation of the different stakeholders working on environmental conservation last June and July 2013. The information was collected using a prescribed information collection sheet and later the data were analyzed.

Environmental protection measures are implemented by National Line Agencies such as Department of Environment and Natural Resource (DENR) and Bureau of Fishery and Aquatic Re-

sources(BFAR), while others like the Provincial organization such as the Bohol Environment Management Office (BEMO) and both the Local Government Unit of Dauis and Panglao. However, the collaboration was not enough since consensus building on issues concerning the whole Panglao Island was minimal. The Project found that there was no functioning organization that focused on environmental protection for Panglao Island and a consensus was made among partners to establish the **Panglao Island Executive Committee** as a framework to implement adaptive management.

(2) **Development of operating bodies of Panglao Island Executive Committee (Activity 1-2 in PDM)**

Referring to the collected information and its analysis, the organizational structure of the Panglao Island Executive Committee (PIEC) was formed as shown in Figure 2-1. Since it is unrealistic and overwhelming if the project just take all the issues at hand, the Project together with PGBh has come up with a PIEC organizational structure with two main working groups, namely the **"Tourism and Conservation"** working group (TCWG) and the **"Waste Management"** working group (WMWG) to address the two components of the project.

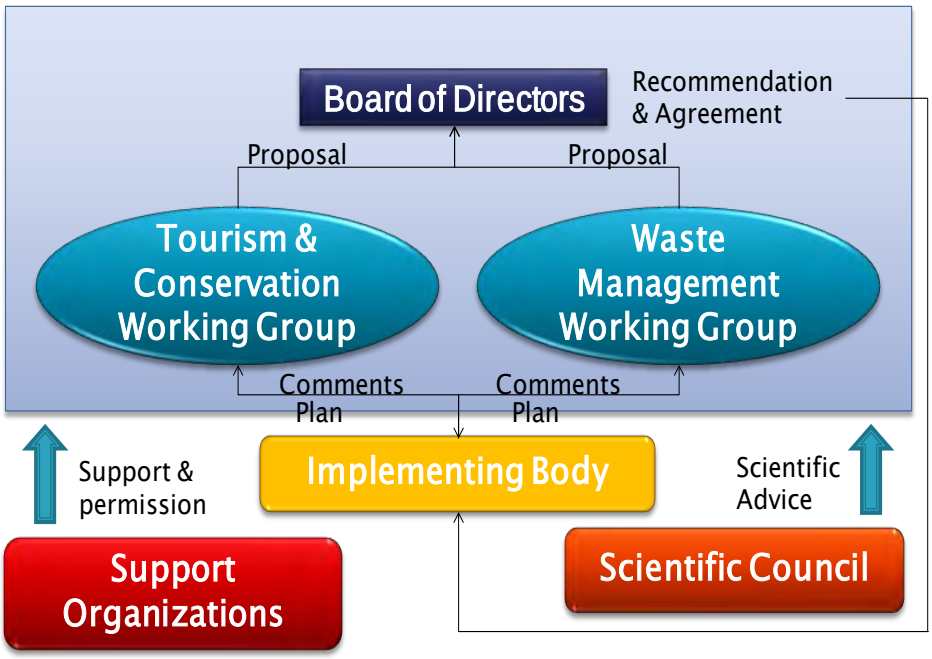


Figure 2-1. Structure of PIEC

The process begins from stakeholders and LGU officials discussing on environmental concerns and measures and then the LGU prepares the discussion paper and build consensus among its stakeholders and submitted to the Scientific Council if necessary and then incorporate recom-

mendations and submitted to the TCWG for discussion. The TCWG will then deliberate and either submits a corresponding resolution or incorporates their recommendations and submitted to PIEC governing board. The PIEC governing board (represented by two working group directors, Provincial Governor, and the two Municipal Mayors) will then discuss the issue at hand and assisted by support organizations for inputs and come up with approvals and/or recommendations to the LGU with regards to environmental conservation measures proposed. The LGU can either craft an Ordinance that will compliment the proposed project (Figure 2-2). The PGBh, specifically the Provincial Planning and Development Office (PPDO) will serve as the secretariat of PIEC whose main task is to organize meetings when the two municipal LGUs have some proposed project/activities or policies that dwells on environmental protection of Panglao Island.

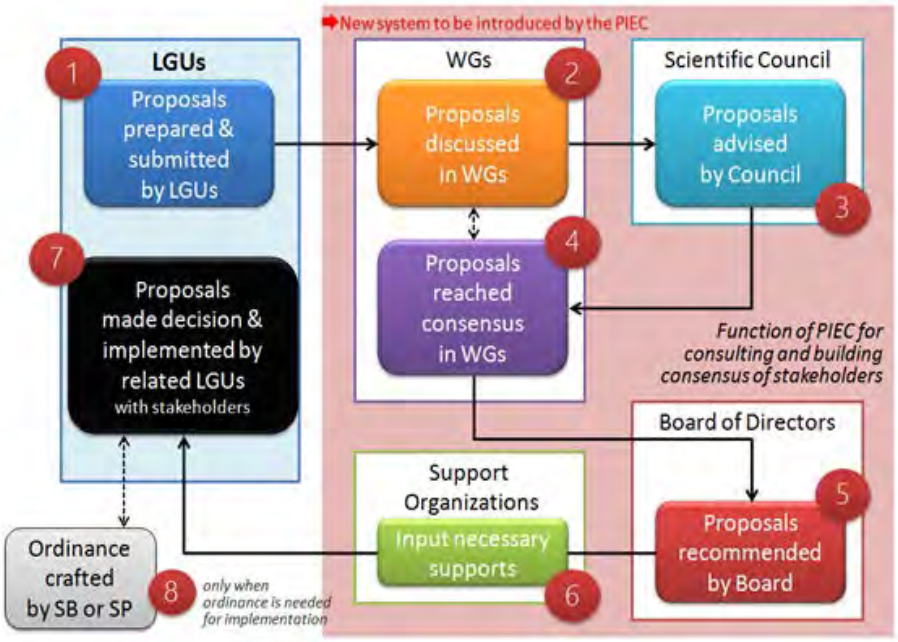


Figure 2-2. Process flow of PIEC

(3) **Sector-wide Workshop (Activity 1-3 in PDM)**

After the collection and analysis of the information were made, a series of workshops were conducted among important sectors last September 18 to October 01, 2013. The specific objectives of the workshops are the following:

a) To evaluate the expected capacities and expertise of each Panglao Island Executive Committee (PIEC) member,

b) To achieve full understanding of what PIEC is about and recruitment of PIEC members.

Participants in the workshop were all identified as potential candidate in the proposed PIEC and the Bohol Project Team and JICA Expert Team were tasked to select among them as final PIEC members. The Project effectively evaluated and selected the new members and there was high willingness of the different sectors to support the establishment of the PIEC. The sector representatives made several comments on the establishment of the PIEC and those were incorporated

in the establishment and operation of PIEC. Outline of the sector-side workshops are shown in Table 2-1 below.

Table 2-1. Outline of the Sector-wide Workshop

No.	Date	Sector	Major Comment
1 2	September 18, 2013	MFARMC/MAFC-Dauis MFARMC/MAFC-Panglao	There should be public hearings upon the setting up of the executive committee & the drafting of policies such as provincial ordinances. There should be information dissemination at the community level.
3	September 18, 2013	Dive Shops	More Filipinos should be involved. PIEC should parallel with the implementation.
4	September 19, 2013	Women, Youth & Fisher Folks-Panglao	There were numerous meetings & plans made in the past & yet no actions executed. Look into the best practice of Palawan. Provide copies of the roles and functions of each sector in the working group.
5	September 20, 2013	Women, Youth & Fisher Folks-Dauis	
6	September 19, 2013	Tour Guides & Boat Operators-Panglao	Selected sectors should be able to identify problems & concerns in the community.
7 8	September 20, 2013	Hotels, Restaurants & Resorts-Dauis Hotels, Restaurants & Resorts-Panglao	Base the percentage of representation to their contribution in the tourism industry. The hotel sector should be present in both working groups (waste management and tourism).
9	September 25, 2013	Provincial, Municipalities & Barangays	Marina & Phil Coast Guards should be part of the solid waste management working group. Philippine Navy and Marina & Phil. Coast Guards should be part of the working group because they have an enforcement power. There should be a balance of both government and private sector representatives in the board level.
10	September 26, 2013	NGOs, Scientific Council & Supporting Organizations	Review baseline studies in Panglao Island declared as protected seascape. There should be a group who will focus on the continuation of the executive committee. Secretariat should not be a member of the board & should not be above the directors.
11	October 1, 2013	Regional Agencies and Cebu Based Partner Organizations	

(4) Establishment of Panglao Island Executive Committee (Activity No 1-4 and 1-5 in PDM)

The Project assumed to establish the PIEC with Executive Order of Provincial Governor, and it was added in PDM ver.1. However, Provincial Governor pointed out the necessity to establish the PIEC with a legal basis such as a Provincial Ordinance to make it a sustainable framework. Hence the Project involved a staff of Provincial Legal Office (PLO) as a C/P, and discussed the operational structure and method of PIEC. Eventually the Project prepared a draft Provincial

Ordinance to establish PIEC including the Scientific Council.

The draft ordinance, which was agreed by the Governor, was brought to *Sangguniang Panlalawigan* (SP, Provincial Council) so that PIEC would be established through a Provincial Ordinance. Three discussions were held by the SP, in particular, the second discussion was made through a joint session with the members of the *Sangguniang Bayans* (SB, Municipal Council) of Panglao and Dauis Municipalities. The purpose and benefits of the PIEC was explained by the project director and opinions were exchanged.

The SP eventually passed Provincial Ordinance No. 2014-002 **"Establishing the Panglao Island Executive Committee for Sustainable Environmental Protection Project (PIEC for SEPP)"** on January 24, 2014. The Provincial Governor signed the ordinance last February 3, 2014, and PIEC was launched. The Project managed to convene its 1st plenary meeting of PIEC with the following Agenda:

- Explanation of roles and operation of PIEC,
- Selection of members of PIEC, and
- Expected proposals discussed in working groups.

As stipulated in the ordinance, the Board of Directors as chaired by the Governor officially selected the members of PIEC through PIEC BOARD RESOLUTION No. 01-2014: A Resolution Finalizing the Composition and Appointing the Members of the Panglao Island Executive Committee for Sustainable Environmental Protection Project to Ensure Proper Implementation of Provincial Ordinance No. 2014-002.

2.1.3. Achievement

Achievement status of the Output 1 following the indicators of the PDM is as follows (Table 2-2):

Table 2-2 Objectively Verifiable Indicator and Achievement Status of Output 1

Deliverable	Indicator	Performed
1. Possible basic framework for implementing "Adaptive Management" under which usage control on carrying capacity is established.	1.1 Panglao Island Executive Committee (PIEC) and Scientific Council were established.	• PIEC including scientific council has established by provincial ordinance in February 2014. • Following meetings have been held since the establishment. Plenary meeting: twice, Board of Directors meeting: 3 times, Tourism and Conservation working group meeting: 6 times, Waste Management working group

		meeting 5 times, and scientific council meeting: 3 times.

When the Project started, C/P and other stakeholders were hardly able to understand adaptive management. Information sharing was not enough even within the Province and within the two municipalities. Consensus building among various stakeholders was formal and not functioning. After the establishment of PIEC, the framework for adaptive management and its operation, actually worked and the C/Ps and other stakeholders enhanced their understanding of adaptive management and consensus building. In particular, with discussions based on advices from scientific council, working group members deeply comprehended the necessity and method of adaptive management strategy. They have changed their attitude e.g. to understand opinions of other stakeholders and build consensus with some compromise, and to cooperate in the decision making process.

2.2. Output 2: Adaptive Management with usage control of resources through carrying capacity limitation is deployed in Panglao Island.

2.2.1. Outline of Activities

Outline of the Output 2 at the end of the Project is as follows:

(1) **Deliverables**

- Usage control plan, including initial figure of carrying capacity
- Monitoring manual
- Report of regular monitoring
- Administrative guidelines for the use of LGU officials

(2) **Knowledge and Capacity to be acquired by the Local Government Staff**

- Understanding adaptive management
- Understanding carrying capacity
- Understanding monitoring, which is necessary for adaptive management
- Skill to conduct monitoring following monitoring manual
- Skill to propose usage control plan based on carrying capacity
- Skill to revise usage control plan based on monitoring result
- Skill to manage tourism resources by use of nature guide
- Skill to collaborate between private and public sectors

(3) **Final Targets upon Completion of the Project**

- Panglao Island Executive Committee meetings are held, and figures of carrying capacity and usage control plans are revised regularly.
- Regular monitoring is conducted around Panglao Island, using monitoring manual.
- Carrying capacity management system established.
- Tourism resources management by use of nature guide is improved.

2.2.2. Activities

(1) **Collection of information that is necessary to set carrying capacity (Activity 2-1 in PDM)**

The Project visited stakeholders and collected information in Panglao Island such as tourism resources, tourism use, and conservation activities, and data on the existing monitoring surveys of environmental conditions in Panglao Island last June and July 2013 as well as the collection of secondary information for Output 1.

(2) **Baseline survey of tourism resources (Activity 2-2 in PDM)**

The Silliman University-Angelo King Center for Research and Environmental Management (SUAKCREM) conducted a baseline survey of tourism resources as subcontracted work. SUAKCREM conducted field surveys from July to November 2013, and submitted final report in December 2013. The survey was conducted using the following methods at the following areas:

Belt Transect Method: From water edge to reef edge, at 12 marine protected areas and 4 dive sites.
Manta Tow: Reef edge of whole Panglao Island and Balicasag Island
Surrounding Marine Area Survey: Where dolphins inhabit near Panglao Island
Beach Survey: All beaches in Panglao Island and Balicasag Island
Landscape Survey: 20 scenic views in Panglao and Balicasag Islands

The outline of the survey result is shown in Table 2-3.
The information gathered will be used as baseline information for future reference of the condition of tourism resources. This information was submitted to PPDO, BEMO, and the two Municipalities of Dauis and Panglao. The information was explained during the TCWG meeting held last April 2014 and the Scientific Council meeting held in May 2014, and used as basis for the discussion of the initial figures of carrying capacity in Balicasag Island.

Table 2-3. Outline of the Baseline Survey of Natural Resources

No	Name	Survey Contents	Survey Items	Outline of the Result
1	Coral Reef Survey A. Belt Transect Method	Sixteen line transects will be set at major beaches and marine sanctuaries. Detailed condition of tourism resources, such as coral reefs, sea grass, fish, and water quality will be quantitatively understood.	➢ Names and coverage of living coral species ➢ Coverage of death coral ➢ Names and coverage of soft coral species ➢ Names and coverage of sea grass species ➢ Names and rough number of fish species ➢ Names and rough number of other crea-	➢ Live coral coverage was lower at eastern survey sites, which tends to be affected by typhoon. Significant degradation of coral caused by water deterioration is not observed as live coral coverage at Tawala MS facing to Alona beach. ➢ Various sea grasses, seaweeds, and benthos grow and inhabit the area. Biodiversity is relatively high in the reef around survey

			tures ➢ Condition of bottom sediment ➢ Water quality (water temperature, saline, pH, COD, TN, TP, transparency, fecal coliform) ➢ Photography	sites. Fish biomass is high around Balicasag Island, which were about 1 kg/m3. However, other sites around Panglao Island were almost less than 0.1 kg/m3. Though number of fish is not so different between Balicasag Island and Panglao Island, the size of fish is much larger around Balicasag Island. ➢ Total and Fecal coliforms in all 16 survey sites were within the DENR safety standards.
	B. Manta Method	Overall condition of coral reefs around Panglao Island will be understood with the use of the manta method or glass bottom boat survey	➢ Names and rough coverage of dominant coral species ➢ Names of other creatures as tourism resources ➢ Photography	➢ The total Manta tow survey length was 54 km. ➢ Live hard coral cover was highest in the western portion. ➢ Predominant hard coral lifeforms were Massive corals and Branching corals.
2	Surrounding Marine Area Survey	Inhabiting situations of whales, dolphins, and sea turtles are confirmed with interviews to dive shops and tour companies.	➢ Locations, seasons and conditions of whales, dolphins, and sea turtles, etc.	➢ The most common animal encountered during the ocean tour was Dolphins. Whales and Manta Rays inhabit but less common.
3	Landscape Survey	Landscape photographs will be taken from 20 famous viewpoints in Panglao Island and Balicasag Island.	➢ Photography	➢ 20 popular tourist and historical sites were photographed and marked using GPS.
4	Sand Beach Survey	Distribution of sand beach is confirmed.	➢ Distribution and boundaries of sand beach using satellite image ➢ Photography	➢ Sand Beach observed mainly south to southeast part of Panglao Island. Each Sand Beach is 1-3 km length and about 20 m width.

(3) **Prepare the periodical monitoring manual and commence in the monitoring (Activity 2-5 in PDM)**

Regular monitoring was expected to be conducted with two main categories identified, namely **"Tourism Usage Status"** and **"Tourism Resource Status"** as referenced in the institutional framework of the PIEC. In every meeting of the Scientific Council and the Working Groups, the result of the regular monitoring will be reported and discussed in order to check and monitor the current and changing conditions of the Panglao Island. Those implementations are as follows.

1) Tourism usage status

Regarding monitoring of nature usage conditions, five (5) types of surveys had been conducted, namely "(1) Visitors Exit Interview Survey", "(2) Balicasag Diving Counting Survey", "(3) Panglao Dive Shop Interview Survey", "(4) Hinagdanan Cave Interview Survey", "(5) Alona Beach Counting, Interview, and Salvage Zone Survey". The Province of Bohol and the two municipalities conducted these survey supported by JICA expert team (JET) of the Project. It was discussed with the PGBh and the two municipalities on how to continue these types of surveys for

the future use in order to secure sustainable monitoring with more efficiency and less cost. Name of activities and their corresponding dates are as shown in Table 2-4 below.

Table 2-4. Conducted Conditions of Tourism Usage Monitoring Survey

Survey Type	Conducted Month
(1) Visitors Exit Interview Survey	・ Nov, 2013 (Interview) ・ May, 2014 (Interview) ・ Sep, 2014 (Interview) ・ Nov, 2014 (Interview) ・ May, 2015 (Interview)
(2) Balicasag Diving Counting Survey	・ Sep, 2013 (Counting) ・ Sep, 2014 (Counting) ・ Mar, 2015 (Counting)
(3) Snorkeling Counting and Interview Survey	・ Jun & Jul, 2014 (Counting & Interview) ・ Mar, 2015 (Counting)
(4) Panglao Dive Shop Interview Survey	・ Jun & Jul, 2014 (Interview)
(5) Hinagdanan Cave Interview Survey	・ May, 2014 (Interview) ・ Sep, 2014 (Interview) ・ Mar, 2015 (Interview) ・ Apr, 2015 (Interview)
(6) Alona Beach Counting, Interview, and Salvage Zone Survey	・ Sep, 2013 (Counting & Interview) ・ May, 2014 (Counting & Interview) ・ Jul, 2014 (Salvage Zone Survey)

2) Tourism resource status

The Project prepared a draft monitoring manual for the tourism resources monitoring last January 2014 and conducted two reef monitoring surveys in 2014 and 2015 which were very important to enhance the skills of our partners in Panglao Island and in the PGBh as well. After each monitoring surveys, the Marine Protected Area – Provincial Technical Working Group (MPA-PTWG) had some discussions on what are practical and cost effective methods and this information was used as basis in revising the contents of the monitoring manual and part of the revision of the manual was to include water quality monitoring.

a) Preparation of the monitoring manual for tourism resources

Baseline survey of tourism resources conducted by Silliman University in 2013 was utilized to determine the present condition of tourism resources around Panglao Island and referred to for future reference. However, the survey methods used in this survey was complicated and very different from what the local monitoring team had been using. For ease in acquiring and comparing data in the future, the Project have decided to adopt the standard methods of Englist *et al* (1997) as commonly used in Bohol (MPA-PTWG) and even in the Philippine's various academic and research institutions in order to confidently compare and share monitoring results using the same methods used in the past and in the future as well. Furthermore, Crown of Thorns Starfish (COTS) and reef damage assessments were added for consideration of usage control plan. Outline of the reef survey method is shown in Figure 2-3 below.

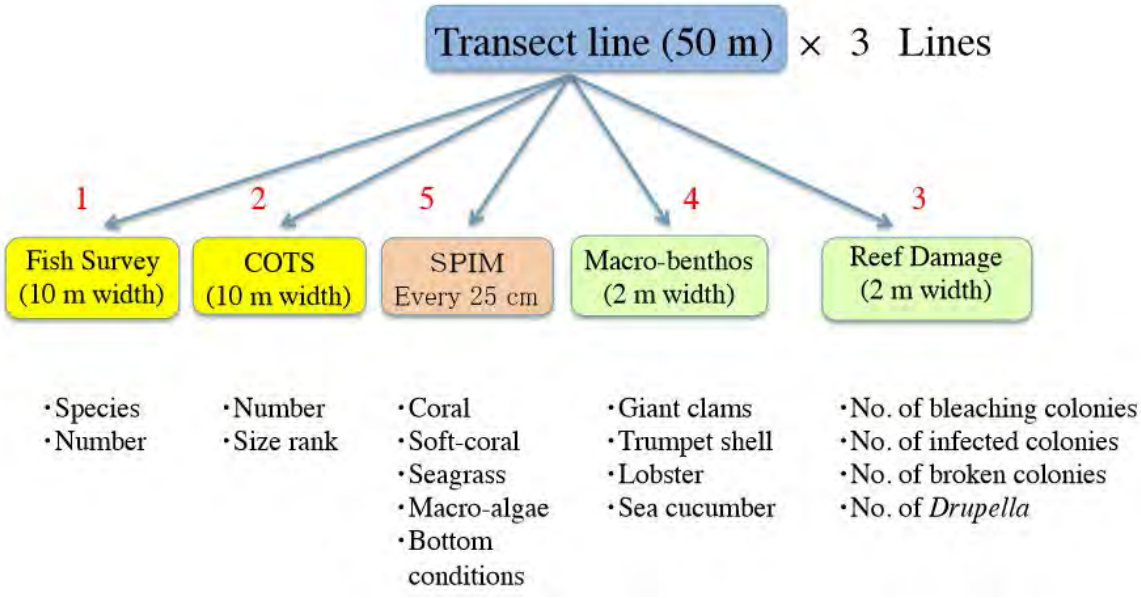


Figure 2-3 Outline of the Reef Monitoring Method

It was decided that the reef monitoring survey will be conducted by the composite team of the MPA-PTWG which has the experience of doing reef surveys around the province. The pre-selected sites for monitoring were all Marine Protected Areas (MPAs) around Panglao Island and the MPA-PTWG; Padayon-BMT together with JET conducted the reef surveys last February 2014. However, after getting the results of the survey and feedback to the stakeholders, the Project found out that the best data needed to manage the carrying capacity limits should be based on existing dive sites around Panglao and Balicasag Island since it is important to get feedback from sites where people tend to have direct impact to the reef rather than a protected area where it is technically off limits.

Part of the adaptive management decision was to change the 2015 monitoring sites from MPAs to dive sites in order to get direct feedback on the effects of divers and snorkelers towards the reef. The latest 2015 monitoring results, complimented with reef damage assessment data will now be used as basis for adjusting the carrying capacity threshold and usage control in Balicasag Island and in all dive sites of Panglao Island in the near future. Additionally, it was recommended by the Scientific Council and supported by the TCWG to use the 2015 reef monitoring result as the official base line data for the long-term monitoring in the future.

The Project and the LGU of Panglao through their Municipal Fisheries and Coastal Resource Management Office (FCRMO) and MPA-PTWG had a discussion on the importance of having Reef Rangers and a separate MPA and Dive Site Monitoring Team (MDMT) in the overall management of resources and since then, they have included it in their amended Municipal Ordinance on Environmental Users Activity System to monitor their marine resources. The latest Periodical field surveys of tourism resources was conducted last February 2015 with the support of

MPA-PTWG, Panglao Association of Dive Operators (PADO) and JET, and survey sites had been changed from MPAs to popular dive sites.

As for data management of environmental survey outputs, the Bohol Environmental Management Office (BEMO) is the responsible organization in maintaining the database for future reference. In order for this to be realized, the JET together with BEMO and members of the MPA-PTWG conducted a training workshop focusing on data processing and analysis and continued towards writing the monitoring report. This workshop enhanced the skills of our partners in preparing future monitoring exercises as well data analysis, writing and data archiving. In Table 2-5, it shows the various implementing organizations of tourism resource monitoring in the future as well as the monitoring flow as shown in Figure 2-4.

Table 2-5. Implementing Organization of Tourism Resource Monitoring

Activity	Implementing Organization
Coral Reef Survey	MPA-PTWG, LGUs of Panglao and Dauis, PADAYON-BMT
Water Quality Survey	Reef monitoring team (sampling), PHO and BEMO (analysis)
Landscape Survey	BEMO in collaboration with LGUs of Panglao and Dauis
Sand Beach Survey	BEMO in collaboration with LGUs of Panglao and Dauis
Data handling	BEMO, MDMTP and PADAYON BMT
Reporting to SC, PIEC and LGUs	BEMO

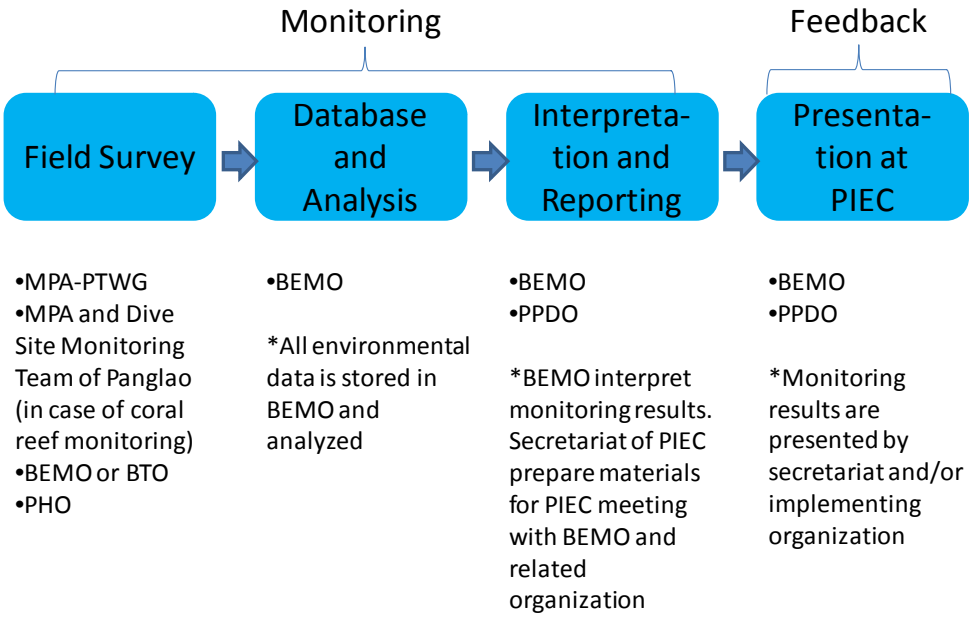


Figure 2-4. Flow of Tourism Resource Monitoring and Feedback

b) Conduct tourism resource monitoring

The Project conducted tourism resource monitoring (reef and water quality) exercises as shown in Table 2-6. In 2015, Counterparts (C/Ps) and JICA expert team (JET) prepared the monitoring report together as their final output.

Table 2-6. Conducted Tourism Resource Monitoring

Year	Date	Item	Implementing Organization	Remarks
2014	Feb. 24	Preparation	DENR, MPA-PTWG, Padayon-BMT, JET	JET and Padayon-BMT
	Feb. 25-27	Field Survey	DENR, MPA-PTWG, JET	OJT
	March	Reporting	JET	JET initiated
2015	Feb. 5-6	Lecture/Preparation	MPA-PTWG, LGU Panglao, JET	Trainor's Training
	Feb. 9-12	Field work – Reef monitoring	MPA-PTWG, LGU Panglao, JET	OJT
	Feb. 13	Field work - Water quality monitoring	MPA-PTWG, PHO, JET	OJT
	Feb. 16-18	Database	MPA-PTWG, LGU Panglao, JET	OJT
	Feb. 20-27	Report writing	MPA-PTWG, JET	BEMO initiated

(4) **Usage Control on Carrying Capacity (Activity 2-3, 2-4, 2-6 and 2-7 in PDM)**

Considered as the most important input/activity in the Output 2, the said activity requires pro-active engagement and transparent discussion with the local communities, private sectors (especially dive operators), Scientific Council and the LGUs. Sharing of information and exchanging opinions and even small debates are part and parcel in getting through Output 2.

The Project selected core members for the TCWG coming from C/P (BEMO, BTO, Mun. of Panglao, and Mun. of Dauis) and carried out regular meeting once a week. The members of the team selected target themes (Dive usage control/UC, Cave UC, Snorkeling UC, Beach UC, Accommodation UC) and prepared corresponding implementing plans of each usage control on carrying capacity using adaptive management strategy. With the support from JET, the core members set the initial figure of carrying capacity per usage control based on several monitoring results and existing literature. The proposed plans were then submitted to TCWG and Scientific Council for further scrutiny and revisions.

Prioritized usage control plans targeted by the TCWG were as follows; Diving in Municipality of Panglao and Hinagdanan Cave in Municipality of Dauis as first priority and a Board Resolution was proposed and approved by the PIEC governing board held last August 2014 at the Governor's Mansion (Figure 2-5). Main contents of the two resolutions were to amend the old EUF Ordinance of Panglao LGU, amend Bingag Barangay Ordinance of Hinagdanan Cave and implement

usage control as pilot activities.

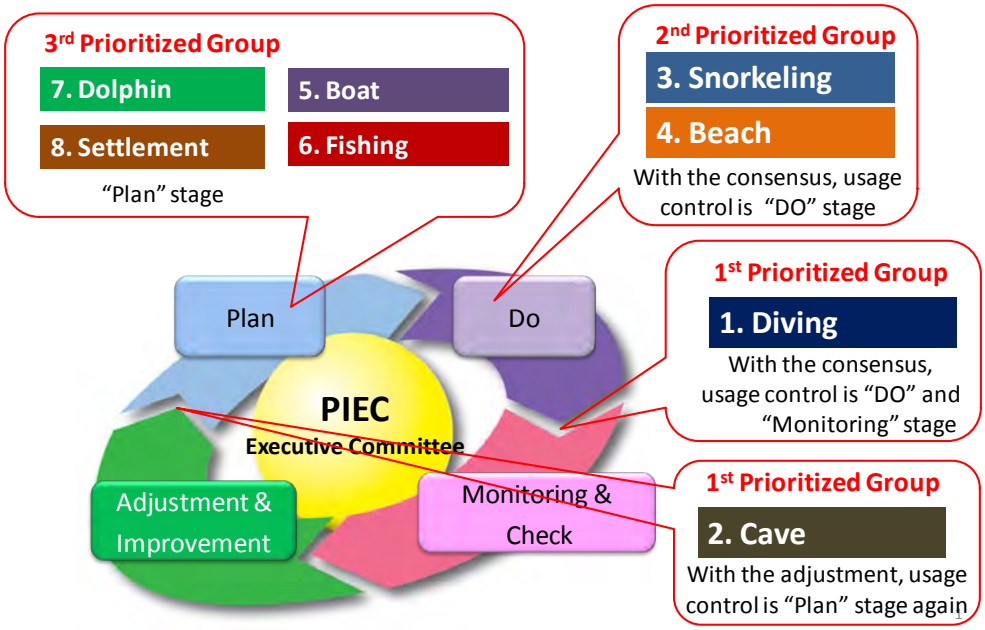


Figure 2-5. Themes of Usage Control under Implementation and Discussions

The EUF Ordinance was amended for diving and usage control with **advance reservation system** (ARS) for Balicasag Island was in placed and in full implementation already. With regard to Hinagdanan Cave, 1st round of adaptive management was completed and based on succeeding monitoring; the Brgy Council of Bingag together with the Project find it necessary to further revised its ordinance on carrying capacity and usage control provisions last June 2015.

The four (4) themes of first and second prioritized groups are as follows.

1) Diving in Balicasag Island

The Municipality of Panglao has been in charge of this activity since diving is the economic driver of the municipality. There are currently 16 dive sites in its jurisdiction; however dive operators concentrate their operations in the five (5) dive sites around Balicasag Island, which is the crown jewel of all dive sites in Panglao and internationally known diving destinations in the world.

JET conducted series of counting surveys for divers and estimated that the annual number of dives per dive site in Balicasag Island is 24,361 dives per year (average of the 5 dive sites) based on the counting survey last September 2013. According to academic literatures, at this dive usage rate, reef impact would be about 11 % coral colony damage per year. Based on the works of Robert and Hawkins (1997), they estimated conservatively that 4% annual coral damage (equivalent to 5,000 to 6,000 dives/site/year in the Middle East) due to diving is an acceptable rate. This is based on the capacity of the corals to regenerate and sustain growth within a period of one

year. More than this rate can mean an annual degradation of the reef until it loses its ability to support a functioning ecosystem. Focusing in Balicasag Island, Stockwell in 2006 made a study also on the effects of diving to the reef in the island and the result had shown that it takes 15,000 dives per site per year before it can reach 4% damage in the reef. In other words, diving activity in Balicasag is "less damaging" as compared to the Middle East diving as observed by Roberts and Hawkins.

This carrying capacity limit (CCL) of 15,000 dives per site per year was then recommended to the Scientific Council through its TCWG. During the deliberation however, the LGU of Panglao requested for a compromise agreement since 15,000 dives per site per year is not economically feasible if implemented right away, especially that there are more than 50 existing dive operators in Panglao and this was the plea of the local dive operators. The LGU suggested to start with 21,900 dives per site per year as an initial CCL as long as they follow the principles of adaptive management, wherein after a year the carrying capacity limit will be adjusted or not based on the results of the bi-annual reef damage assessment. The Scientific Council upon hearing this supported the compromise but strongly recommended to conduct stringent regular reef damage monitoring in order to check if the rate suggested is detrimental to the reef or not. Based on the latest tourism-related reef damage assessment conducted last August 14, 2015 the reef damage was at 6%. This will be the official baseline data to be used for future reference especially by the EUF Implementation and Monitoring Council (EIMC) of Panglao. This is the official body that is mandated to review, recommend and approve matters pertaining to EUF implementation. Complimenting the revised ordinance is another new ordinance called the "An ordinance regulating the Business of Diving", both of which were enacted in October 2014. This ordinance helped establish the Panglao Association of Dive Operators (PADO) last January 2015. PADO is also the official accredited dive organization in Panglao and it serve as a partner of the LGU in the regulation of diving in the municipality. Only PADO members and accredited transient boat operator can avail of diving in Balicasag Island through the use of the advance reservation system (ARS). Violators had been apprehended by Panglao who do not comply of the regulation. The ARS was officially launched last April 2015 and some "birth pains" are to be expected and with some adjustments and perseverance the system is still on the go. As of July 2015, the EUF has reached PhP 9 million already after four (4) months of implementation as compared to PhP3-4 million only per year before the ARS establishment. Major discussions of the EIMC are pertaining to disbursement of EUF share to different beneficiaries (Mun. LGU – 40%, Brgy LGU – 30%, MPA and Dive Site monitoring team – 25% and Padayon BMT -5%), potential projects to be funded and how to make the system work better.

2) Hinagdanan Cave

Hinagdanan Cave is managed by Barangay Bingag in the Municipality of Dauis, prior to the project intervention there are no carrying capacity limits in the cave. In 2014, the Brgy Council of

Bingag revised their ordinance with the number of visitors at max. 50 people in 30 minutes as CCL and approved the new Barangay Ordinance No. 03 Series of 2014. The Scientific Council members discussed the carrying capacity in the 1st Scientific Council meeting and they considered the number as appropriate carrying capacity limit.

The Project made the usage control plan of Hinagdanan Cave based on the initial CCL, and implemented training workshops (2 days) and trial run of usage control for five days with the volunteer local guides from May 19 to 25, 2014. Monitoring were done using Cave questionnaire survey to evaluate effect of the enforced usage control last May 18 2014 (before the training) and May 25, 2014 (after the trial of usage control) to represent "before and after" results. Questions were pertaining to satisfaction level of the cave tour, accessibility of the cave, effectiveness of local tour guide and so on. The result of the survey showed that there was improvement of the cave tour. Satisfaction level of Hinagdanan Cave as tourism destination has also improved dramatically from 43% excellent to 53% excellent level (Figure 2-6). The result was presented and discussed during 2nd TCWG meeting last June 24, 2014 and Board meeting issued the resolution last August 1, 2014 to implement comprehensive usage control with amendment of Barangay Ordinance (Resolution No.4).

Based on this monitoring results and feedbacks, the Brgy Ordinance was revised and stipulated the CCL is now 50 people in 30 minutes, however during continuous monitoring and feedback from the local guides they mentioned how complicated it is to impose time limits and sometimes huge delegation of more than 50 can be very intimidating and stressful to control. Based on these feedbacks, the Brgy Council together with the Project has revised once again the ordinance last July 2015 to be more manageable and doable. The latest changes in the ordinance now impose only 30 visitors inside the cave at any given time as the CCL. This removes the hassle of monitoring the time and give emphasis on the fix number of guests inside at any given time. If for example 10 came out, then only ten are permitted to go in to fill in the gap. Based on observations, guests spend around 10-15 minutes max and they go out so not a lot of time is spent. Additionally, the ordinance has now an incentive provision wherein guides can get PhP 10 per guests they have guided and no longer relies on TIP alone and another important provision is the regular water quality monitoring to be conducted twice a month as basis for allowing guests to swim or not.

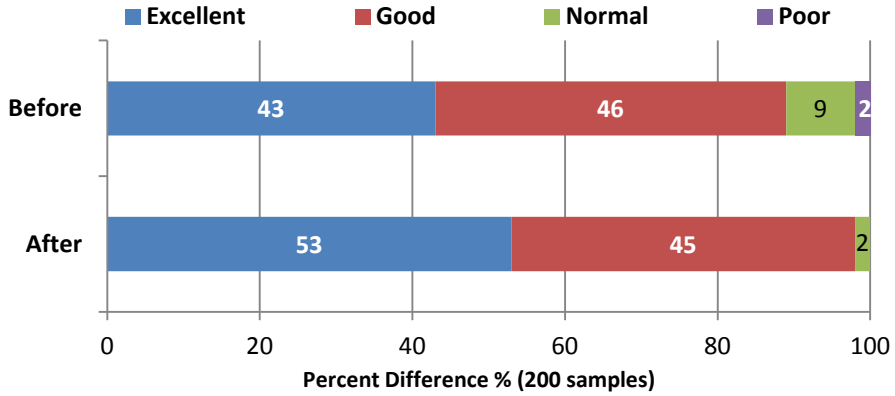


Figure 2-6. Satisfaction of Hinagdanan Cave as Tourism Destination

3) Snorkeling in Balicasag Island

Snorkeling activity in Balicasag Island seems to have a problem of over-capacity. In contrast to diving activity, the snorkeler can enjoy snorkeling without any license and advance lectures. As a result, snorkeling guests in the island are expanding fast and makes more negative impact to the coral reef than diving, especially at shallow areas. Because of this situation, snorkeling usage control became one of the prioritized topics of the first meeting of the TCWG conducted last April 21, 2014 together with diving UC, cave UC and beach UC.

Snorkeler counting survey had been conducted in 2014 and 2015 and according to the latest results held last March 2015, an average of 304 snorkelers per day was observed around Balicasag Island in two days, meaning approximately 111,000 snorkelers per year are estimated to visit Balicasag Island. This current rate should be regulated since reef contact, especially in the shallow areas are very vulnerable to snorkeling activity. Furthermore, a snorkeling interaction survey was also conducted last June 25, 2014 (weekday) and in July12, 2014 (weekend). The survey result shows that 17% of all snorkelers had reef contacts (holding, collecting and/or fish feeding) while 83% did not. In the case of the snorkeling guides, it was the opposite, 81% of all guides had reef contact and this was probably to impress their guests by showing-off their "skills" in collecting animals and feeding the fish for the guests to impressed. This gives us the idea to train our local guides on proper handling of guests and being more environment-friendly guide is the logical thing to do. This brought us to a series of workshops to develop the snorkeling module and protocols to be adopted later by the LGU. These series of workshops were held last September 12 and October 1 and 29, 2014 in Panglao SB Hall and in Balicasag Is., Dive Resort respectively. Through these workshops, a draft "Instruction Manual for the Snorkeling Activity in Balicasag Island" was crafted to promote appropriate understanding of guides and proper guiding for snorkelers.

As for the initial CCL, a 150 m^2 per snorkeler was recommended based on the works of Pangemanan *et al*, 2012 in Indonesia and adopted in Pamilacan Island, Baclayon, Bohol. However, the Scientific Council recommended mapping out the actual snorkeling area used and not

assume that the snorkelers are using the whole island for snorkeling. The Project together with the LGU of Panglao and snorkeling guides conducted the mapping and again presented the results during the 3rd Scientific Council meeting. The result shows that starting from Cathedral all the way to Black Forest where snorkelers are using is estimated at six (6) hectares or an equivalent of 400 snorkelers per day based on 150 m^2 per snorkeler. On the other side of the island, the effective area used by snorkelers starting the marine sanctuary all the way to Rudy's Rock is estimated at three (3) hectares or about 200 snorkelers per day only. The other question which was not answered yet was, will the LGU of Panglao allows both areas to be used during summer since both are accessible during this time. This would mean the CCL for summer would be at 600 snorkelers per day. The recommendation of the council was to conduct further snorkeler damage assessment just to ensure that the 150 m^2 per snorkeler CCL is not only viable for Indonesia but for our local situation as well. This damage assessment was in tandem with the reef damage assessment conducted last Aug 14, 2015 since the area is shared by both divers and snorkelers (Figure 2-7).

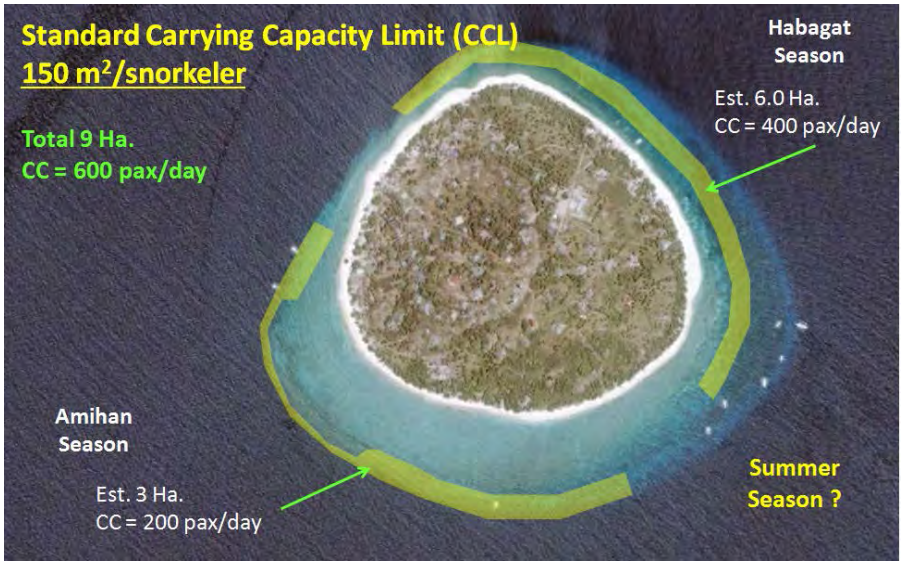


Figure 2-7. Snorkeling areas with corresponding carrying capacity limits in Balicasag Island, Panglao, Bohol.

We are fortunate also to work with the Green Fin team who visited Panglao last July-August 2015 to help out in the proper snorkeling techniques and diving education advocacy. They also conducted a snorkeling interaction survey and found similar result to our survey in 2014 wherein much of the reef contact is done by the local guides and less from the guests.

4) Beach in Alona

Municipality of Panglao proceeded with the usage control of Alona Beach. Alona Beach, which is a public beach located at the south-west tip of Panglao Island, is one of most popular destinations of Bohol for tourists as well as local people. There are 36 commercial facilities along the white beach stretching about one kilometer, such as restaurants, souvenir shops, resort hotels, diving shops, etc. According to the beach visitor counting survey conducted in 2014, an estimated more

than one million persons visited Alona Beach per day during peak season. Although it should be evaluated whether the current status is over-capacity or not, it is clear that the offshore waters of Alona Beach has resulted to eutrophication (overabundance of nutrients) caused by discharged water and from sewage contamination coming from the commercial establishments.

The salvage zone (20 meters from highest tide) of Alona Beach was the subject of the beach UC. Many establishments put up tables and chair by the beach during day and night which limits the area for beach walkers, swimmers and the likes despite prohibition by the National Water Code.
On 14th of July, 2014, a composite team from BTO, BEMO, LGU of Panglao and JET conducted the Alona Beach Salvage Zone Survey. The result shows that only 38% of Alona Beach is considered free zones while 45% are used by temporary structures such as massage beds, tables and chairs, tents while permanent structures like stairs and seawalls accounts to 12 % and another 12% for buildings which encroached the salvage zone (Figure 2-8).

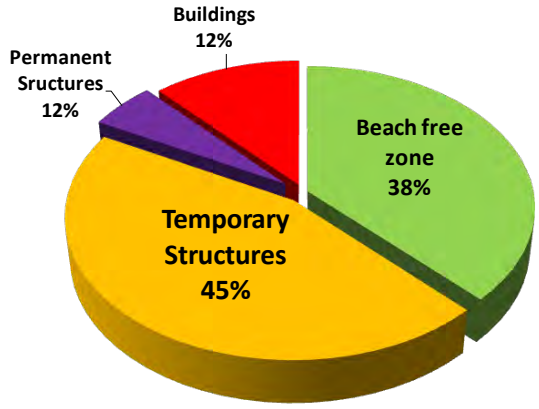


Figure 2-8. Salvage zone profile of Alona Beach showing violators and free zones.

In light of the current status, the Mayor signed the Executive Order No.9 on last August 27, 2014 to impose the 20m salvage zone. The E.O was implemented and the Municipality of Panglao management team help removed some temporary structure while other establishments initiated their own clean-up. As a compromise agreement only tables and chairs are allowed to be set up in the salvage zone after sunset only and cleaned up every night with no tables and chairs in sight every morning. Furthermore, they also imposed the 50-meter swimming zone from the lowest tide and demarcated with buoys. Boats are allowed temporary loading and unloading only while the rest of the boats are moored beyond the 50 meter zone. They have assigned a beach inspector along the beach to monitor its implementation.

(5) Improvement of Guide System (Activity 2-9 and 2-10 in PDM)

1) Hinagdanan Cave

Training workshop to local guides was conducted for two days and a trial run for five days in Hinagdanan Cave. Two separate cave questionnaire survey was conducted last May18, 2014 (before the training) and a last May 25, 2014 (after the training) in order to evaluate the perfor-

mance of the guides. The result shows that before the training, the satisfaction rate of the local guides was 80% excellent and with a grade of fair and poor at 1% each, on the other hand after the training, the guides received a score of 78% excellent. This may be lesser to the "before" however, the good level increased from 18% to 22% and no one graded them with fair and poor which is in general has a positive net effect (Figure 2-9).

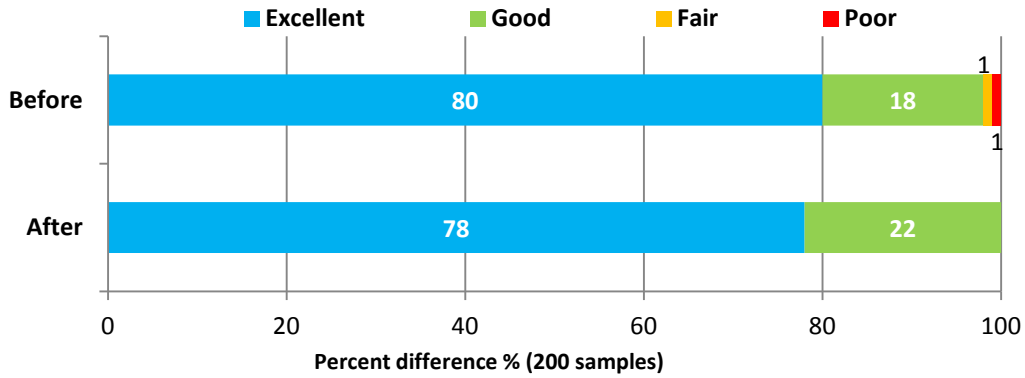


Figure 2-9. Evaluation of local guides before and after the Training

The Project conducted the survey again last March 2015, but the satisfaction level of the guides was much worse than May 2014 survey. 79% excellent went down to 71% and they have acquired fair and poor grades (Figure 2-10).

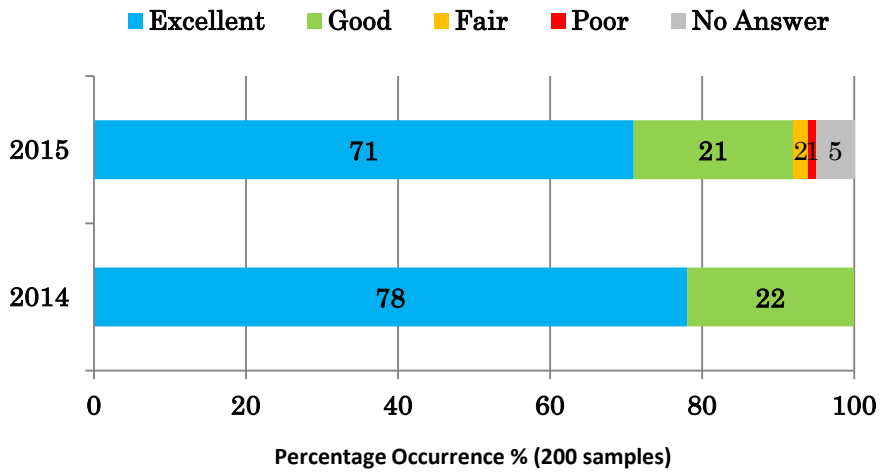


Figure 2-10 Difference of Evaluation after 10 month from Guide Training

Therefore, the Project discussed with Barangay Bingag on the need to improve the system and so the output of the meeting was to come up with this new guideline and incorporated the changes to the proposed amended ordinance which was approved by the Brgy Council last July 2015. The following are as follows;

Guide Policy

- A tourist(s) can only enter the cave accompanied by a local guide(s)

- Prescribed ratio for guests and guides to be followed strictly below

Number of Tourist in a Group	Number of Guide
1-10 persons	1 guide
11-20 persons	2 guides
21-30 persons	3 guides

Establishment of Guide Team

- All local guides shall be composed only of existing trained volunteer guides
- All official guides must be an accredited guide by Barangay Bingag
- New guide applicants should undergo training prior to accreditation
- All guides shall receive incentives in a form of PhP 10 per guests. The guides shall collect tickets from tourists and the ticketing office shall pay Ten Pesos per ticket collected as a form of proof of transaction.

2) Snorkeling in Balicasag Island

The Balicasag Island Snorkeling Guide Association (BISGA) has long been existing but inactive. The organization also does not have official Constitution and By-Laws and did not function as a team. The Project then assisted the group to re-organize and help improve their Constitution and By-Laws. Furthermore, the project gave workshops to the LGU and to BISGA in order to improve their snorkeling guide system in the island.

Training Workshop to Local Snorkeling Guides

Majority of snorkeling guides in Balicasag Island are basically member of BISGA while other "outsider" guides living in the island are not part of the organization. The Project held training workshops to the member of BISGA in partnership with the LGU. The dates and topics are shown in Table 2-7. The training plan is in attachment 3-6.

Table 2-7. Snorkeling Workshops Conducted

No.	Date	Topics
1	September 12, 2014	Discussion on Snorkeling Protocols
2	October 1, 2014	Discussion on Snorkeling Manual
3	October 29, 2014	Re-organization of BISGA and preparation of Constitution and By-law.

Improvement of Snorkeling Guide System

Instruction Manual for the Snorkeling Activity in Balicasag Island was drafted through workshops as mentioned above so that guides conduct appropriate environmentally-sound snorkeling guiding. In addition, the guides and the Project drafted their Constitution and by-laws and agreed on the

contents. Presently, the Constitution and by-laws was approved by BISGA, and registration to Department of Labor and Employment (DOLE) will be obtained. Contents of the Constitution and by-laws are as follows.

- Article 1: Name and Domicile
- Article 2: Purpose and Objective
- Article 3: Membership
- Article 4: Officers
- Article 5: Standing Committees
- Article 6: General Membership Meeting
- Article 7: Dues, Fees, Fines and other Payments
- Article 8: Fiscal Year
- Article 9: Amendments
- Article 10: Effectivity

(6) **Formulate and carry out training programs (Activity 2-11 in PDM)**

JET discussed with C/Ps and provided five trainings that capacitate the C/Ps as well as the guides in order to effectively implement usage control on carrying capacity. According to the progress of the Project, JET prepared training programs and implemented the following (Table2-8).

Table 2-8. Trainings for Output 2

No.	Date	Training
1	March 2014	Carrying capacity training
2	May 2014	Hinagdanan Cave guides training
3	September and October 2014	Snorkeling guides training
4	November 2014	GIS training
5	February 2015	Tourism resource monitoring training

(7) **Prepare administrative guidelines for the use by officials (Activity 2-12 in PDM)**

JET prepared administrative guidelines for adaptive management of tourism resources in Panglao Island so that C/Ps will continuously implement the basic system of adaptive management that the Project has introduced during project period. Basic system of adaptive management is implemented through the Panglao Island Executive Committee (PIEC) and how to proceed with discussion on usage control plans with the TCWG, Scientific Council and the PIEC governing board was explained in the guideline. The guideline was recently approved by the PIEC Board during the 3rd PIEC board meeting held last Aug 12, 2015 in the Governor's Mansion. This was supported by a board resolution that will be forwarded to the Sangguniang Panlalawigan for deliberation and approval. This will later become the official guidelines to continue on managing sustainably the environment of Panglao Island.

(8) **Study tour in Cebu and Negros Oriental (Activity 2-13 in PDM)**

The core members together with relevant stakeholders and the JET conducted a study tour to observe firsthand how they handle and manage their MPAs, EUF system, beach resources and reef ranger system in Cebu and Negros Oriental last July 1 to 4, 2014. A total of nine (9) participants attended the study tour represented by the two LGUs of Dauis and Panglao, BEMO, MFARMC of Panglao, BTO and JET headed by the Deputy Leader, Mr. Hirano.

They have met different individuals starting from Nalusuan Island, Cordova, Mactan in Cebu who manages a "resort-run" MPA and the how they invest in securing their MPA which leads to abundance of fishery resources used for tourism as well as fishery management. They also learned how the co-management agreement between the LGU and the Resort was crafted and the benefits derived from it. On the second league of the trip, the team went to Malapascua Island in Daan Bantayan, Cebu to see for themselves how the LGU managed the beach resource of the island and how they demarcated the salvage zone. They were able to talk with local officials as well as resort owners who gave their insights on the salvage zone implementation. On the third league, the team went to Dumaguete and visits the world famous Apo Island. The team had a discussion with the local officials managing the MPA and shared to the group their experience in handling carrying capacity limits, EUF and reef ranger system. The following day the team went back to Bohol.

The team later convened in Bohol and conducted a review workshop on what they have experienced and observed and gave their insights on what they can contribute positively to improve the management of resources in Panglao Island. Table 2-9 below shows the detailed itinerary of the study tour.

Table 2-9. Itinerary of Study Tour

Date	Destination and Objective	Observation
July 1, 2014	Nalusuan Island Marine Sanctuary (Mactan, Cebu)	Meet the mgt body of a "resort-run" MPA in Nalusuan Island, Cordova, Mactan
July 2, 2014	Malapascua Island (Daan, Bantayan, Cebu)	Meet the mgt body in Malapascua Island to visit their best practices on beach management
July 3, 2014	Apo Island (Dauin, Negros Oriental)	Meet the mgt body to observe their carrying capacity practices, environmental user's fee (EUF) system and reef ranger system.
July 4, 2014	Homeward bound	

2.2.3. Achievement of Output 2

Achievement status of the Output 2 following the indicators of the PDM is as follows (Table 2-10):

Table 2-10. Objectively Verifiable Indicator and Achievement Status of Output 2

Deliverable	Indicator	Performed
2. Basic system of "Adaptive Management" under which usage control on carrying capacity is applied in Panglao.	2.1 Initial figures of carrying capacity have been established based on the monitoring results and decision makings were carried out at the PIEC level in the tourism usage control component. 2.2 Administrative guidelines for official use, which include the basic system of adaptive management were prepared.	・Carrying capacities for Diving around Balicasag Island and Caving at Hinagdanan cave were set based on the monitoring results. ・Usage control protocol of diving around Balicasag Island and caving at Hinagdanan cave were agreed in TCWG meetings of PIEC. ・PIEC Board provided resolutions to LGUs. ・LGUs crafted municipal/barangay ordinance and implemented the usage controls. ・Administrative guidelines for official include the basic system of adaptive management has been prepared and agreed by PIEC.

C/Ps had a general knowledge of what carrying capacity limit (CCL) is about when the Project started. However, formulating and getting the ideal CCL was lacking. Therefore, C/Ps could not implement fully the proposed usage controls since a CCL is a prerequisite ingredient. Through series of surveys and training workshops, the Project was able to collect massive information which lead to a better and clearer decision making process in setting the CCL. Then appropriate activities were conducted (carrying capacity trainings, monitoring) to further strengthen the CCL. There were series of discussions with stakeholders, TCWG, Scientific Council and PIEC board which lead to an initial CCL, preparation of usage control plan based on that CCL and revision of usage control plan. Then now fully implemented and monitored to check its feasibility and cost-effectiveness and review and adjust to what is ideal. All these factors are the characteristic of an adaptive management strategy that forms the foundation of this project.

C/Ps will continue the periodic monitoring based on the manuals for tourism resources monitoring and they now have the full understanding of the importance of monitoring, and utilized monitoring result in doing adaptive management. As for guides in Panglao Island, there are snorkeling guides and Hinagdanan Cave local guides. However, they did not have certain rules and training opportunities and their knowledge on tourism resources management was not enough. Therefore, the Project provided trainings and formulated regulations that are now crafted as Municipal and

Barangay Ordinances and the situation of tourism resource management has improved.

2.3. Output 3: Consideration of Sustainable Tourism Development in Province of Bohol to Continue "Adaptive Management" for Surrounding Area of Panglao Island

2.3.1. Outline of the Activities

Outline of the Output 3 at the end of the Project is as follows:

(1) **Deliverables**

- New Tourism Development Concept, "Eco-tourism Bohol"
- More than 100 Individual Eco-tour Sites and 10 Day-tour packages
- New Tourism Portal Web Site of Province of Bohol
- Brochures and Banners of Eco-tourism Bohol

(2) **Knowledge and Capacity to be acquired by the Local Government Staff**

- To understand tourism resources of Bohol
- To understand the objectives and know-how of Eco-tourism Bohol
- To be able to plan and design eco-tours
- To be able to promote eco-tours
- To be able to utilize the website as a useful tool for tourism development

(3) **Final Targets upon Completion of the Project**

- Well-establish Bohol tourism branding through the development of 100 individual eco-tour sites and 10 packaged day tours
- Well-maintained tourism portal website

2.3.2. Activities

(1) **Review of Current Status of Tourism Resources and Development of Bohol (Activity 3-1 in PDM)**

Firstly, review of the current status related to tourism resources and development of Bohol were conducted mainly by data collection through the works such as field survey, web search, and existing secondary data which BTO has collected in past. The review of current status would be useful for setting new tourism concept and designing a pilot project to be done in this project.

On 4th of August, 2014, a Workshop was held participated by MTOs (Municipal Tourism Officers) under the Province of Bohol in order to explain to them about the objectives, scope of works, methodology, and schedule of the tourism development program in this project. In this workshop, MTOs were requested to submit information and data about their respective municipality in a form of Municipal Tourism information sheet prepared by JET and BTO.

(2) **Establishment of a New Tourism Development Concept of Bohol (Activity 3-2 in PDM)**

In establishing a new tourism development concept, several meetings were held to discuss and reach consensus among the counterparts and stakeholders, especially during the PTC (Provincial

Tourism Council) meeting on 30th of June 2014, all MTOs meeting on 4th of August 2014, and private sector gathering meeting last 12th of August 2014.

In conclusion of the said meetings above, the new tourism development concept of Bohol was set as **"Eco-tourism Bohol"** which aims at making good use of existing rich nature and culture resources and developing communities by resource base tourism with less initial investment. In the end of November 2014, a logo mark designed in the motif of a mangrove tree with fish leaves was approved among the stakeholders (Figure 2-11 and Figure 2-12).

Figure 2-11 Eco-tourism Bohol Concept and its Logo Design

Figure 2-12 Paper Fans of Eco-tourism Bohol

(3) **Preparation of Tourism Development Guideline of Bohol (Activity 3-3 in PDM)**

A tourism development guideline was in order to promote activities following the new concept (Figure 2-13). Under the guideline, provisions of three items (info introduction in new web-site, preparations of guide plate and welcome banner) were supported for each eco-tour site by JICA budget (Figure 2-14). This program has close relationship with "Visit Bohol 2015 program" conducted by USAID in parallel activities.

For securing implementation of this program, an "Eco-tourism Promotion Program Committee" was established in October 2014 as a main implementing organization in cooperation with BTO, all LGUs, private sector and JET (Figure 2-15). This committee consists of 11 members representing private and public sector, chaired by a representative from a private travel agent in Bohol. The main works of this committee are the following 1) eco-tour site inspection, 2) eco-tour program examination and preparation, and 3) advisory for implementation of the program. The existing committee, such as Provincial Tourism Committee, was respected as important partner.

BTO and JET prepared a tourism development guideline which is a technical reference in design and implementation of eco-tour. This guideline consists of 1) information collection, 2) field survey, 3) marketing interview, 4) eco-tour improvement, and 5) packaging of eco-tour sites.

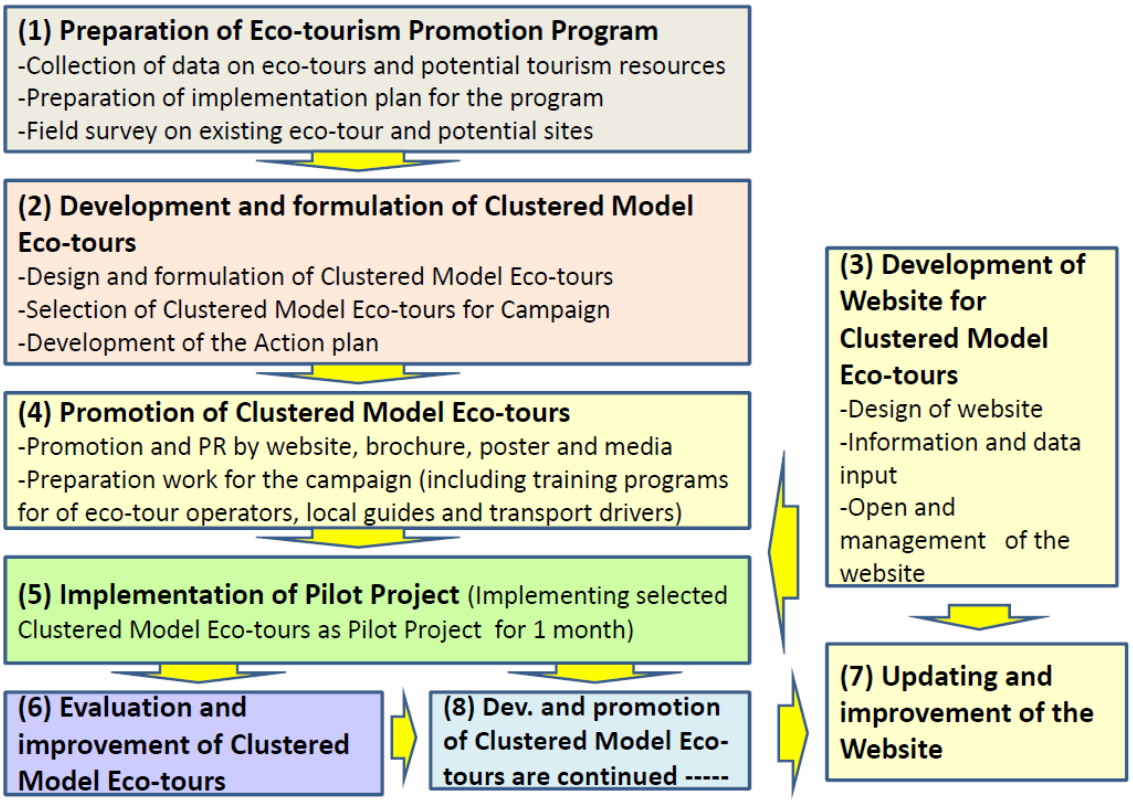


Figure 2-13 Implementation Work Flow of Eco-tourism Development Program

Figure 2-14 A Supporting Framework for Eco-tourism Development

Figure 2-15 Implementation Body of Eco-tourism Development Program

(4) **Development of Eco-tour Sites and Packaging Tours (Activity 3-5 in PDM)**

In initial stage, goals of the program was set, namely development of more than 100 individual eco-tour sites and 10 day-tour packages (Figure 2-16). The works commenced starting July 2014 and as follows, 1) information collection from all municipalities, 2) inspection survey of individual site, 3) web-site development (see later in detail), 4) packaging of individual sites, 5) site demonstration survey of the package tours, 5) local guide training (Figure 2-17). Subsequent activities after the series of activities mentioned above was the pilot project conducted from Febru-

ary 2015 (see later in detail). The month of February and March 2015 were identified as the prioritized promotion period for the pilot project. After the February and March promotion campaign, the series of works from 1 to 5 has been continued mainly by counterparts, as a result, the goal to capacitate counterparts was achieved by the completion of this project, namely development of 102 individual eco-tour sites and 12 day-tour packages (Table 2-11). The series of works is expected to be continued by counterparts even without the project support. Finally all developed eco-tour sites during this project period received welcome banners and guide plates in the final workshop by JET last September 2, 2015 (Figure 2-18, Figure 2-19).

Figure 2-16 Goals of Eco-tourism Development

Figure 2-17 Process flow of Eco-tourism Development

Table 2-11 Conducted Works for Eco-tourism Development

Date	Types	Objectives and Target Town
4th Aug 2014	Workshop	Launching the program
6th Aug 2014	Workshop	(general)
12th Aug 2014	Workshop	(general)
2nd Sep 2014	Individual Site Inspection	Antequera, Catigbian, Sagbayan
23rd Sep 2014	Workshop	(general)
8th Oct 2014	Individual Site Inspection	Cabilao
22nd Oct 2014	Individual Site Inspection	Batuan, Bilar
5th Nov 2014	Individual Site Inspection	Baclayon
6th Nov 2014	Committee Meeting	(general)
7th Nov 2014	Individual Site Inspection	Bilar
24th Nov 2014	Packaging Meeting	Site1 (Tubigon, Loon, Maribojoc)
27th Nov 2014	Packaging Meeting	Site2 (Anda, Jagna, Loay)
27th Nov 2014	Packaging Meeting	Site3 (Albur, Loay, Batuan, Bilar)
1st Dec 2014	Site Demonstration Tour	Site1 (Tubigon, Loon, Maribojoc)
12th Dec 2014	Site Demonstration Tour	Site3 (Albur, Loay, Batuan, Bilar)
15th Dec 2014	Site Demonstration Tour	Site2 (Anda, Jagna, Loay)
17th Dec 2014	Packaging Review Meeting	Site1, Site2, Site3
3rd Feb 2015	Local Guide Training	Site1, Site2, Site3
From Feb 2015	Pilot Project (Eco-tourism Bohol Promotion Campaign)	

(esp. Feb & Mar)	** see late in details*	
8th Apr 2015	Review Workshop	Site1, Site2, Site3
13th May 2015	Individual Site Inspection	Buenavista, Talibon, Ubay
22nd May 2015	Individual Site Inspection	Jagna, Duero, Candijay
27th May 2015	Individual Site Inspection	Mabini, Alicia, Ubay
5th Jun 2015	Individual Site Inspection	Corella, Sikatuna, Loboc
9th Jun 2015	Individual Site Inspection	Tagbilaran
17th Jun 2015	Individual Site Inspection	Inabanga
19th Jun 2015	Individual Site Inspection	Calape, Antiquera
26th Jun 2015	Individual Site Inspection	Dimiao, Lila
8th Jul 2015	Individual Site Inspection	Cogtong Bay, Garcia Hernandez
10th Jul 2015	Individual Site Inspection	Balilihan, Sevilla
10th Aug 2015	Package Demonstration Tour	Site9 (Corella, Sikatuna, Loboc)
12th Aug 2015	Package Demonstration Tour	Site8 (Danao, Carmen, Sevilla)
13th Aug 2015	Package Demonstration Tour	Site6 (Talibon, Ubay)
14th Aug 2015	Package Demonstration Tour	Site7 (Mabini, Duero, Dimiao)
17th Aug 2015	Package Demonstration Tour	Site4 (Loon, Antequera, Balilihan)
18th Aug 2015	Package Demonstration Tour	Site5 (Loon, Antequera, Balilihan)
2nd Sept 2015	Final Tourism Workshop	Metro center Hotel, Tagbilaran, Bohol

Figure 2-18 Distributed Welcome Banners for Individual Eco-tour Sites (Design Samples)

Figure 2-19 Distributed Guide Plates for Individual Eco-tour Sites (Design Examples)

(5) **Implementation of Pilot Project (Activity 3-6 in PDM)**

Aiming at actively and smoothly launching the new tourism concept and program, the pilot project, namely "Eco-tourism Bohol Promotion Campaign", was conducted last February 2015 (prioritized period was February and March 2015). The draft contents, methodology, and schedule of the pilot project have been discussed and reached consensus in the first committee meeting last 6th of November 2014.

This pilot project has two main components. The first component is to hold campaign tours which are composed of three (3) trail day -tours in total combined with some eco-tour sites in different municipalities. In this campaign tours, it lasted for three weeks and actual tourists were invited at a discounted rate (Figure 2-20). This campaign tour was expected to improve human resources and facility of each site. In the Bohol surprise tour 1 during the first week (19th to 21st of February 2015 for three days), it accommodated a total of 54 participants. In the Bohol surprise tour 2 in the second week (26th Feb to 1st March 2015 for four days), it was participated by 95 vis-

itors, and in the Bohol surprise tour 3 in the third week (5th to 8th Mar 2015 for four days), it was able to get 93 participants. All in all the tour was able to obtain 242 participants in the three weeks period (Figure 2-21).

Figure 2-20 Itinerary of Three Targets of Promotion Campaign

Figure 2-21 Pictures of Promotion Campaign

The other component of the pilot project was the grand "Launching Ceremony" which was attended by Governor Edgar Chatto, all Mayors and MTOs, and tourism sector stakeholders in order to announce the "Eco-tourism Bohol" officially. During the ceremony, some lessons learned from the campaign tours were shared among the provincial government officials in order to spread the learning experiences and knowhow. The launching ceremony was held last 21st of March 2015, and chaired by the Governor and participated by 146 attendees. The ceremony was also publicized in some local newspapers and Japanese newspaper as well (Figure 2-22).

LAUNCHING. Gov. Edgar Chatto with tourism stakeholders at yesterday's grand launching at the Bohol Tropics together with Kuniomi Hirano, deputy leader of the JICA Expert Team, Judilyn Quiachon of DOT-7, Provl Board member Yul Lopez, Liza Quirog, Mayor Lloyd Lopezand Anda Mayor Dodong Amper.

TOURISTS WILL. . .

From p.1

Tour No. 3 includes a visit at the cocojam industry in Albur, ironsmith workshop in Loay, Balay sa Humay in Batuan , Bohol Biodiversity compkex in Bilar and ancestral house in Loay (9:00am 5:00pm)

Booking for the tours can be done at the Bohol Tourism office at the Governor'sd Mansion while its website is atwww.boholtourismph.com

Governor Edgar M. Chatto officially launched theEcotourism Bohol Program, a component of the Japan International Cooperation Agency (JICA) Sustainable Environment Protection Project (SEPP)

The event was witnessed by DOT Region 7 representative Ms. Judilyn Quiachon, 1st District Board Member Yul Lopez, Municipal Mayors, Heads of PGBh offices, SEEM Cluster Head, Provincial Tourism Council, Municipal Tourism Officers, Ecotourism Sites Representatives, Tour Operators, Tour Guides, Transport Group Representatives, members of the Press including YoichiroAso of the Manila Daily Shimbun, members of the Ecotourism Promotion Committee and other tourism stakeholders.

Kuniomi Hirano, deputy leader of the JICA Expert Team said the objectives of the program are to encourage well-balanced development of whole Bohol, to make a new Bohol branding, to contribute on local economy and community income and to attract more tourists by offering new tourism destinations and tour products.

JICA also supports the program with a website (www.boholtourismph.com) for all eco sites. Guide plates and Welcome Banners were given to sitespart of the Bohol Surprise Tours 1, 2 and 3. Other needs of eco sites were also addressed.

Hirano added that Welcome Boards (acrylic material) and Welcome Banners will be given to 100 more tourism sites in the province by August 2015. Ecotourism Bohol Program expects to come up with 10 more eco tours and JICAwill prepare brochures for new clustered- eco tours before the project ends.

Atty. John Vistal, Provincial Planning and Development Coordinator shared his eco tour experiences in Ise City, Japan during his recent trip funded by JICA.

NonetMadriñan-Bolo, chair of the Ecotourism Promotion Committee presented the survey results of the three new Bohol Surprise Tours that showed paying guests gave good satisfaction rating for all three new eco tours. The same rating was received by individual eco sites. The same survey showed guests willing to pay for the price of said tours which they consider fairly-priced.

In his speech, Gov. Chatto declared his support to the Eco-tourism Bohol Commitment - to value and preserve Bohol's nature, culture, food and livelihood, introduce local resoures and way of life, empower local communities for sustainability, establish a sense of mutual responsibility with the tourist as caretakers of the community. To underscore his support, he alsodeclared that the LGU commits to make policies that are conducive to ecotourism development in Bohol.

In the EcoTourism Bohol website is the inventory of destinations: completed, not yet completed and those which are still collecting data for the development program.

Figure 2-22 A Newspaper Article of Eco-tourism Bohol (Bohol Chronicle)

The target of the pilot project in February and March 2015 was in total three package day-tours. The main purpose of developing these day-tours is to decentralize the tourism destinations especially in Panglao Island. In light of this purpose, the following viewpoints should be respected for selection of the tour target, 1) accessibility from the center of Bohol, namely 1 or 2 hours travel time from Tagbilaran City, 2) combination of some eco-tours in different municipalities to involve as many municipalities as possible, and 3) inclusion of a variety of potential resources (e.g. mountains, oceans, cultures, entertainment, local products, local foods, topography, etc) under the concept of eco-tourism. To keep the capacity at a certain level which is able to accommodate foreign tourist and all selected eco-tour sites of the pilot project received minimum supports by JET in terms of improvement of facilities, equipment, information, and human capacity. Additionally a review workshop was held last 8th of April 2015 for future improvement.

After the March 2015 pilot project, a series of site inspection surveys and package demonstration surveys were conducted continuously and finally a total 102 individual eco-tour sites and 12 day-tour packages were developed through these surveys.

(6) **Dissemination and Promotion of Eco-tourism Bohol (Activity 3-4 in PDM)**

To penetrate deeper the concept of "Eco-tourism Bohol" among the stakeholders, the "Eco-tourism Bohol Commitment" was drafted and the Governor led the pledge of commitment during the launching ceremony. The Eco-tourism Bohol Commitment posters with wood-frame were prepared and posted in different government offices and private establishments as well (Figure 2-23). Additionally, an oath taking to uphold Eco-tourism Bohol Commitment was done by all participants during the workshop held last 2nd of September 2015 at the end of the project.

Establishment of portal web-site and distribution of the eco-tourism brochure were done as well (see later in details), additionally 33 sets of 3-color banners were also posted in the city for public promotion (Figure 2-24). On the other hand, a lot of meetings and workshops participated by MTOs and private sector were held in this project, mentioned in section (4) above.

Figure 2-23 Commitment of Eco-tourism Bohol

Figure 2-24 Campaign Banners in City Areas

(7) **Establishment of a Tourism Website of Bohol (Activity 3-7 in PDM)**

This activity was mainly done by BTO staffs who manage the website. Two C/P from BTO staff worked with this project to determine the main composition of website and make adjustments with relevant organizations. In addition, about five BTO staff worked on the updating of the website pages and collecting of information under the supervision of two staff as mentioned above.

a. Clarification of Concept of the Website

The basic concept for the website was clarified by BTO and JET. There were roughly two existing websites introducing tourism in Bohol. Although these websites included reservation system for tours and hotels, most of these websites focused on the famous tourism spots in Bohol and written in very long text like websites managed by municipalities. As mentioned earlier, JET has set three basic concepts for the new website:

- ✓ The website will include not only famous tourist spots but also tourism information of all existing tourism development in the Province of Bohol.
- ✓ The website will minimize text as much as possible, and focus on visual appeal using photos and videos.
- ✓ Contact information of all selected eco-tours should be given in the website.

b. Design of the Portal Web-site

Based on ease of internet search and availability of domain, the www.boholtourismph.com domain was selected. BTO contacted all relevant tourism organizations and decided that this website will be the official website for Bohol tourism. In addition, based on the discussions with BTO, the Project decided that the new website will introduce tourism information for the whole Province of Bohol and using only English for continuous updating of the website. JET assisted in the whole conceptualization and design of the website and making of eco-tour subpages. In this website, three subpages were established. These pages can be accessed from the homepage. There is one attractive photo for each eco-tour in the ecotourism subpage with eco-tour information. By clicking on each eco-tour photos, the eco-tour page can be accessed. Detailed pages also used as many photos as possible for visual appeal. This is the official web address **http://www.boholtourismph.com** showing the homepage and various webpages of the website (Figure 2-25).

Slideshow of the Top-page

Homepage

Ecotourism

Sightseeing

Figure 2-25. Official website of Tourism Bohol showing homepage and various subpages in the web-site (www.boholtourismph.com).

BTO and JET also made pages which introduce packaged tours for the pilot activities of "Eco-tourism Bohol Promotion Campaign" in the Ecotourism subpage. Reservation system is also located on this page, so tourists can make reservations via this subpage. During the campaign period, several brochures printed with QR code can be accessed from ecotourism subpage and were distributed to tourists and hotels. As a result, some tourists made reservations from this website during the campaign period. Reservation information was automatically transferred to BTO and they managed reservation conditions and transferred the information to the corresponding travel agency.

c. Usage of Social Media

Social media such as Facebook and Twitter were used to increase access to the website. Social media plays an important role to increase traffic to websites in the modern world and so the tourism information can be transmitted all over the world. A new Facebook page (**https://www.facebook.com/Boholtourismph**) dedicated for tourism Bohol was set-up which is connected to the new website. BTO is the administrator of this Facebook account as well as the new website. Whenever a keyword such as "Bohol tourism" is searched on the Internet, search ranking of this website will come out on top (as of August 31, 2015) which would mean the website will be visible first and becomes the first choice of anyone searching about Bohol tourism.

Updating the website will be done by BTO and JET team and all information gathered from the field contributed by MTOs in each municipality will be used to update the website. As a result of updating work, about 40 eco-tour pages and 12 packaged-tour pages were made as of August 31 2015. In addition, tourism information such as hotels and restaurants excluding eco-tour information was also updated by BTO.

d. Technical transfer

The five training session were conducted about website management for continual updating of the website after project completion. In this training, participants not only learned updating methods but also discussed updating the framework for the future. BTO staff was especially interested in marketing and asked a lot of questions about it. Table 2-12 below shows the various trainings conducted by JET.

Table 2-12. Training schedule of website training

Training	Date	Venue	Participants	Topic
1st Trng.	2/6/2015	JET Office	7 staff of BTO	・ Outline of website ・ Use of social media ・ Data sharing method
2nd Trng.	2/13/2015	JET Office	6 staff of BTO	・ Updating procedure of website
3rd Trng.	2/25/2015	JET Office	6 staff of BTO	・ Updating practice ・ Confirmation of collected info in the future
4th Trng.	8/26/2015	JET Office	6 staff of BTO	・ Review of updating procedure of website
5th Trng.	8/27/2015	JET Office	6 staff of BTO	・ Updating of website

(8) **Distribution of Brochures and Banners of Eco-tourism Bohol (Activity 3-8 in PDM)**

Eco-tourism Bohol produced two kinds of brochures developed by JET support. One is the brochure for the pilot project "Eco-tourism Bohol Promotion Campaign" which was distributed to counterparts, hotels, restaurants, airport and public facilities, and actual tourist. This introduces the three (3) day-tour packages (Bohol Surprise Tour 1-3) for the eco-tourism campaign. A total of 10,000 copies were prepared and distributed. The other brochure developed by JET was the

final version which includes the 102 individual eco-tour sites and 12 day-tour packages as well as the eco-tourism concept, objectives, and introduction of the portal web-site. A total of 20,000 copies were prepared and distributed (Figure 2-26).

Figure 2-26 Final Prepared Brochure (Cover-page and One Sample of Contents)

2.3.3. Achievement of Output 3

Achievement status of the Output 3 following the indicators of the PDM is as follows (Table 2-13):

Table 2-13. Objectively Verifiable Indicator and Achievement

Deliverable	Indicator	Performed
3. Consideration of Sustainable Tourism Development in Province of Bohol to Continue "Adaptive Management" for Surrounding Area of Panglao Island	3.1 The concept of Bohol tourism development is clarified and trials of tourism development are implemented as pilot activities.	・ A new tourism concept "Eco-tourism Bohol" was established and disseminated in the province. In the launching ceremony last March 2015, the concept was officially launched by the Governor. ・ A new website was developed, operated and maintained by the provincial government staffs. ・ A promotion campaign in the pilot project was held from February 2015 and participated by 242 participants. Some local newspapers and journals publish the activity. ・ Targeted 13 eco-tour sites in the promotion campaign improved their facilities, equipment, and human resources. ・ Finally total 102 individual eco-tour sites

		identified and prepared for tourism development and 12 package day tours were developed and introduced in the website and all welcome banner and guide plate were delivered to all sites.

[Improvement of on-site STFs]

2.4. Output 4: Effective and realistic laws and regulations for the construction and the management of the on-site STFs are proposed.

2.4.1. Outline of Activities

Outline of the Output 4 at the end of the Project is as follows:

(1) **Deliverables**

- Additions/revisions on "Bohol Sanitation Code" and "Municipal Ordinances" on the management of on-site STFs (including IRR)

(2) **Knowledge and capacity to be acquired by the local government staff**

- To obtain knowledge on the relevant laws and regulations for the management of on-site STFs from national to municipal levels
- To obtain knowledge for the explanation and guidance on the revised laws and regulations to concerned people
- To understand required arrangements for the revisions/additions to existing laws and regulations through the future

(3) **Final targets upon completion of the Project**

- Added/revised laws and regulations relevant to on-site STFs are put into practice in the province.
- All concerned parties practice requirements on the on-site STFs covering planning/design, construction and O&M stages.
- Improvement of the effluent from on-site STFs is achieved to meet design treatment efficiency of on-site STFs.

2.4.2. Activities

(1) **Conduct seminar for C/Ps: confirmation of the component approach, data base survey, etc. (Activity 4-1 in PDM)**

After commencement of technical assistance from June 2013, seminars/workshops were conducted three times by the beginning of July, 2013. Discussions on the methodologies for the improvement in the sewerage component were made among the participants referring to the suggested plans by JICA Expert Team (JET) and working environment was established.

(2) **Collect and summarize information on the existing laws and regulations on the on-site STFs (Activity 4-1 in PDM)**

Relevant laws and regulations were collected and summarized having requested the C/Ps to cooperate through discussions at some workshops.

(3) **Conduct interview survey with concerned parties (Activity 4-2 in PDM)**

JET prepared detailed schedule for the field interview survey in collaboration with C/Ps of Panglao and Dauis municipalities. The interview survey was conducted for households and hotels last July 2013 to find installation status and identify operation and maintenance (O&M) practices on the on-site STFs.

(4) **Study of an effective management system in regulation, inspection and provision of possible penalties (Activity 4-3 in PDM)**

JET prepared draft laws and regulations to be revised/ modified based on issues and problems identified in the field and results of review on existing relevant laws and regulations. The draft was used as the reference for discussions at the workshop.

(5) **Conduct seminar for the C/Ps: confirmation of component approach, data base survey, etc. (Activity 4-4 in PDM)**

The workshop for the C/Ps was held to discuss revisions/modifications on the relevant laws and regulations referring to the draft prepared by JICA Expert Team. It was confirmed by the all participants that standard design of septic tank (ST) in the existing relevant laws was misunderstood by them at the time the workshop was held. Details on implementing rules and regulations (IRR) were prepared for proper application of standard design of ST in consideration of special soil conditions in Panglao Island. In addition, required work by municipal officers for the management of STs was clarified covering a series of work from planning to the approval for the use of the facility.

(6) **C/Ps will study required change of laws and regulations together with guidelines/manuals (Activity 4-4 in PDM)**

C/Ps studied proper design and construction of STs reviewing implementing rules and regulations given by JET. Then, they prepared draft revisions/modifications to existing ordinances, as required.

(7) **Collaboration by concerned parties to come up with a proposal on the required SW and change of regulations/guidelines (Activity 4-4 in PDM)**

For finalization of the revisions/modifications on existing relevant laws and regulations; Bohol Sanitation Code and municipal ordinances, C/Ps arranged discussions within respective departments/sections to get comments and finally concurrence.

(8) Conduct seminar on proposed laws and regulations (Activity 4-4 in PDM)

Draft implementing rules and regulations on STs were agreed by concerned provincial offices and submitted to provincial assembly for final approval. On the contrary, for the revisions/additions to existing municipal ordinances, the requirements were explained to *Sangguniang Bayan* members of the respective municipalities at the beginning of October, 2013 to get full support for realization of the changes.

(9) Discuss with concerned governmental offices on the findings and draft proposal on laws and regulations (Activity 4-4 in PDM)

JET and C/Ps explained to the mayors of the two municipalities directly and got concurrence from them on the need of revisions with full understanding on the requirements of STs. However, it was confirmed that further involvement of *Sangguniang Bayan* members was important, since majority of households need to construct new STs entailing penalty, in the fact that most of the existing ones are against standard design of the required facilities.

(10) Get initial concurrence from top management of concerned offices: province and municipalities (Activity 4-5 in PDM)

As a result of several follow up meetings with mayors and *Sangguniang Bayan* members of the two municipalities during November, 2013, the draft ordinances were basically agreed.

(11) Assist C/Ps and Sangguniang members for additions/revisions to existing laws and regulations (Activity 4-6 in PDM)

JET continued to support C/Ps for the dissemination of information to the people and community meetings in barangay level, since there are some complex problems including that the owner of ST is private resident/hotel and the soil condition in the Island is specific consisting of limestone. Never the less, concerned offices of the municipalities started to apply appropriate standard design of STs for newly planned houses, since there is no change on the standard design of STs in the existing National Plumbing Code.

(12) Review proposed draft municipal ordinances based on inspection results on existing septage treatment systems in the Philippines (Activity 4-6 in PDM)

The draft municipal ordinances prepared by the end of 2013 were reviewed based on the inspection results on the existing septage treatment systems in the Philippines by concerned officials both from province and municipalities. The ordinances adopted by Dumaguete city were mainly referred to.

The mechanism for the collection of septage charges is presented in the F/S for the Construction of a Septage Treatment Plant. It is reasonable to collect charges corresponding to their water consumption rate at households/hotels. However, in case of no provision of public water supply, the

charge may be determined adding to asset tax, as applied in San Fernando City, La Union. More practical method, such as collection of charges under the responsibility of Barangay officials, may be studied. Additional ordinances to include those for septage treatment shall be prepared in early stage referring to Dumaguete City case.

(13) **Get concurrence from the Panglao Island Executive Committee (PIEC) on the modified/revised laws and regulations through explanations and discussions (Activity 4-7 in PDM)**

The Waste Management Working Group submitted a proposal in May, 2014 to PIEC for the revisions of the existing relevant laws and regulations. The PIEC agreed to revise existing laws and regulations and instructed concerned municipalities to finalize the ordinances immediately.

(14) **Prepare manuals/reference materials for the field activities by relevant officials and conduct training for them (Activity 4-8 & 4-9 in PDM)**

JICA Expert Team prepared manuals/references for the work from planning/design to field inspection and final approval of STs. Using the manuals, JICA Expert Team conducted training during May and June, 2014 for the Task Force (Municipal Sewage and Septage management Office: MSSMO). Then, JICA Expert Team collaborated with MSSMO staff by each municipality (Dauis and Panglao) in the field.

(15) **Complete the process for revisions/modifications of existing laws and regulations and follow up in the field (Activity 4-10 in PDM)**

Draft ordinances for each municipality were prepared by the end of June, 2014 and it was sent to *Sangguniang Bayan* meeting for their study and approval. Discussions on the draft were started in July, 2014. However, the revisions of the ordinances have not yet been finalized as of June, 2015, due to the issues on the need of renewal of existing STs at majority of households. It is necessary for the municipalities to expedite finalization of the ordinances increasing the chances of communication with residents to promote the understanding on water pollution control.

(16) **Provide supplemental countermeasures for the implementation of an effective system (Activity 4-11 in PDM)**

The need of renewal of STs with a high cost for most of existing ones makes *Sangguniang Bayan* members difficult to finalize the ordinances. Thus, various countermeasures shall be provided at the same time including the following:

- Conduct community meetings in barangay level as many as possible to get concurrence from residents on the need of countermeasures.
- The grace period for the renewal of ST shall be set with a longer period.
- Construction of community toilets for low income households and effective use of the toilets with full understanding from them.

- LGUs shall provide people with financial support for toilet construction.

Although there are problems on existing STs requiring modifications/renewal, after year 2013, they have been applying revised design and construction method of the STs according to proper interpretation of standard STs in the National Code.

(17) **Propose revisions/modifications of existing laws and regulations based on the experience up to the end of 2014 (Activity 4-12 in PDM)**

Several workshops had been held to improve consciousness of the participants on the proper countermeasures and C/Ps developed an action plan based on the road map suggested by JICA Expert Team. The action plan includes various kinds of countermeasures to the residents as described in the previous activity (16).

2.4.3. Achievement in Output 4

Achievement status of the Output 4 following the indicators of the PDM is as follows (Table 2-14):

Table 2-14. Objectively Verifiable Indicator and Achievement Status of Output 4

Deliverables	Indicator	Performed
4. Effective and realistic laws and regulations for the construction and the management of the on-site STFs are proposed.	Effective and realistic draft control plan including periodical inspection and possible penalties are presented for both tourism facilities and general households to be approved by PIEC.	・ Effective modifications/additions to existing relevant laws and regulations for the control of on-site sewage treatment facilities both for households and commercial establishments were proposed including penalty clauses. Implementing rules and regulations for the construction of ST were supplemented for Bohol Sanitation Code. ・ LGU staff understood all relevant laws and regulations. They can explain revised ordinances to the people and required draft additions on septage treatment system were prepared. ・ Waste Management Working Group studied draft ordinances and submitted it to PIEC main meeting to get their concurrence. The PIEC requested immediate finalization of the proposed ordinances. Concerned municipalities started finalization process.

There was almost no experience by C/Ps on the review/study of relevant laws and regulations on the on-site STFs. Accordingly; they did not have a concrete and accurate idea on the structure of ST and treatment capacity. Then, they followed the manner of design according to the traditional way in Panglao Island.

Through a series of workshops and individual meetings at provincial/municipal offices, C/Ps recognized all relevant laws and regulations from national to municipal levels with their characteristics and limitations. In line with the idea for completion of a septage management system in the near future, C/Ps prepared draft ordinances for the management of a septage treatment plant including penalty and charge collection, aside from those for ST control.

2.5. Output 5: Effective and realistic management systems to control on-site STFs covering Panglao Island are established.

2.5.1. Outline of Activities

Outline of the Output 5 at the end of the Project is as follows:

(1) **Deliverables:**

- Effective and realistic organization is established for the management of on-site STFs
- Manual for LGU staff work for the management of on-site STFs covering Planning/design, construction and O&M

(2) **Knowledge and capacity to be acquired by the local government staff**

- Proper implementation of required work by LGU from planning/design to O&M in use of the manual
- To understand the manner of monitoring on and provision of countermeasures to water pollution sources and water body
- Promotion of cooperation within municipalities and between provincial and municipal offices concerned
- To understand the need of self-support for the improvement of technology and systematic work through the future

(3) **Final targets upon completion of the Project**

- Adequate information on the management of the on-site STFs is disseminated to concerned parties by the staff members assigned (Task Force who shall be the core staff in the establishment of a specific office for the management of on-site STFs in the future).
- Financial support is ensured for the Task Force to manage logistic support for the work
- The Task Force (Municipal Sewage and Septage Management Office: MSSMO) carry out systematic work required to improve effluent quality from on-site STFs using the manual prepared according to revised laws and regulations.

2.5.2. Activities

(1) **Collect information on the existing structures for the management of on-site STFs including financial status (Activity 5-1 in PDM)**

Management status on the on-site STFs was investigated requesting information collection to provincial and municipal C/Ps. It was found that there is no close coordination between province and municipalities for the management of on-site STFs. The required work for the re-

view/check of ST designs and final approval to use constructed facilities had been mainly undertaken by MPDO supported by engineering and sanitation health offices, on a required base. Accordingly, there was no permanent organization for the management of on-site STFs.

(2) **Study an appropriate structure for management of on-site STFs (Activity 5-2 in PDM)**

Based on the findings with issues and problems on present management of on-site STFs, a plan for the required organization with staff members was prepared.

(3) **Study to establish laboratory for sewage examination and discussions with concerned provincial offices (Activity 5-14 in PDM)**

There was no sewage laboratory in Province of Bohol as of 2013, even a simple laboratory with minimum examination equipment/facilities. All examinations for sewage quality were contracted out to the laboratories in other provinces until the time for discussions on the introduction of the laboratory. Discussions on the improvement need were made among concerned offices of the province; BEMO, PPDO and PHO for the installation of a simple laboratory for sewage examination on the indices for the minimum requirements. In the Philippine side, PHO agreed to install the laboratory and BEMO to arrange staff for the examination work. While, JICA planned to provide required equipment and facilities to install a simple laboratory.

(4) **Study on the arrangement of the office with staff members with reference to the establishment of sewage laboratory and discussions with concerned provincial offices (Activity 5-14 in PDM)**

Since the installation of sewage laboratory is the first experience in Bohol, it was planned to improve it from a simple laboratory to formally authorized one by DENR through the future. BEMO arranged to assign staff for the laboratory including a chemist and two support staff in June, 2014 and they started to attend domestic training courses.

(5) **Identify present issues and problems on existing offices and staff concerned to manage on-site STFs in compliance with existing laws. Training will also be done during the work considering proposed municipal ordinances.**
(Activity 5-2 in PDM)

The standard design and O&M of STs shown in national Codes (Sanitation and Plumbing Codes) are to be adopted without any change. But a proper interpretation on the requirements was necessary for the all concerned parties. In this regard, “Implementing rules and Regulations for design, construction and O&M of STs” was prepared and added to the existing Bohol Sanitation Code. Municipal ordinances shall refer to the additions to properly comply with the requirements.

In use of the detailed guideline mentioned above, MSSMO staff members of the municipalities

were trained covering review of plan and design of STs, field inspection during construction of the facility and final approval to use the facility by the owner. Issues and problems on the actual work by the staff were identified through the collaboration by JICA Expert Team and MSSMO staff in the field.

(6) **Recommend required organizational arrangements with staff members based on experience for the management of on-site STFs (Activity 5-2 in PDM)**

The problems on the staff to achieve required work according to the guideline were identified. A proposal was prepared to improve the performance including technical aspect, qualification and experience of the staff and financial support.

(7) **Explain to and get concurrence from PIEC on the new organizational arrangements (Activity 5-2, 5-10 in PDM)**

The waste management working group studies required organization for the management of on-site STFs in the occasion of the study for the improvement of relevant laws and regulations. Thus, the proposal to the main conference for PIEC covered both the requirements of laws and regulations, and organizational set-up. PIEC instructed concerned municipalities to arrange organization (MSSMO) with reference to Municipal Disaster Risk Reduction Management Office (MDRRMO).

(8) **Study for financial arrangements to ensure newly created office for the management of on-site STFs (Activity 5-3 in PDM)**

The records on financial arrangements by the municipalities in the last 2 years were collected and studied, especially with reference to the budget for environmental projects. With regard to income of the municipalities, Dauis received most of income from IRA of National government, while Panglao received about 50% of annual total income from commercial tax and remaining from IRA. Regarding environmental expenditures, Dauis did not spend specifically for environmental projects, only having provided for the sanitation requirements, while, Panglao invested about 10 million pesos in 2012 for the coastal area improvement. Under the above financial situations, it seems to be difficult for the municipalities to ensure budget for the operation of a new office. Financial assistance from outside shall be sought including partial assistance from tourism business.

(9) **Arrange required staff for the management of on-site STFs including employment of staff, as required (Activity 5-4 in PDM)**

The mayors of the two municipalities appointed staff for the establishment of MSSMO through issuance of an executive order. However, assigned staff from PPDO, Engineering Office and MHO held two posts concurrently, due to lack of qualified staff with experience in the municipalities and shortage of the budget for the operation of the new office. MSSMO will be merged into

MDRRMO this year, budget for which will be contributed by the National Government.

(10) **Hold Workshop for the staff to manage on-site STFs (Activity 5-5 in PDM)**

After approval at the PIEC conference on the supplemental "Implementing Rules and regulations on design and construction of STs" to Bohol Sanitation Code, manner of management work by the staff of MSSMO with detailed reference materials was transferred through the workshop.

(11) **Implement the work for about 1 month according to new arrangements (Activity 5-6, 5-11 in PDM)**

The staff of MSSMO of the two municipalities conducted work for the management of STs using guidance provided at the aforementioned workshop. JICA Expert team extended assistance with advice to the staff having visited their offices.

(12) **Evaluate the results of field work by the new organizational set-up and study on the countermeasures, as required (Activity 5-7 in PDM)**

JICA Expert Team observed the work conducted by the staff of MSSMO from planning/design to approval of the facility to use by owner. Required improvement/development for the management of on-site STFs was discussed and summarized.

(13) **Exchange of information and cooperation with selected owners of on-site STFs and septage collection companies (Activity 5-8, 5-9 in PDM)**

Community meeting was held at Barangay San Isidro, Dauis Municipality for the residents, constructors and other concerned people. Explanation and exchange of opinions on "Implementing Rules and Regulations on ST construction" ware made and need of water pollution control was discussed including promotion of awareness and participation by residents and commercial establishments.

(14) **Summarize issues and problems on the organizational arrangements for further improvement (Activity 5-12 in PDM)**

The achievements by MSSMO staff during absence of JICA Expert Team were self-evaluated by the staff at the workshop to come up with required countermeasures for the further improvement of the work. Through discussions, the needs of staff training and follow up for immediate set-up of MDRRMO were confirmed.

(15) **Recommend future organizational improvement needs (Activity 5-13 in PDM)**

Presently the roll of MSSMO is limited to the management of on-site STFs, however, they need to be involved in a wide range of concerned work for the water pollution control in the marine area. The road map for the realization of septage management system and water quality monitoring was presented to the C/Ps at the workshop and action plan was prepared by all participants. Actual

actions are expected to be start immediately by provincial and municipal staff.

(16) **Procurement of sewage quality examination equipment (Activity 5-15 in PDM)**

The need of at least a simple sewage laboratory was confirmed by provincial government. The budget for the procurement of equipment was arranged by JICA

(17) **Establish laboratory for sewage quality examination (Activity 5-16 in PDM)**

Through the meeting held by concerned departments in the province, the laboratory was planned to install in PHO premises and required budget was arranged. Immediate function of the laboratory is to monitor pilot STs constructed under output6. Other wastewater, sea water samples can be also analyzed by procured equipment except for COD, T-N and T-P of seawater.

Table 2-15 Parameters and Methods of Procured Water Quality Analysis Equipment

Parameters	Analysis method	Approved method
Temperature	Use of Mercury-filled thermometer	✓
pH	Glass electrode method	✓
TSS	Gravimetric method	✓
DO	Azide modification (Winkler method), Membrane Electrode (DO meter)	✓
BOD	Azide Modification (Dilution Technique)	✓
COD	Pretreatment with Silver nitrate + Simple examination kit; Absorption spectrophotometry dichromic acid method	
T-N	Pretreatment with Silver nitrate + Simple examination kit ; Alkalinity Potassium peroxodisultate decomposed-chromotropic acid method	
T-P	Pretreatment with Silver nitrate + Simple examination kit; Potassium peroxodisultate decomposed- molybdenum blue method	

(18) **Conduct training on basic knowledge for water quality examination (Activity 5-17 in PDM)**

A JICA Expert for sewage quality examination was dispatched two times. PHO provided laboratory staff with general guidance for water quality examination.

(19) **Conduct training on the manner of examination (activity 5-18 in PDM)**

Using procured equipment, manner of examination was transferred two times to the laboratory staff. They made a plan to improve their capacities to get an earlier authorization from DENR as formal laboratory in the future.

(20) **Prepare a manual for sewage quality examination (Activity 5-19 in PDM)**

In consideration of the experience thorough technology transfer to laboratory staff, a manual for sewage quality examination was prepared for the staff.

(21) **Conduct training on the analysis and evaluation of sewage samples (Activity 5-20 in PDM)**

Water sampling and analysis were conducted monthly at pilot STs to study treatment efficiencies. Manner of study using the monitoring results was transferred to the provincial staff.

2.5.3. Achievement in Output 5

Achievement status of the Output 5 following the indicators of the PDM is as follows (Table 2-16):

Table 2-16. Objectively Verifiable Indicator and Achievement Status of Output 5

Deliverables	Indicator	Performed
5. Effective and realistic management systems to control on-site STFs covering Panglao Island are established.	5.1 Management systems to control on-site STFs including roles of the concerned organization's staff are established and approved by PIEC. 5.2 Organizational arrangements are made for sewage quality examination constantly	・ A proposal for the establishment of management system for on-site STFs was submitted to PIEC. PIEC recommended creating a permanent office in the MDRRMO with a full understanding on the need of the management system. ・ The work manual for the staff of MSSMO was prepared covering plan review and construction inspection of the STs. The details in the manual were transferred to the staff. ・ A simple laboratory for sewage quality examination was established and assigned staff were trained for constant examination. ・ LGU staff understood monitoring methods and countermeasures for water pollution control. The staff started management work for on-site STFs using the work manual. Cooperation between province and municipalities has been improved through increased joint field work. The needs of further improvement of technology and systematic work were understood by the concerned staff.

Before commencement of the project, concerned municipalities managed the work for the control of on-site STFs (review of submitted design of ST, field inspection and permission to use ST) mainly by PPDO staff supported by the staff of Engineering Office and Sanitation Office, as required. There was no permanent staff assigned for the management of on-site STFs. Under this arrangement, they did not recognize the need of permanent office for the management of on-site STFs and staff training.

C/Ps fully understood the need of office set-up for the management of on-site STFs in application of adequate laws and regulations through conduct of workshops and collaboration in the field with JICA Expert Team. As a result of C/P efforts, MSSMO was created for the two municipalities by the executive order of the mayors. However, staff assigned for MSSMO holds two posts concurrently, though the manager is arranged as a full-time officer. The manager started to train his staff for the strengthening of the MSSMO.

The offices of the two municipalities are operated for the management of on-site STFs using manual prepared through collaboration with JICA Expert Team including review of design, construction inspection and approval to use ST. Further improvement of the manual has been continued by them.

2.6. Output 6: Possible design of the STs with improved capacity (satisfying design capacity of on-site STFs with the improvement of effluent quality is proposed).

2.6.1. Outline of Activities

Outline of the Output 6 at the end of the Project is as follows:

(1) **Deliverables**:

- Design of pilot STs
- Constructed STs
- Results of sewage quality examination on existing STs
- Monitoring results on pilot STs
- Standard designs of STs which have higher treatment efficiencies than conventional STs
- O&M manual for recommended STs

(2) **Knowledge and capacity to be acquired by the local government staff**

- Proper knowledge on standard STs including design, construction and O&M of STs
- Sewage quality examination method
- To understand study method to evaluate treatment efficiency of ST using sewage quality examination results
- To collect information on the knowledge for sewage treatment processes

(3) **Final targets upon completion of the Project**

- Standard STs with higher treatment efficiencies and reasonable construction cost are introduced to concerned parties based on the monitoring results on pilot STs.
- Recommended STs are employed in Panglao Island

- O&M of the STs recommended is practiced using the manual.

2.6.2. Activities

(1) **Conduct investigations on existing on-site STFs (Activity 6-1 in PDM)**

Upon commencement of the project, investigations on existing on-site STFs were conducted both in Dauis and Panglao municipalities. As a result of the survey, it was found that majority of existing STs (about 80% of households) don't comply with relevant laws and regulations (National Plumbing Code). On the other hand, commercial establishments (hotels) usually installed 2-chamber type STs. Sewage quality examination was conducted for the STs during the survey.

(2) **Prepare database for on-site STFs (Activity 6-2 in PDM)**

Data collection and their filing had been conducted in the beginning of December, 2013 by the joint efforts of the local Consultant and C/Ps. During the survey period, they collected data from 90 households (HHs) and 144 HHs for Dauis and Panglao, respectively. Before completion of the tour of local Consultant, workshop was held for further continuation by the municipalities including evaluation of performance with issues and problems, improvement need for the continuation of data collection and manner of data use (manner of computer use). Presently MSSMO staff have been undertaking the work. As of March, 2015, total number of households/hotels with data/information is 3,000 in Dauis and 600 in Panglao. Insufficient transportation service and limited staff available are major reasons of the lower performance in database preparation.

(3) **Study of effective on-site STFs (Activity 6-3 in PDM)**

Standard STs adoptable in Panglao Island were studied considering the survey results on the existing STs. Design of pilot STs was made based on the study. The following are purpose of the pilot study and basic conditions/assumptions.

1) Purpose of pilot study: Simple additional facilities to the standard ST shall be field confirmed to improve effluent quality.
2) Subject pilot pollution sources

Households (5 persons/family) and small-size hotels (less than 30 customer's accommodation)

3) Basic conditions

a) On-site sewage treatment facility

In case of highly populated areas with low income HHs, like in some areas of Panglao Island, community toilet facilities are suitable, however, pilot study limited to STs (on-site sewage treatment facility) for households in consideration of land availability, locational characteristics and surrounding environmental conditions.

b) ST shall meet standard requirements in National Plumbing Code

The pilot facilities shall be designed to meet national standard specifications. However for the facilities with aeration, some modifications are applied.

c) To consider economic and realistic cost for the construction and O&M of the facility

The subject STs are those for common HHs and small-size hotel located in Panglao Island. The cost for construction and O&M shall be affordable for the HHs with average income (construction cost; about P50,000 and O&M cost P150-300/month).

d) Periodic septage removal is a precondition for making construction and O&M plans

Periodic desludging from STs is a precondition to maintain the facility. The management capacity of the LGUs and preset practices by septage collection contractors shall be taken into account.

e) Assumption of target effluent quality

Target effluent quality was assumed as shown in Table 2-17. Effluent quality of pilot SPs expected to be improved compared to conventional ST. However, considering the financial aspect of middle to lower income people, upper limit of the target effluent quality was set by referring the result of existing ST survey of D-House#1, which is conventional ST maintained well.

Table 2-17. Target ST Effluent Quality

Item	Effluent standard		Result of existing ST survey "D-House#1" outlet water quality	Designed effluent quality
	Existing	Newly constructed		
BOD (mg/l)	50	30	133	50~130
SS (mg/l)	70	50	90	70~90

(4) **Conduct bidding for pilot plant construction (Activity 6-4 in PDM)**

Detailed design of pilot plants was prepared through collaboration with the C/Ps from provincial government. The bidding for the construction of pilot plants was made in application of a selective competitive method. For the selection of candidate contractors, the list of potential contractors (6 constructors) was obtained from provincial procurement office in provision of screening criteria. The selection process for the contractor started in August, 2013 and completed in December, 2015 and construction work started in the middle of January, 2014.

(5) **Construct pilot plants (Activity 6-5 in PDM)**

The construction of pilot plants; the construction of the plants at 3 sites in Panglao and 2 sites in Dauis started in January, 2014 and completed by the end of April, 2014. Table 2-18 shows the outline of pilot plants and Figure 2-27 to 2-29 present design by site. Photos are in Figure 2-30.

Table 2-18. Outline of Pilot STs

Site	Treatment Process	Pollution source	No of Plants	Design persons/ Tank capacity	Facility	Construction Cost* (PHP)
Site1	Method 1 Type A: ST+Sponge media Treatment (SMT)	HH (Dauis)	1	5persons Design volume Q=0.95m^3/d Inflow load	1st chamber & 2nd chamber: 1.1m×1.4m×1.25m＝1.9 m^3 2nd chamber: 1.1m×0.8m×1.2m＝1.1m^3	137,600

Site2	Method 1 Type B: ST+SMT	HH (Panglao)	1	BOD:200g/d SS: 225g/d	Leaching Chamber with Sponge Media: 1.1m×0.8m×1.15m＝1.0m^3	135,800
Site3	Method 2 Type A: ST+ anaerobic media (fish net)	HH (Dauis)	1	5persons Q=2.40m^3/d Inflow load BOD:200g/d SS: 225g/d	1st chamber & 2nd chamber: 1.1m×1.4m×1.30m＝2.00m^3 1.1m×0.7m×1.25m＝0.96m^3 Anaerobic filter chamber: 0.6m×2.2m×1.2m＝1.58m^3 Leaching Chamber with fishing net: 0.6m×2.2m×1.15m＝1.52m^3	193,400
Site4	Method 3: Aeration type ST	Hotel (Panglao)	1	5persons+ Restaurant sewage Design volume Q=2.00m^3/d Inflow load BOD:1.2kg/d SS: 1.3kg/d	1st chamber: 2.0m×2.0m×1.8m＝7.4m^3 Aeration tank: 2.0m×1.2m×1.75m＝4.2m^3 Clarifier: 2.0m×0.6m×0.5m＝0.6m^3 Leaching Chamber: 2.0m×0.9m×1.75m＝3.15m^3	381.700
Site5	Method 2Type B: ST+ anaerobic media (PVC)	Hotel (Panglao)	1	12persons Design volume Q=2.00m^3/d Inflow load BOD:480g/d SS: 540g/d	1st chamber & 2nd chamber: 2.0m×1.6m×1.5m＝4.8m^3 2.0m×0.85m×1.45m＝2.47m^3 Anaerobic filter chamber: 2.0m×1.1m×1.4m＝3.08m^3 Leaching Chamber with plastic media: 2.0m×1.0m×1.35m＝2.7m^3	329,000

*Direct costs not including general requirements cost and tax.

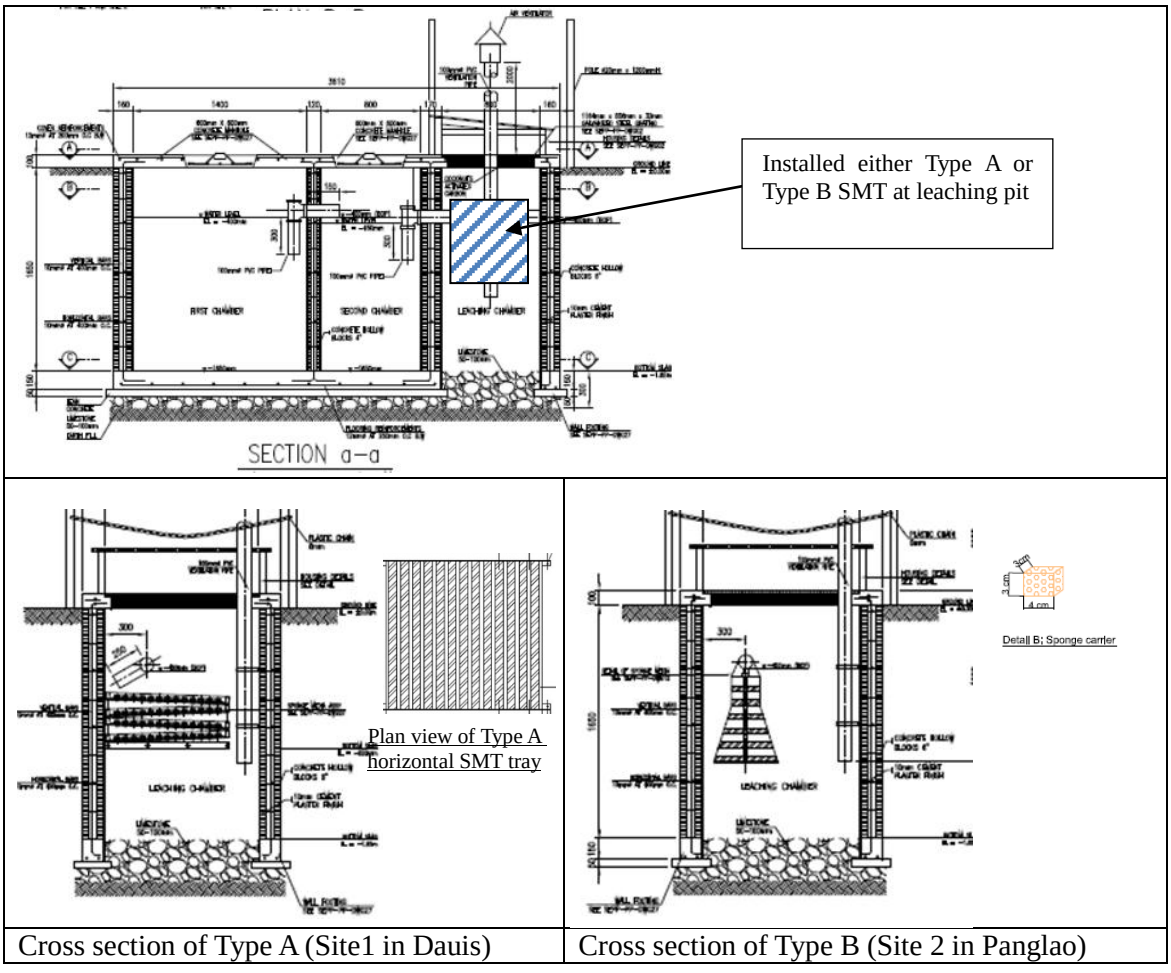
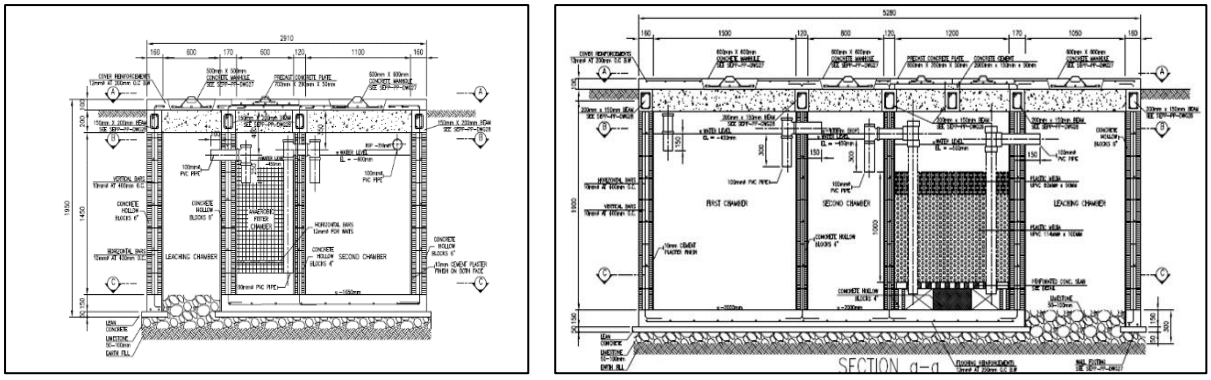


Figure 2-27. Method 1 (Site 1 & Site 3) ST + SMT facility Section



Cross section of Type A (Site 3) Cross section of Type B (Site 5)

Figure 2-28. Method 2 (Site 3 and Site 5) ST + Anaerobic Media Section

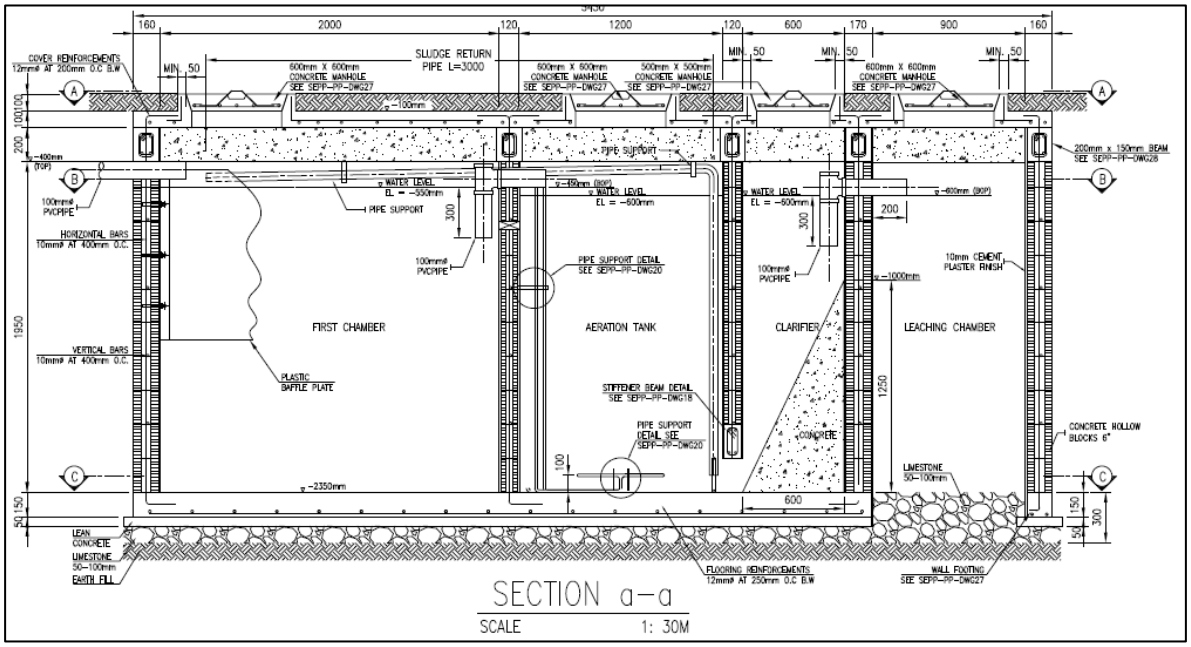


Figure 2-29. Method 3 (Site 4) Aeration Type ST Section

	
Site1	Site 1 Leaching chamber SMT

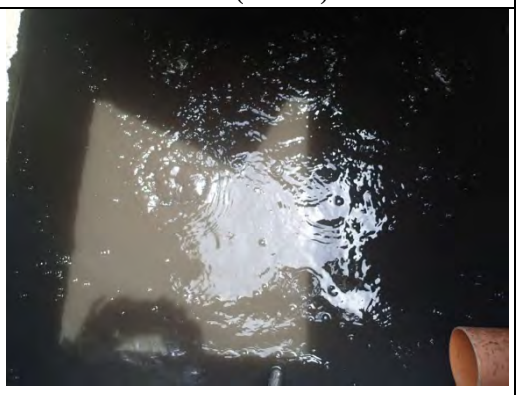
	
Site 2	Site 2 Leaching chamber SMT
	
Site 3	Site 3 Anaerobic Media (Fish net)
	
Site 4	Site4 Activated sludge in aeration tank
	
Site 5	Site 5 Anaerobic Media (PVC pipe)

Figure 2-30. Pilot Septic Tank Facilities

(6) **Conduct monitoring of pilot plants to analyze treatment efficiencies (Activity 6-6 in PDM)**

1) Monitoring method

a) Monitoring period: After construction of the plants, 2 months were kept without any arrangements under anaerobic condition. Monitoring was conducted from June, 2014 to March, 2015.

b) Monitoring items and examination frequency: Monitoring items include basic water quality indices (BOD,COD, SS; TN for Site 1,2 and 4) and additional information such as monthly water consumption, sludge sedimentation depth and operation status of the ST (refer to Table 2-19).

Table 2-19. Monitoring Items for Pilot Plants

Monitoring Item		Method	Monitoring Frequency
Sewage quality	Site 1, 2, and 4: (can expect partial reduction of Nitrogen) SS, COD, T-N, pH, Water temperature, BOD	Laboratory testing or simple water testing equipment.	Once a month
	Site 3 and 5: (cannot expect removal of Nitrogen) SS, COD, pH, Water temperature, BOD		
Others	・Monthly water consumption	Water supply flow meter	Once a month
	・Accumulated sediment depth ・Water surface depth	Sediment measurement pole	Once a month
	General information on the use of STs; No. of family living in the house, No. of guests, No. of serving dishes	Questionnaire form	Once a month

2) Monitoring results

Average water quality examination results at each site from July, 2014 to February, 2015 are shown in Figure 2-31 to 2-34 and Table 2-20.

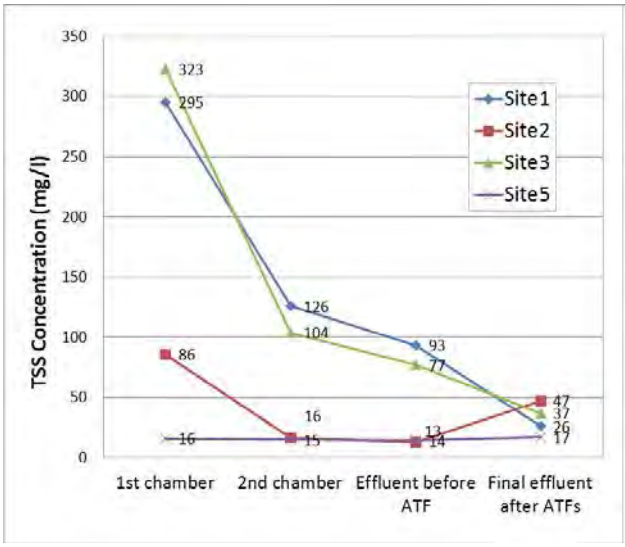


Figure 2-31. Average TSS Analysis Results of Site1, Site2, Site3 and Site5

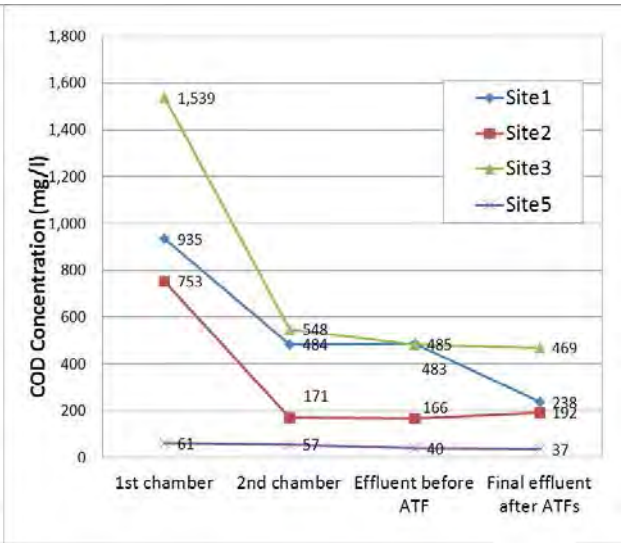


Figure 2-32. Average COD Analysis Results of Site1, Site2, Site3 and Site5

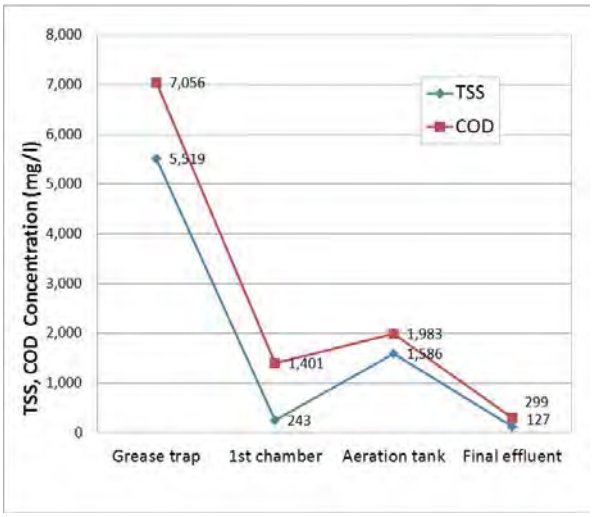


Figure 2-33. Average TSS and COD Analysis Results of Site4

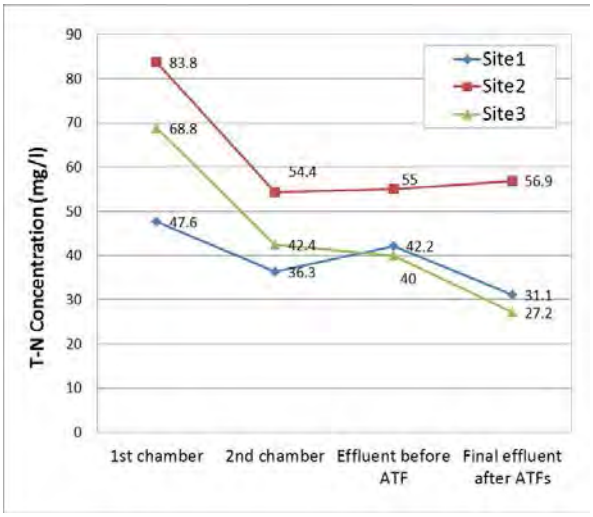


Figure 2-34. Average T-N Analysis Results of Site1, Site2 and Site4

Table 2-20. Results of Pilot Septic Tank Monitoring (Water consumption, Sludge depth, pH)

Site No.	Monitoring Item		Accumulated Sludge depth								Average pH
			2014						2015		
			JUN	JULY	AUG	OCT	NOV	DEC	JAN	FEB	
Site1 Adult:4	Daily Ave. water consumption(m3)*1		No data	0.32	0.81	0.81	0.67	0.87	No data	No data	
	Unit water consumption (lpc)		–	–	202.5	202.5	167.5	217.5	–	–	
	Sludge depth/pH	1st chamber	12cm	4cm	13cm	0cm	5cm	5cm	6cm	22cm	6.1
		2nd chamber	0cm	0cm	23cm	2cm	10cm	13cm	5cm	46cm	6.0
		Effluent of 2nd chamber	–	–	–	–	–	–	–	–	6.3
		Final Effluent	No data	0cm	1cm	5cm	6cm	–	15cm	–	7.4
Site2 Adult 3-4	Daily Ave. water consumption		2.67	0.45	0.74	0.71	1.6	1.19	No data	No data	
	Unit water consumption (lpc)		763	129	211	203	457	340	–	–	
	Sludge depth/pH	1st chamber	35cm	10cm	13cm	No data	9cm	5cm	12.5cm	12.5cm	7.3
		2nd chamber	No data	10cm	8cm	No data	–	1cm	12cm	12cm	7.2
		Effluent of 2nd ch.	–	–	–	No data	–	–	–	–	7.3
		Final Effluent	0cm	0cm	0cm	No data	0cm	0cm	0cm	0cm	7.4
Site3 Adult 4-5	Daily Ave. water consumption		0.67	1.03	0.84	1.03	1.27	1.61	No data	No data	
	Unit water consumption (lpc)		119.6	183.9	150	183.9	226.8	287.5	0	0	
	Sludge depth/pH	1st chamber	8cm	7cm	30cm	11cm	18cm	6.5cm	0cm	No data	6.4
		2nd chamber	0cm	4cm	7cm	10cm	8cm	38cm	0cm	23cm	6.4
		3rd chamber	0cm	4cm	20cm	2.5cm	0cm	0cm	0cm	0cm	6.7
		Final Effluent	0cm	0cm	0cm	0cm	0cm	0cm	0cm	0cm	6.9
Site4 Restaurant	Daily Ave. water consumption(m3/d)*		No data	2.5	3.36	1.99	2.34	2.6	2.62	2.7	
	Daily Ave. guest no. (persons)		No data	78.1	78.4	48.8	54.6	55	0	75.7	
	Water consumption per capita (lpc)		–	32	42.9	40.8	42.9	47.3	0	35.7	
	Sludge depth/pH	Grease trap		42cm	25cm	40cm	8cm	0cm	13cm	88cm	5.2
		1st chamber	Full	0cm	0cm	0cm	0cm	0cm	0cm	0cm	6.0
		Aeration tank		–	–	–	–	–	–	–	7.0
		Final Effluent		0cm	41cm	0cm	0cm	0cm	9cm	0cm	7.0
SIte5 Hotel guest room	Daily Ave. water consumption(m3/d)		2.03	3.31	3.15	4.26	3.79	3.97	No data	No data	
	Daily Ave. guest no. (persons/d)		4.2	3.5	5.9	3	3	4.3	0	0	
	Water consumption per capita (lpc)		483.3	945.7	533.9	1420	1263.3	923.3	0	0	
	Sludge depth/pH	1st chamber	6cm	42cm	10cm	5cm	6cm	8cm	23cm	0cm	7.1
		2nd chamber	0cm	0cm	0cm	0cm	0cm	0cm	0cm	0cm	7.5
		3rd chamber	–	–	–	–	–	–	–	–	7.4
		Final Effluent	0cm	0cm	0cm	0cm	0cm	0cm	0cm	0cm	7.6

*1) Water meter was in defect until middle of July at Site1.
*2) Water consumption at Site4 includes all kitchen water but part of sewage flows to old ST. Thus, actual sewage flow at pilot ST is estimated to be lower than the figures.

(7) Evaluate functional performance of pilot plants and establish indices for operation and management (Activity 6-6 in PDM)

1) Treatment efficiency

Treatment efficiency by the method was studied based on the monitoring results as shown in table 2-21.

Table 2-21. Treatment Efficiency by Method

Method	Final effluent water quality Criteria (mg/l)	Average removal rate (%)			Observation	Effectiveness of ATF
	BOD50~130 SS70~90	TSS	ATF	Total		
Method 1 type A	Passed Criteria	TSS: 68 COD: 48 T-N: 11	TSS: 62 COD: 44 T-N: 26	TSS: 91 COD: 75 T-N: 35	Improvement of ST effluent quality was observed. However, it can be only applied under high permeability soil condition.	Effective
Method 1 type B	Passed Criteria	TSS:85 COD:78 T-N: 34	TSS:-202 COD:-7 T-N: -3	TSS:45 COD: 74 T-N: 32	Significant effectiveness of additional facility was not observed.	Note effective

Method 2 type A	Passed TSS Criteria but exceed BOD Criteria	TSS: 68 COD:54	TSS: 38 COD:18	TSS: 78 COD:61	Growth of biofilm on fishing net AF was not observed.	Limited
Method 2 type B	Passed TSS Criteria but exceed BOD Criteria	Site 5 TSS: 12 BOD: 30 Site 3 TSS: 81 COD: 72	Site 5 TSS: -21 21e 52 Site 3 TSS: 70 COD: 19	Site 5 TSS: -7 BOD: 48 Site 3 TSS: 95 COD: 77	Growth of biofilm on plastic AF was not observed at Site5 which has low BOD inflow concentration. But it was observed at Site3 which has high BOD inflow. Required continuous monitoring.	Effective at site3
Method 3	Passed criteria during good operation but exceed TSS criteria during bad operation	TSS: 96 COD: 80 T-N: 45	TSS: 41 COD: 79 T-N: 52	TSS: 98 COD: 96 T-N: 73	Improvement of ST effluent quality was observed. However, O&M issues for stable operation are remained.	Effective

The methods which were confirmed with improved effluent quality are Method 1 Type A (horizontally installed sponge media), Method 2 Type B (PVC/Pipe media) and Method 3 (provision of aeration). In case of Method 3 at site 4, a routine maintenance work is required due to inflow of highly concentrated sewage.

2) Establish O&M Parameters

Table 2-22 presents proposed operation parameters. Expected effluent quality for BOD and SS is assumed to be caused by domestic sewage under proper operation and maintenance. Desludging frequency, cleaning frequency of media and durability of SMT of Method 1 and Method 2 shall be updated using accumulated data in continuation of monitoring of effluent quality.

Table 2-22. O&M Parameters

Evaluation Indicator	Evaluation Criteria	Expected value
Final effluent water quality (mg/l) BOD and SS	・Designed effluent quality set in the pilot study: BOD 50~130 mg/l SS 70~90 mg/l	Designed effluent quality: ・Mthod1 type A: BOD 70~130 mg/l SS 50~90 mg/l ・Method 2 type B: BOD 70~200 mg/l SS 50~90 mg/l ・Method 3 BOD 70~100 mg/l SS 50~90 mg/l
Required Desludging frequency	・When the accumulated sediment depth reached to more than one third of the tank depth. ・When the scum reached to outlet pipe	・Mthod1 type A: Once in 2 years ・Method 2 type B: Once in 2 years ・Method 3 Once in 2 months~6months

Cleaning frequency of media *Cleaning may not necessary due to natural detached of thicken bio-film at the surface of media	・When the effluent SS concentration exceed design criteria.	・Mthod1 type A: Once in 3 years ・Method 2 type B: Once in 5 years
Durability of SMT (Method1) and AF (Method 2)	・When a natural deterioration or a physical damage is confirmed.	・Mthod1 type A: Once in 5 years ・Method 2 type B: Once in 7 years

(8) **Prepare standard design and O&M manual for the improvement of effluent quality (Activity 6-6 in PDM)**

1) Standard ST

Based on pilot study on the treatment efficiency of STs, the following two types of additional facilities (modified STs) are recommended for the treatment of domestic sewage, and commercial sewage, the inflow quality of which is similar to domestic sewage.

For the highly polluted sewage discharged from restaurants shall be, in principle, treated at sewage treatment plant. But if no such a plant is available, it is necessary to use ST with aeration method (such as Japanese type ST). Table 2-23 shows overview of modified STs.

Domestic sewage treatment

a) Method 1: ST + SMT (horizontal type)

b) Method 2: ST + Anaerobic filter (short-cut PVC/Pipe)

Business sewage like discharge from restaurant

a) Method 3: Aeration type on-site STF

Table 2-23. Overview of Modified STs

Type	Construction Cost Almost same as Conventional ST	O&M	Treatment efficiency	Application condition
Domestic sewage Method 1	+5000PHP	Almost none	Good TSS 40～70% BOD 20~40%	・High infiltration rate at the depth of about 1.5m from ground surface
Domestic sewage Method 2	Almost same as Conventional ST +5500PHP	Almost none	Good ,but less than Method1TSS 40% BOD 10～20%	・No special conditions
Business sewage Method 3	expensive	Necessary Periodic desludging since sludge is accumulated with a high pace	Very good TSS,BOD; 80%~90% If operation is not properly done, treatment efficiency goes down.	・In case of large fluctuation of inflow sewage quality and quantity, a balancing tank shall be installed. ・Treatment of highly polluted sewage (such as from restaurant) shall be made together with domestic

				sewage. ・Proper routine operation of the facility is a requisite including removal of oil.

2) Problems and recommendations on the application of modified STs

a) Expensive construction cost

The construction cost of additional facilities for Method 1 and Method 2 is P3,500 to P5,000 as a result of cost reduction countermeasures. However, construction cost for the conventional type ST with the capacity of 5 persons is estimated at P50,000. According to income survey, an average monthly income in Panglao Island is P11,000. Thus, the construction cost coincides with about 5 month of average household monthly income, which seems to be difficult to raise the cost, especially for law income households. The following are technical measures for the reduction of the construction cost.

- Construction of community toilet facilities: A common unit of the ST can be constructed for some neighboring households, technically considering distance between houses, ground levels, etc. to ensure gravity inflow of sewage from subject houses to the tank. The size of ST may be reduced coinciding with the increase of number of persons for the treatment (according Philippine Plumbing Code).
- A Provision of the simple pit for final disposal of effluent instead of the infiltration chamber, in case that sub-soil condition is favorable with higher infiltration rate for effluent disposal.
- Saving excavation cost (about 20% of the total cost): The owner may undertake excavation work without contract out to the contractor. There is no need to provide a slope for the excavation, because of self- support of excavated wall under lime stone formation in Panglao Island.

b) Issues for the application of Method 3 type ST to treat highly loaded sewage

Through the survey on the sewage quality, it was confirmed that the sewage discharged from restaurants has considerably high concentration in organic substances (BOD and SS). The recommended method is one of possible treatment processes to ensure the improvement of effluent quality. However, for the application of the method, the owner shall understand the need of routine O&M entailing frequent removal of septage, aside from the need of a larger size ST for the sewage with high concentration of BOD and SS. Anyway without provision of a sewage treatment plant, an individual sophisticated treatment method such as recommended one are required to improve effluent quality for protection of sea water.

3) Design of modified ST and prepare manual for construction and O&M of facilities

To ensure required quality of effluent discharged from on-site STFs, appropriate design, construction and O&M of facilities are to be prepared and constructed. Therefore, concerned LGU staff

shall manage requirements in full understanding of the staged check points from planning to final approval of facility use. For their work, required manual was prepared and provided for them.

2.6.3. Achievement in Output 6

Achievement status of the Output 6 following the indicators of the PDM is as follows (Table 2-24):

Table 2-24. Objectively Verifiable Indicator and Achievement Status of Output 6

Deliverables	Indicator	Performed
6. Possible design of STs with improved capacity (satisfying design capacity of on-site STFs with the improvement of effluent quality) is proposed	Appropriate types of on-site STFs in Panglao Island are presented. Pilot plant construction for verification is carried out. Standard design for the improved/modified on-site STFs and draft O&M manual is prepared for approval by PIEC.	・ Appropriate types of on-site STFs in Panglao Island were prepared. ・ Monitoring on the pilot plants had been conducted and the efficiencies of the treatment were evaluated. ・ Based on the monitoring results, modified design of STs was prepared to improve effluent quality. The manual for the modified STs was prepared for design, construction and O&M of the facilities. ・ Application need of modified STs was explained at PIEC and got concurrence from PIEC on the use. ・ C/P obtained knowledge on standard ST covering design, construction and O&M of facilities. Manners on sewage quality examination and evaluation of the treatment efficiency of the ST were obtained. Information on different sewage treatment methods was also received.

When the project started, they did not recognize that the traditional type ST does not meet the requirements of the standard ST in National Code. C/Ps conducted investigations on the existing STs to identify issues and problems. They also collaborated with JICA Expert for pilot study to improve effluent quality. They joined construction of pilot plants and water quality monitoring. As a result of the above activities, Provincial C/Ps undertook preparation of design of modified ST for the improvement of effluent quality. He joined to prepare manual for design, construction

and O&M of facilities. Explanation on the outputs at the work shop was also undertaken by him and follow up to municipal staff has been continued.

2.7. Output 7: Preliminary design of septage treatment plant and preparation of sustainable management system including alternative financial arrangements.

2.7.1. Outline of Activities

Outline of the Output 7 at the end of the Project is as follows:

(1) **Deliverables:**

- Projection of sludge volume to be generated in Panglao Island
- Investigation results on quality and quantity of generated solid waste in Panglao Island
- Investigation results on the use of fertilizer and its demand projection
- Preliminary design of septage treatment plant with capital and O&M cost (F/S for the construction of a septage treatment plan)
- Study results on implementing body for the construction of septage treatment plant

(2) **Knowledge and capacity to be acquired by the local government staff**

- Knowledge on a septage treatment system
- To understand the manner of investigation and projection of volume on solid waste and fertilizer
- To understand the manner of preliminary design of septage treatment plant
- To understand study method on project implementation

(3) **Final targets upon completion of the Project**

- A plan of sustainable management system is prepared for the treatment and disposal of septage from STs including design of septage treatment plant and financial arrangement plan.
- Workshop is held for potential investors including private sector for the construction of a septage treatment plant.

2.7.2. Activities

(1) **Investigate existing septage treatment systems in the Philippines (Activity 7-1 in PDM)**

Inspection visits to the existing septage treatment plans in the Philippines were conducted two times in January, 2014 and February, 2015. The existing plans visited were located in Manila, San Fernando, La Union, Dumaguete City and Bayawan City. The participants from Panglao Island included municipal officers, Sangguniang members as well as C/Ps. As a result of the inspection, they realized that construction and O&M of the septage treatment plant are not so difficult and the plant site maintains sanitary environment. Thus, they are only concerned about early realization of plant construction.


Figure 2-35. Advanced Cases Study in Manila (Jan. 2014, left) and in Dumaguete (Feb. 2015, right)

(2) **Project sludge volume to be generated in Panglao Island (Activity 7-2 in PDM)**

Two stage construction of the septage treatment plant was planned with the target years of 2025 and 2035. Septage volume for the target years was projected based on projected population both for residents and tourists. However, potential septage volume to be collected depends on accessibility by vacuum car to STs and their structural arrangements (manhole installation). As a result of the investigations on the existence of manhole cover on the ST and accessibility by vacuum car revealed that only about 30% of existing STs may be subjected for desludging. Septage volume to be treated was projected assuming the percentage against the total number of STs which allow for the desludging by target year and 300 operation days in a year. The plant capacities for the year 2025 and 2035 were proposed to be 30m^3/d and 60 $m^{3/}$d, respectively.

(3) **Investigate quality and quantity of solid waste being generated in Panglao Island**

A local Consultant was employed for the investigations on quality and quantity of solid waste generated in Panglao Island. Base on the field findings, study was made including per capita solid waste generation rate and its quality.

(4) **Investigate the present usage of fertilizer and project its future demand in Panglao Island (Activity 7-4 in PDM)**

There are some hotels in Panglao Island where they practice compost use of solid waste generated in their premises. The quality of sludge was investigated including heavy metals.

(5) **Prepare preliminary design of a septage treatment plant (Activity 7-5 in PDM)**

The septage treatment method was studied referring to existing methods being applied in Metro Manila, San Fernando City, La Union, Dumaguete City and Bayawan City. The result of the trial on the sludge dewatering in Cebu City, which is a part of Japanese Government assistance to developing countries, was also considered. In the design work, “Support for the Nationwide Roll-out of the National Sewerage and Septage Management Program (2013)” was referred to on

the recommended conditions; site area requirement, shape of site, location of construction site, availability of electric supply, soil conditions with ground water level and soil strength. As a result of the study, Lagoon type treatment process for the sewage was recommended, same as that used by Dumaguete, Bayawan and San Fernando cites.

The method for the treatment and disposal of generated sludge at the septage treatment plant was studied in consideration of "Operation Manual on the Rules and Regulations Governing Domestic Sludge and Septage" by USAID. It is recommended to use sludge drying bed and sludge shall be used as soil conditioner. Basic design of the septage treatment plant was made considering the candidate construction site at Barangay Bingag with 1 ha.

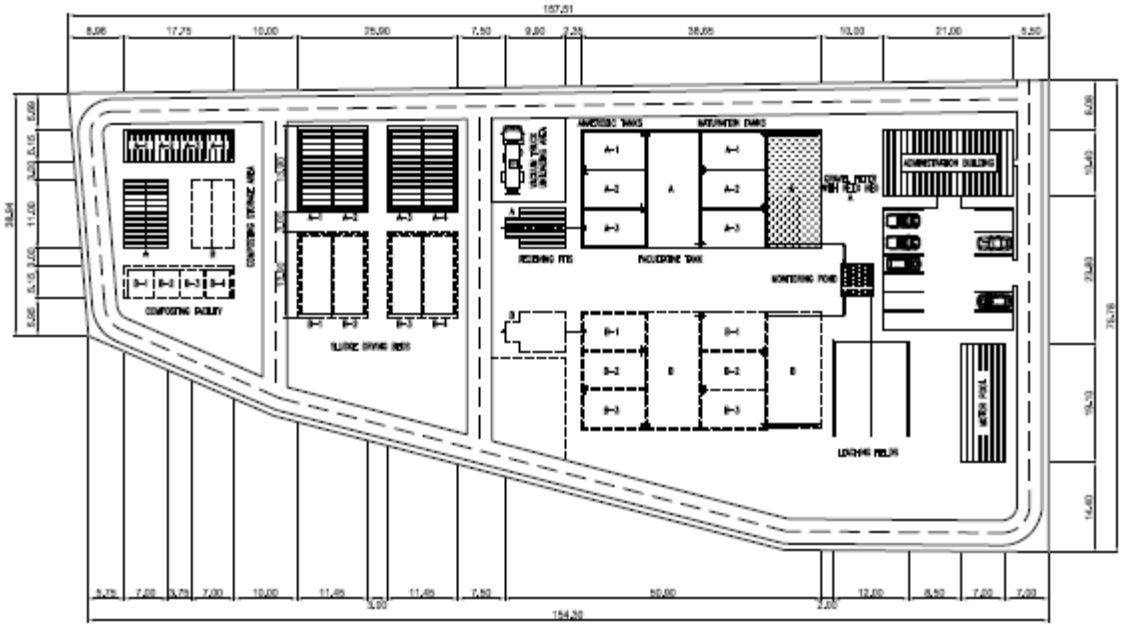


Figure 2-36. General Layout of designed Septage Treatment Facility

(6) **Estimate capital and O&M cost of septage treatment plant (Activity 7-6 in PDM)**

1) Capital cost

The capital cost covers land acquisition cost, septage treatment construction cost, administration building and parking/workshop area cost, and equipment purchase cost; vacuum car and sludge transportation and mixing car. The access road from main road to the site will be constructed by Dauis Municipality. The land for the construction of septage treatment plant shall be obtained before commencement of the construction work at P3,500,000 (P350/m^2).

In stage 1, scope of work should include the construction of one system of treatment facilities, administrative building and parking/workshop area. In addition, 3 units of vacuum car and one unit of sludge transportation equipment should be procured. The capital cost includes cost for common temporary facilities, contingencies and contractor's profit. The construction cost for stage 1 and stage 2 arrives at P22,100,000 and P15,800,000 respectively.

The cost for the second hand equipment is P6,000,000 (for stage 1 P3,500,000 and stage 2 2,500,000). It is necessary to employ Consultant for detailed design, biding assistance and construction supervision. The cost required is estimated assuming 20% of the construction cost; P4,400,000 for stage 1 and P3,100,000 for stage 2). Thus, the total construction cost is P54,900,000 consisting of P30,000,000 for stage 1 and P21,400,000 for stage 2 (2014 price level) as well as land acquisition cost of P 3,500,000.

2) O&M cost

O&M cost includes personnel expenses, sewage/sludge examination cost, fuel cost, maintenance cost of facilities and equipment, lighting expense, insurance, tax and interest repayment to the bank.

3) Study on cost recovery

Required septage charge was estimated preparing a cash flow using construction and O&M cost. EIRR and EIRR are also calculated together with sensitivity analysis to confirm the feasibility of the construction project. Overall cost required for the construction of the plant and O&M of facilities can be recovered collecting septage charges from residents and over-night tourists with P120/person a year and P10/tourist/day, respectively; even collection rate of residents become worse with less than 50%.

(7) **Study on project implementation body/s (Activity 7-7 in PDM)**

Required organizations for both construction and O&M stages were studied for the LGUs.

1) Construction stage

For the construction of septage treatment plant, a series of work is necessary; detailed design of facilities, selection of the contractor, construction supervision and trial operation of facilities. Prior to the construction work, concerned LGUs shall establish project implementation organization to prepare project implementing plan.

Two municipalities are beneficiaries of the septage treatment plant, however, for the establishment of implementation organization, the following four alternatives are suggested to select by the LGUs.

- Concerned two municipalities establish the organization together, with the support from provincial government
- Dauis municipality plays a role for the project implementation, as the STP site is located in the municipality. Panglao municipality depends on Dauis on the management with cost sharing.
- Provincial government manages the project with cooperation by the two municipalities.
- Application of PPP (Public/Private Partnership) including management of construction work. PPP includes PFI (Private Financial Initiative) and DBO (Design Build and Operate).

- Even if PPP may be applied, concerned LGUs shall establish organization for the management of project implementation. The responsibilities between LGUs and private sector are different depending on the main implementing body for the project, either LGUs or private sector. In either case, employment of local Consultant is necessary and required cost shall include consulting fee.

2) O&M stage

Three alternatives are suggested for the establishment of O&M unit.

- Two municipalities cooperate to establish "Special Purpose Company; SPC. Aside from concerned two municipalities, other parties' involvement to the SPC shall be studied including Bohol Provincial Government, BEUI, septage collection companies and others.
- Dauis municipality manages the work and Panglao municipality shares required cost.
- Commitment to private sector in application of DBO method (still need of management by the two municipalities)

Required number of the drivers and assistants for operation of vacuum car will be each 6 persons in case of the collection of 60m^3/d for the target volume in 2035. Overall staff required at the final target year will be 20 persons in a total. The work for collection of septage may be contract out to private sector including BWUI and Dumaguete WD.

(8) **Conduct seminar/open forum for the implementation of the construction project for septage treatment plant (Activity 7-8 in PDM)**

With regard to the implementation of the construction project for a septage treatment plant, open forum was held at the end of March, 2014 in Tagbilaran city. Resource speakers were invited from DPWH head office and Dumaguete Water District. In the forum, plan of septage collection, treatment and disposal; required cost, project implementing plan and financial arrangements were explained. The participants from LGU and private sector understood the contents of F/S. Information was provided from DPWH representatives on the conditions to have National Government assistance and from the plant manager of Dumaguete WD on the successful arrangements on the septage management system. Discussions were made by all participants and early realization of the septage treatment plant was agreed by provincial and municipal participants.

2.7.3. Achievement in Output 7

Achievement status of the Output 7 following the indicators of the PDM is as follows (2-25):

Table 2-25. Objectively Verifiable Indicator and Achievement Status of Output 7

Deliverables	Indicator	Performed
7. Preliminary design of septage treatment plant and assistance for prep-	Feasibility of the construction of septage treatment plant is verified and implementation	・ Feasibility study on the construction of a septage treatment plant was conducted. ・ C/Ps obtained the knowledge on

aration of sustainable management system including financial arrangements	framework is planned.	septage treatment system through the inspection to existing septage treatment plants and discussions with JICA Expert Team. Manner of design of the plant and requirements for the preparation of implementing plan was also studied. They learned the manner of investigation on solid waste and projection of solid waste in the future. ・ Project implementation plan and the need of financial arrangements for construction and O&M cost were confirmed through sharing related information by concerned people at the open forum. ・ Preparatory action by province and municipalities has been started for the implementation of the construction project for septage treatment.

Since no existing septage treatment system in Province of Bohol, there was no basis for discussions to create a septage management system without relevant knowledge among concerned LGUs. C/Ps and concerned people paid inspection visits two times to the existing septage treatment plants in the Philippines. They obtained knowledge on construction and O&M of the facilities including charge collection. The results of the inspections were reported by C/Ps to the people in the subject areas through several times of seminar. C/Ps confirmed implementing plan for the construction of a septage treatment plant in use of F/S prepared by JET. Then they prepared action plan referring to road map for further improvement in water pollution control.

Compost use by the combination of sludge to be generated at septage treatment plant and solid waste was planned. Then, joint work between JICA Expert Team and municipal staff was made for the collection and treatment of solid waste in Panglao Island. Municipal staff obtained knowledge on the manner of investigation and projection of solid waste volume in the future.

2.8. Common Activities

2.8.1. Training in Japan

JICA implemented training in Japan from July 6 to 19, 2014 (14 days) at Kobe, Toba, and Okinawa which has much in common with Bohol. The trainees were 12 people from PGBh, Municipality of Dauis and Panglao including Provincial Governor and two Municipal Mayors of Panglao

Island. Trainees conducted field observations and actively discussed on the purpose of the training, and achieved the purpose. Trainees prepared action plans at the end of the training, and after returning to Bohol, they are implementing the action plan using their experience in Japan.

2.8.2. Publicity

The Project endeavored for publicity to raise awareness of the project activities using following media.

- Newsletter

  The Project issued Newsletter No. 1 in August 2013 to announce commencement of the Project to stakeholders. In March 2014, the Project issued Newsletter No. 2 and informed establishment of Panglao Island Executive Committee and its contents to stakeholders. Project activities after the Newsletter No.2 were introduced in a pamphlet at the end of the Project.

Newsletter No.1

Newsletter No.2

Pamphlet

Figure 2-37. Cover Pages of Newsletters and Pamphlet

- Pamphlet

  The Project prepared a pamphlet in July 2015 to publicize project activities and outputs. It is 16 pages, and gave more emphasis on the layout to laymanized. The Project printed 10,000 copies and distributed in Panglao Island.

- Websites

  The Project established a website especially for ecotourism development (refer to section 2.3). Whole project activities were posted on JICA website (http://www.jica.go.jp/project/english/philippines/010/index.html).

- Poster, Banner and brochure

  The Project distributed posters, banners and brochures especially for ecotourism development, and posted in Tagbilaran city and Panglao Island for public appeals.

- Desk Calendar

  The Project prepared desk calendars 2014 and 2015 respectively that convey images of

project activities, and distributed to stakeholders.

Calendar 2014 (Front and Back)

Calendar 2015 (Front and Back)

Figure 2-38. Photos of Calendar 2014 and 2015

- Newspaper

  Project activities such as PIEC meetings and ecotourism development activities were placed in newspapers.

2.8.3. Preparation of Road Map

The Project achieved the project purpose through gaining 7 outputs. However, in order to realize the overall goal "The sustainable tourism development is achieved after completion of the new airport construction", C/P needs to continue the project activities, overcome various issues, and produce outputs. Aiming to show the way to achieve the overall goal, the Project prepared a road map in which necessary activities, methods, schedule and implementing organizations are sorted out. Provincial Government of Bohol, Municipality of Panglao, and Municipality of Dauis has committed to implement the activities, and the Governor and Mayors exchanged Memorandum of Understanding (MOU) with JICA and JET (Attachment-4) to promise the implementation in August 2015.

2.8.4. Plenary Meeting

1st plenary workshop was held in June 2013, and 2nd plenary workshop was held in March 2014. The plenary workshop was expected to be held four times after preparations of progress reports in original plan. However, it was evaluated that the effect to convene was not large, and participants and contents were duplicated with PIEC. Hence, after the 2nd plenary workshop, workshops were held for "Development of sustainable tourism resource use" and "Improvement of on-site STFs" respectively.

In August 2015, the Project held final seminar to review the Project. JET explained result, lessons learned and recommendation, and induced opinions of C/Ps on several themes of the Project.

2.9. Capacity Development and Capacity Assessment

2.9.1. Capacity Development

The results of technology transfer to C/Ps are shown in Table 2-26.

Table 2-26. Technology Transfer to C/P

Target Knowledge & Capacity	C/P		Method of Technology Transfer	Achievement
	Office & Position	Participation		
Output 1 1) To understand outline of adaptive management 2) Information sharing is possible among stakeholders 3) To understand importance of consensus building and figure out the consensus building	**PPDO** ・ PPDC ・ Planning Officer ・ Project Development Officer **BEMO** ・ Aquaculturist **PLO** ・ Legal Officer **Gov. Bohol** ・ Provincial Board Member **Mun. Dauis** ・ Councilor **Mun. Panglao** ・ Councilor	1) C/P meetings (1 day/week from July 2013 to February 2014) 2) Sector wide consultation and individual hearing (September 2013 to February 2014) 3) PIEC meetings (February 2014 to August 2015)	1) C/P and JET discussed many times on basic framework to collaborate public and private for adaptive management and prepared draft ordinance and implementing rules and regulations. 2) C/P explained present issues and necessity of PIEC, and listened to opinions from each sector. C/P apprehended function of PIEC. 3) C/P supported by JET prepared detail materials for every PIEC meeting, and encouraged logical discussion.	1) C/P explained and discussed on the framework of adaptive management when they prepared draft ordinance, held meetings, and attend sessions, and enhanced understandings. 2) Communication among stakeholders became active with sector-wide consultation, and information has been shared in PIEC meetings. 3) Stakeholders accumulated productive discussions, and became possible to build consensus.

Note) PPDO: Planning and Development Office, BEMO: Bohol Environmental management Office, PLO: Provincial Legal Office, BTO: Bohol Tourism Office, MPDO: Municipal Planning and Development Office, PHO: Provincial Health Office, PGSO: provincial General Service Office, MEO: Municipal Engineering Office, MSSMO: Municipal Sewage and Septage management Office

Target Knowledge & Capacity	C/P		Method of Technology Transfer	Achievement
	Office & Position	Participation		
Output 2 1) To understand adaptive management 2) To understand carrying capacity 3) To understand monitoring that is necessary for adaptive management 4) To conduct regular monitoring following the monitoring manual becomes possible 5) To propose usage control on carrying capacity becomes possible 6) To revise usage control plan based on monitoring results becomes possible. 7) Management of tourism resources utilizing guides becomes possible. 8) Public-Private collaboration becomes possible.	**BEMO** ・Aquaculturist **BTO** ・Administrative Aide **PPDO** ・Planning Officer **Mun. Dauis** ・Tourism Officer **Mun. Panglao** ・Tourism and Coastal Resource Management Officer	1) Core member meetings (once in a week) 2) Tourism use (15 times) and tourism resource (twice) monitoring 3) Pilot activities regarding diving, caving, snorkeling and beach supported by PIEC meetings. (January 2014 to August 2015) 4) Study tour in Philippines (4 days in July 2014) 5) Training in Japan (two weeks in July 2014)	1) C/P facilitates understanding of adaptive management through PIEC meetings. 2) C/P analyzes results of tourism use and tourism resource monitoring, and consider present issues and necessary measures. 3) C/P sets initial figure of carrying capacity for dive site and Hinagdanan Cave, plans usage control, and implements. 4) C/P prepares guidelines of guide association for snorkeling in Balicasag. 5) C/P provides training to guides of Hinagdanan Cave, and evaluate with questionnaire survey. 6) C/P visits to model sites in and out of Philippines.	1) C/P discussed usage control on carrying capacity in PIEC meetings, became possible to figure out appropriate plan. 2) C/P prepared monitoring manual. With repetition of monitoring, C/P improved monitoring capacity, and became possible to analyze the result and reflect to review of plan. 3) C/P formulated guide system for snorkeling and caving, and enhanced conscious and skill. 4) C/P implemented adaptive management, and improved knowledge.

Target Knowledge & Capacity	C/P		Method of Technology Transfer	Achievement
	Office & Position	Participation		
Output 3 1) To understand tourism resources of Bohol 2) To understand the objectives and know-how of Eco-tourism Bohol 3) To be able to plan and design eco-tours 4) To be able to promote eco-tours 5) To be able to utilize the web-site as a useful tool for tourism development	**BTO** ・Head of BTO/ Administrative Aide **PPDO** ・Planning Officer **Relevant Committee Members** ・Eco-tourism Promotion Program Committee and Provincial Tourism Committee (PTC) Members **Municipalities** ・MTO(Municipal Tourism Officer)s	1) Usual Work Meeting 2) Meeting for Eco-tourism Program and for the Pilot Project 3) Survey for Site Inspection, Demonstration, Monitoring 4) Information Collection of Tourism Resources	1) Review of tourism resources and tourists needs through conducting interview and field surveys 2) Discussion of eco-tourism development and potential tourism resources among a variety of stakeholders 3) Proposal of new Bohol's tourism development concept and guideline 4) Implementation of pilot project (tour packaging) 5) Development of new portal web-site (web design, information posting, etc)	1) New Bohol's tourism development concept, "Eco-tourism Bohol" was discussed among the counterparts, and finally launched officially by the Governor in March 2015 2) Works for Eco-tourism development were done comprehensively by initiatives of BTO and MTOs 3) Finally total 102 individual eco-tour site and 12 daily packaging tours were developed and posted on the web-site supported by MTOs and private sectors 4) Pilot project was conducted in February and March 2015 and technical transfer was also done through it 5) New web-site was developed and technical transfer was also done

Target Knowledge & Capacity	C/P		Method of Technology Transfer	Achievement
	Office & Position	**Participation**		
Output 4 1) Knowledge on laws and regulations from National to municipal levels for the management of on-site STFs 2) Explanation and guidance to concerned people on revised laws and regulations 3) Provision of required improvement of relevant laws and regulations through the future	**PHO** ・ Head of PHO **BEMO** ・ Manager of BEMO/ Pollution Control Officer **MPDO** (Dauis) ・ MPDC **MPDO** (Panglao) ・ MPDC	Major meetings/ investigations(2-3days/week) Major meeting (2-3 times/month) Major meeting/ routine meeting（2-3day/week） -do- Collaboration in the field according to proper interpretation of relevant laws& regulations (1time/week	All C/P join a series of workshop 1) Regarding all related laws and regulations on the on-site STFs, all C/Ps reviewed and confirmed the contents. 2) All C/Ps participated to prepare draft revision of relevant existing ordinances together with Sangguniang Members and presented the draft at PIEC working group meeting. 3) Draft for further improvement/ revision of ordinances to include septage treatment system was prepared and discussed with C/Ps.	1) In the several workshops, reference materials on laws and regulations were provided for C/Ps. 2) Continuous field collaboration for draft preparation 3) Conducted at the same time together with item 2 Provided *Sangguniang Bayan* Members with the background for the revision of existing ordinance, required countermeasures and other relevant information and exchanged opinions for early finalization of the revision. Assisted LGUs in Public Hearings/ community meeting (preparatory works, workshops, follow up activities)

Target Knowledge & Capacity	C/P		Method of Technology Transfer	Achievement
	Office & Position	Participation		
Output 5 1) Appropriate routine work by municipal staff for the required work to manage on-site (check of plan and design of ST, inspection during and upon construction of facilities and check of O&M of existing STs) 2) Monitoring and provision of countermeasures on pollution sources and sea area(including effective use of sewage laboratory) 3) Promotion of collaborated work between concerned parties in the municipalities and province 4) Self-supporting improvement measures in technical and systematic work	**PHO** ・ Head of PHO ・ Staff for sewage quality examination(3 persons) **BEMO** ・ Pollution Control Officer **MPDO** (Dauis) ・ MPDC **MPDO** (Panglao) ・ MPDC **MSSMO(Dauis)** ・ Office Head, Planning, construction and sanitation personnel in charge **MSSMO (Panglao)** ・ Office Head, Planning, construction and sanitation personnel in charge	Attend major meetings with municipal staff, as required Attend the training for sewage quality examination Attend major meetings with municipal staff, as required Attend concerned WS/Seminar and field survey Check applied documents on STs; inspection during and upon construction of STs through collaboration with JICA Expert Team (7days/2 weeks) -do-	1) Held WS for required work to manage on-site STFs complying existing laws and regulations and conduct training for MSSMO staff. 2) Collaborate with MSSMO staff for the review of submitted plan/design of STs and field inspection during and upon construction of the STs. 3) Discuss with concerned provincial C/Ps the importance of routine sewage quality examination and establishment strategy of sewage laboratory. JICA Expert Team provided C/Ps with outline of water pollution control and monitoring activities related to Water Act. Draft organization for the monitoring was worked out. 4) Conduct WS for municipal staff on field work to manage on-site STFs and promote relationship in the work for the management of on-site STFs between municipalities and province. 5) Basic knowledge for water pollution control was transferred to C/Ps and the need of change of idea on water pollution control was confirmed. A draft road map was prepared considering comprehensive countermeasures for water pollution control. Action plan was made by C/Ps referring to the road map.	1) JICA Expert Team collaborated spending much time with MSSMO staff for proper implementation of management work for control of on-site STFs 2) Sewage quality examination methods were transferred by a JICA Expert in September-November, 2014. 3) The chances of attendance by provincial C/Ps to the meetings with municipal staff as well as WSs/seminars were maximized. Then, cooperation between province and municipalities improved considerably. Assistance by province to the municipalities were intentionally increased including support for preparation of pamphlet for the dissemination of standard ST

Target Knowledge & Capacity	C/P		Method of Technology Transfer	Achievement
	Office & Position	Participation		
Output 6 1) Knowledge on standard design of ST, and construction and O&M of facilities 2) Sewage quality examination method 3) Study of treatment efficiency using sewage quality examination results 4) Acquisition of knowledge on sewage treatment methods	**PHO** ・ Head of PHO ・Laboratory staff（2persons） **PGSO** ・ Assistant Eng. **MPDO** ・ MPDC and his staff **MEO** ・ ME and his staff	Major meeting (1 time/month) Examination training and conduct monitoring of pilot plants (2days/week) Planning, design, construction and operation & monitoring of pilot plants（1day/week） Examination training (20days） Planning pilot plants and construction（1day/2weeks） -do-	1) Workshops were held for the selection of sewage treatment methods, basic design of facilities, and O&M manual preparation. Through design and construction supervision of pilot plans, JICA Expert Team transferred the technology. 2) Sewage examination methods were transferred by JICA Expert to laboratory staff using equipment donated by JICA. 3) Analysis on treatment efficiency of pilot plants was made by joint effort of JICA Expert Team and C/Ps. 4) Alternative sewage treatment methods were explained to and discussed with C/Ps	1) Details on the standard ST were fully understood by C/Ps through the work related to output 4 and 5. Modified type STs for further improve effluent quality were finally presented by JICA Expert Team at the workshop held in March, 2015. 2) Training for sewage quality examination was conducted by JICA Expert two times in 2014. 3) –do- 4) Related information on sewage treatment methods was provided for C/P in the course of pilot plant implementation and summarized at the seminar in March, 2015.

Target Knowledge & Capacity	C/P		Method of Technology Transfer	Achievement
	Office & Position	Participation		
Output 7 1) Knowledge on septage treatment system 2) Investigations on solid waste and compost use sludge and projection method of solid waste 3) Manner of design of septage treatment plant 4) Study on project implementation	**PHO** ・ Head of PHO **BEMO** ・ Manager of BEMO/ Pollution Control Officer **MPDO** (Dauis) ・ MPDC **MPDO**(Panglao) ・ MPDC	Inspect existing septage treatment plants and joining for the study of treatment method and design fundamentals. -do- -do- Attend survey for solid waste and sludge compost use (2days/ week)	1) A septage treatment system was repeatedly explained to the C/Ps during study of treatment process. 2) For the inspection at existing septage treatment plants, review of the system s was made using reference materials and field confirmed the actual facilities and O&M practices. 3) During the course of design of septage treatment plant, basic conditions and planning method were discussed and overall plan was explained at the open forum in March, 2015. 4) Project implementing plan was prepared with required countermeasures and shared by concerned parties.	1) Septage treatment and disposal methods were fully explained referring to existing processes in the Philippines. 2) Local consultant and municipal staff collaborated for the investigation of solid waste. Municipal staff obtained manner of investigations and projection of solid waste in the future. 3) Preparatory work for the inspection of existing plans and summarization of inspection results were jointly made by C/Ps and JICA Expert Team. Manner of design of septage treatment plant was shared at the open form held in March 2015 and follow up workshop. 4) Project implementation plan was discussed with provincial staff for early action by LGUs.

2.9.2. Capacity Assessment of C/P

The implementing capacities of the C/Ps by major output were evaluated based on self-evaluation results before commencement and after completion of the Project. The inquiries in the format were filled in by them in August, 2013 and April, 2015. The form is designed considering the following 5 stage evaluation.

Evaluation standard

5：Always able、4：Generally able、3：Sometimes able、2：Hardly able、1：Unable

[Development of Sustainable Tourism Resource Use]

The self-evaluation results by twelve C/Ps involved in the component work for the strengthening on the on-site STFs are summarized and an overall average score by major output is presented in Figure 2-39 both for before commencement and after completion of the project.

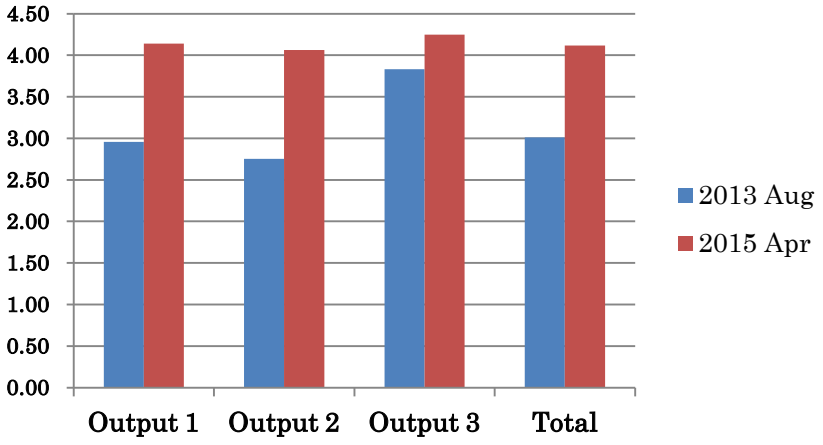


Figure 2-39. Overall average score of C/Ps by major output before commencement and after completion of the Project (Output 1-3)

Panglao Island Executive Committee (PIEC) is newly introduced framework in Bohol, but activities such as documentation, legislation and operation of meetings for PIEC were common works of C/P. Therefore, capacity of C/P for output 1 was higher that of C/P for output 2 from the beginning of the Project. As C/P has not implemented usage control on carrying capacity exactly, capacity of C/P for output 2 was relatively low. However, C/P has accumulated discussion and implementation throughout the Project, and understandings of scientific system of adaptive management. Eventually, the level rose more than 1 point, and exceeded “Generally able” level. C/P of output 3 was only staff of BTO, since the activities were for development of tourism in whole Bohol Province. BTO had worked for tourism development of Province of Bohol since the commencement of the Project, therefore, the score at the beginning of the Project was relatively high. However, likewise, the level rose and became highest score among three outputs, and effect of CD is confirmed.

[Improvement of on-site STFs]

The self-evaluation results by eleven C/Ps involved in the component work for the strengthening on the on-site STFs are summarized and an overall average score by major output is presented in figure 2-40 both for before commencement and after completion of the project.

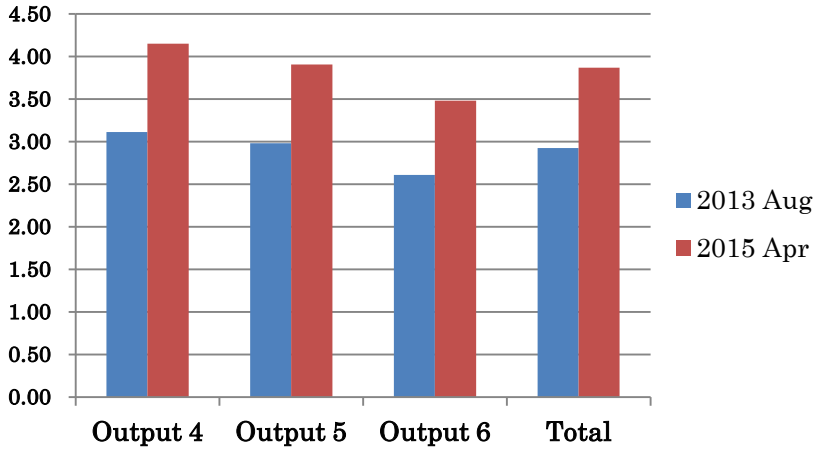


Figure 2-40. Overall average score of C/Ps by major output before commencement and after completion of the Project (Output 4-6)

With regard to the three outputs to be achieved, all outputs are improved from "Sometimes able" to Generally able/Always Able as shown in the above Figure. Among them, improvement rate of output 4 shows a higher score. This result may be caused by the familiarity on the laws and regulations by C/Ps as officials of LGUs. For output 5, under few chances to improve organization by themselves due to a traditional top down/vertical type management system, it will take more time to make actions by themselves. Regarding output 6, the capacity of C/Ps is limited to coordination for the project implementation from planning to O&M of facilities. Although the score is lower than that of other outputs, a comparatively higher score is obtained as a result of their efforts to understand basic concepts and important conditions for design and construction of facilities.

3. ACHIEVEMENT AND PROJECT PURPOSE

3.1. [Development of Sustainable Tourism Resource Use] (Component 1)

Achievement status of the project purpose following the indicators of the PDM for component 1 is as follows (Table 3-1).

Table 3-1. Objectively Verifiable Indicator and Achievement Status (Component 1)

Project Objectives	Objectively Verifiable Indicator	Achievement Status
To protect Environment of Panglao Island from increasing tourists estimated after completion of the new airport construction	Tourism usage control in and around Panglao Island has started with the concept of adaptive management.	・ In the Municipality of Dauis, adaptive management cycle (monitoring, set a initial figure of carrying capacity, establish usage control plan, legislation of an ordinance, monitoring, review of carrying capacity and usage control) was completely implemented. Consensus building and scientific discussion were carried out in the meetings or working group and scientific council, and adaptive management system was utilized. ・ In the Municipality of Panglao, C/P carefully discussed initial figure of carrying capacity and usage control of diving through working group and scientific council referring academic literature and results of monitoring. The usage control on carrying capacity was included in the amended EUF Ordinance "An Ordinance Providing for the Establishment of Environmental Users Activity System", and the usage control has been implemented with advance reservation. Environment load is now limited with adaptive management system in place. ・ C/P also discussed on usage controls on carrying capacity for beach, snorkeling, and boat in Municipality of Panglao through PIEC. The municipality has amended ordinance and announced executive order, usage control has started for protection of tourism resources with the concept of adaptive management. ・ C/P of BTO conducted "Eco-tourism Bohol Program" with MTOs and private sectors in order to mitigate negative impact on Panglao's nature.

		Public awareness, technical transfer, and activity promotion were done especially through the pilot project, and finally total 102 individual eco-tour sites and 12 package tours were developed by C/P. Private travel agents utilizes these package tours in their selling tours.

As mentioned above, project purpose has been achieved referring to the indicator. However, in order to achieve overall goal "The sustainable tourism development is achieved after completion of the new airport construction", further capacity development is crucial. Necessary actions after the Project are as follows.

1) Adequate operation of PIEC: Capacity of C/P to operate PIEC has improved, and there is no problem to convene meetings and preparation of minutes. However, collaboration among Province and two Municipalities is essential for selection of agenda of a meeting and preparation of material for the subject. In addition, to secure the cost of meetings is necessary.
2) Usage control for adaptive management: Usage control of diving is presently successful, but to control illegal boat and fishery, additional staff to inspect the activities must be inputted. Municipality of Panglao has just started trainings at present. As for beach protection, skillful experts must conduct study and analysis deeply, and as there is no such expert in Bohol, Municipality of Panglao or Province of Bohol has to invite from outside experts.
3) Sustainable tourism development: Eco-tour development has become successful, and awareness and commitment of stakeholders who recognize Bohol as the province of ecotourism have improved. However, there are only two regular staff in BTO to implement sustainable ecotourism. Employment of staff and capacity development are necessary. On the other hand, since private sectors tend to realize and utilize packaged tours, it is expected that the "Eco-tourism Program" is initiated by private sector supported by public sector.

3.2. [Improvement of on-site STFs] (Component 2)

Achievement status of the project purpose following the indicators of the PDM for component 2 is as follows (Table 3-2):

Table 3-2. Objectively Verifiable Indicator and Achievement Status (Component 2)

Project Objectives	Objectively Verifiable Indicator	Achievement Status
Strengthening of management capacity to control on-site STFs is achieved.	Countermeasures to improve effluent quality from on-site STFs have started.	In order to achieve project purpose, establishment of relevant laws and regulations, setting up management office and technical improvement are required simultaneously. It is urgent at present to construct a septage

		treatment plant in the fact that the provision of a sewerage system cannot be expected. ・ Draft provincial sanitation code and municipal ordinances were prepared after additions and revisions of the existing ones based on the identified issues/problems on the existing on-site STFs. The proposal was submitted to PIEC and got concurrence from them to finalize at each municipality. ・ The office for the management of on-site STFs （MSSMO）was established and operated to manage on-site STFs according to existing National codes with adequate interpretation on the structure of standard ST. ・ Modified STs to improve effluent quality were proposed based on pilot study through monitoring of constructed pilot plants. ・ F/S for the construction of a septage treatment plant was prepared to complete a septage management system. Action plan for the implementation of the project was prepared by C/Ps.

The overall goal of the project is set as "The sustainable tourism development is achieved after completion of the new airport construction". To achieve the target, after achievement of project purpose continuation of simultaneous activities are required including improvement/revision of relevant laws and regulations, operation of a permanent office for the management of on-site STFs and technical improvement for on-site STFs. The generated septage shall be properly treated and disposed of under the responsibility of LGUs, as described in National Sanitation Code. The following are issues and required countermeasures through the future.

1) Relevant laws and regulations: Presently, proposed ordinance for the management of ST has been under discussions at *Sangguniang Bayan* meeting. Information dissemination on the additions/revisions to existing ones and community meetings hall be made to get full support from beneficiaries. An additional ordinance for the management of septage treatment system including construction and O&M of septage treatment plant shall also be prepared and approved before commencement of the construction of a septage treatment plant.
2) Organization for the management of the septage management system: Presently MSSMO has been operating for the management of STs, however, for the permanent arrangements, position of MSSMO in the MDRRMO shall be clarified with budgetary

arrangements.

3) Technical improvement: The cost for the construction of standard ST is expensive. Therefore, various countermeasures shall be provided by LGUs including financial assistance, installation of community toilet facilities, etc., aside from promotion of community participation.
4) Construction of a septage treatment plant and operation of the septage management system: In accordance with F/S for the construction of septage treatment plant, preparatory work shall be started including financial arrangement and implementing countermeasures.

4. INPUT TO THE PROJECT

4.1. Input by the Japanese Side

4.1.1. Dispatch of JICA Expert Team (Table 4-1)

Table 4-1. Input of the JICA Expert Team

Name (Position)	Year	M/M	Major Activity
Shinichiro TANIMOTO (Team Leader/ Sustainable Tourism Development (1)/ Ecosystem Conservation (1))	2013	5.57	・ Supervision of the project implementation ・ Collection of information for adaptive management ・ Sector-wide workshop ・ Baseline survey of tourism resources (contract) ・ Preparation for establishment of PIEC
	2014	8.17	・ Supervision of the project implementation ・ Establishment of PIEC supported with Provincial Ordinance, and in Operation ・ Preparation of Draft Monitoring Manual of Tourism Resources ・ Discussion and implementation of usage control on carrying capacity ・ Establishment of guide system and training
	2015	4.7	・ Supervision of the project implementation ・ Operation of PIEC ・ Monitoring based on the monitoring manual ・ Discussion and implementation of usage control on carrying capacity, and review ・ Preparation of Administrative Guidelines ・ Preparation of Road Map after the Project and its MOU
Kuniomi HIRANO (Deputy Team Leader /Sustainable Tourism Development (2)/Land Use Management)	2013	2.13	・ Establishment of PIEC and implementation body of the project ・ Preparation of adaptive management plan ・ Preparation of new mechanism of environmental monitoring survey
	2014	4.9	・ Continuous implementation of adaptive management in the PDCA cycle ・ Technical transfer of environmental monitoring survey ・ Proposal of new tourism development program
	2015	2.27	・ Continuous implementation of the tourism development program ・ Preparation and implementation of the pilot project
Satoshi NOJIMA (Ecosystem Conservation (2)/Coral	2013	1.5	・ Supervision of baseline survey of tourism resources ・ Training of coral reef survey

Reef Monitoring)	2014	1.0	・ Preparation of monitoring manual (coral reef)
	2015	1.0	・ Preparation of monitoring manual (coral reef) ・ Training of coral reef monitoring
Masatoshi MOMOSE (Institutional Management Improvement)	2013	6.6	・ Survey to get information on the o-site STFs and review of existing relevant laws and regulations (Workshop) ・ Preparation of draft for revisions/additions to existing ordinances (Explanation to and exchange of opinions with Sangguniang members and municipal staff). ・ Investigation of private companies which are undertaking septage collection and discussions on issues & problems with municipal staff.
	2014	6.37	・ Assistance to C/P for getting approval from PIEC on revised ordinances ・ Assistance for the improvement of management office on the on-site STFs and staff training (from planning to construction inspection) ・ Collaboration with C/P in the field for the promotion of their self-support work and conduct several workshops (laws& regulations, organization and operation, technical improvement for effluent control) ・ Assistance to hold community meeting to change consciousness and participation
	2015	3.03	・ Conduct open forum for the construction of septage treatment plant (implementing plan, financial arrangements, cooperation between the province and municipalities and private sector participation) ・ Evaluation of technology transfer to C/P and recommendations (workshop)
Yoko SHIMAZU (Improvement of on-site STFs (1))	2013	5.37	・ Investigation on existing STs ・ Assistance for preparation of inventory of existing STs ・ Design of pilot STs and bidding
	2014	4.17	・ Procurement of sewage quality examination equipment ・ Assistance for the operation of pilot plants and conduct water quality monitoring ・ Design of modified STs for the improvement of effluent quality
	2015	1.4	・ Design of modified STs for the improvement of effluent quality and prepare manual (workshop)
Hisato TAKEDA	2013	1.97	・ Design of pilot STs and preparation of bidding document

(Improvement of on-site STFs (2))			・ Projection of septage volume
	2014	2.13	・ Investigation on existing septage treatment in the Philippines ・ Construction supervision for pilot plant construction ・ Preparation of TOR for procurement of sewage quality examination equipment
	2015	1.37	・ Investigation on existing septage treatment in the Philippines ・ Prepare F/S for the construction of septage treatment plant. ・ Assistance for preparatory work to construct septage treatment plant (land acquisition, etc.) ・ Preparation of Road Map after the Project
Go KIMURA (Tourism Development)	2014	2.37	・ Survey of present situation of tourism in Bohol ・ Proposal of new tourism development program
	2015	1.00	・ Proposal of new tourism development program
Yoshito MOCHIZUKI (Tourism information management)	2014	1.07	・ Collecting information and determine the design of tourism portal web-site of Bohol ・ Experimental publishing of tourisml web-site of Bohol
	2015	1.57	・ Making detail pages and updating of tourism web-site of Bohol ・ Improvement of tourism web-site of Bohol and technical transfer to Bohol tourism office
Yasuhiro ATSUMI (Sewage quality examination)	2014	1.00	・ Conduct training for examination of sewage quality ・ Conduct training for analysis of examination results
Takashi GOTO (Solid waste & Compost)	2014	2.00	・ Selection of local Consultant for the investigation of solid waste ・ Conduct survey for solid waste volume and quality ・ Survey on the compost use and project future compost demand

4.1.2. Local Staff of JICA Expert Team (Table 4-2)

Table 4-2. Input of Major Local Staff of the JICA Expert Team

Name (affiliation)	Position	Year	Input M/M
Joey Gatus (University of San Carlos)	Coral Reef Expert	2014-2015	19.00
Wenifel Porpetcho	Coral Reef Expert	2014−2015	0.53
Ely L. Alcala	Coral Reef Expert	2013-2015	0.55

(SUAKCREM)			
Anthony S. Ilano (University San Carlos)	Coral Reef Expert	2015	0.06
Abner A. Bucol (SUAKCREM)	Carrying Capacity Expert	2013-2015	0.88
Pablina L. Cadiz (SUAKCREM)	Carrying Capacity Expert	2013-2015	0.39
Francisco B. Baltazar Jr. (PhilKoei International Inc.)	GIS Expert	2013-2015	2.75
Hannah A. Panares (iSEA SysDev Corporation)	Web Producer	2014-2015	0.79
Kevin Bryan D. Bermido (CEST Incorporated)	Organizational Management	2013	5.66
Bien Aaron F. Madayag (CEST Incorporated)	CAD Operator/ Cost Estimator	2013	0.39
Reynaldo M. Ebajay (CEST Incorporated)	Construction Super-vision	2014	1.62
Elmer Romulo G. Valdez (EGIS BCEOM International)	Construction Super-visor)	2014	2.00
Analeh C. Patindol (CCEF Inc.)	Facilitator	2013	0.88
Argelyn B. Adlawon (University of the Philippines)	Facilitator	2013	0.79
Ma. Clarissa L. Macalam	Tourism Assistant	2014-2015	16.00
Kimmy Gerica A. Trinidad	Tourism Assistant	2014-2015	13.00
Lourd Pocon (University of Bohol)	Tourism Assistant	2014-2015	2.83
Nicefora C. Luga	Secretary	2013-2015	26.00
Christopher J. Cartera (PhilKoei International Inc.)	Secretary/ Tourism Assistant	2013-2014	7.48

4.1.3. Training in Japan

JET arranged and implemented the training in Japan for C/P. Outline, Participants, and Program are as follows (Figure 4-1 and Table 4-3).

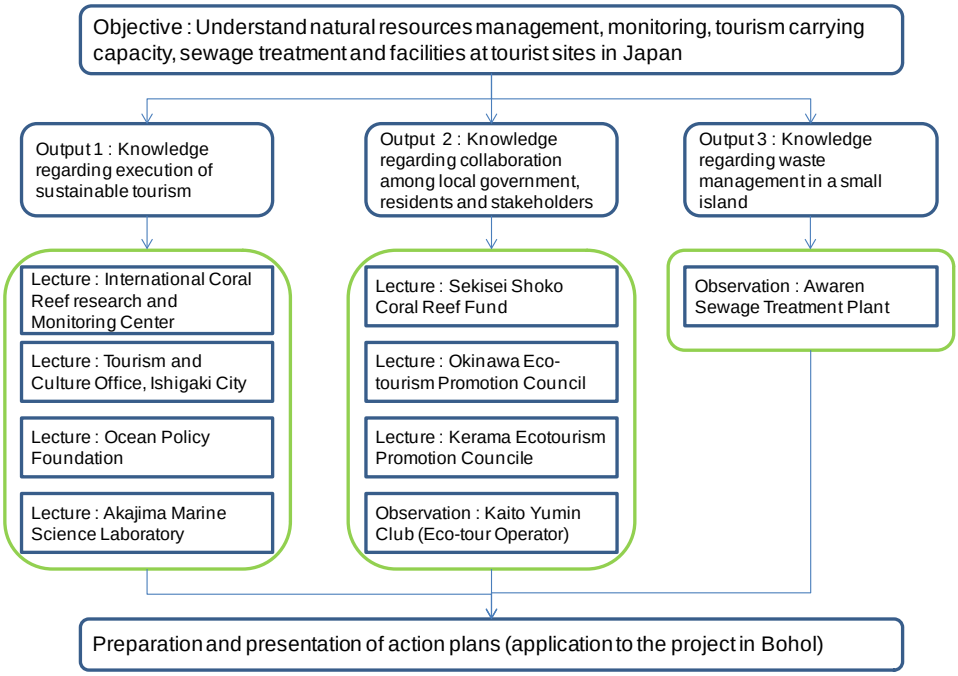
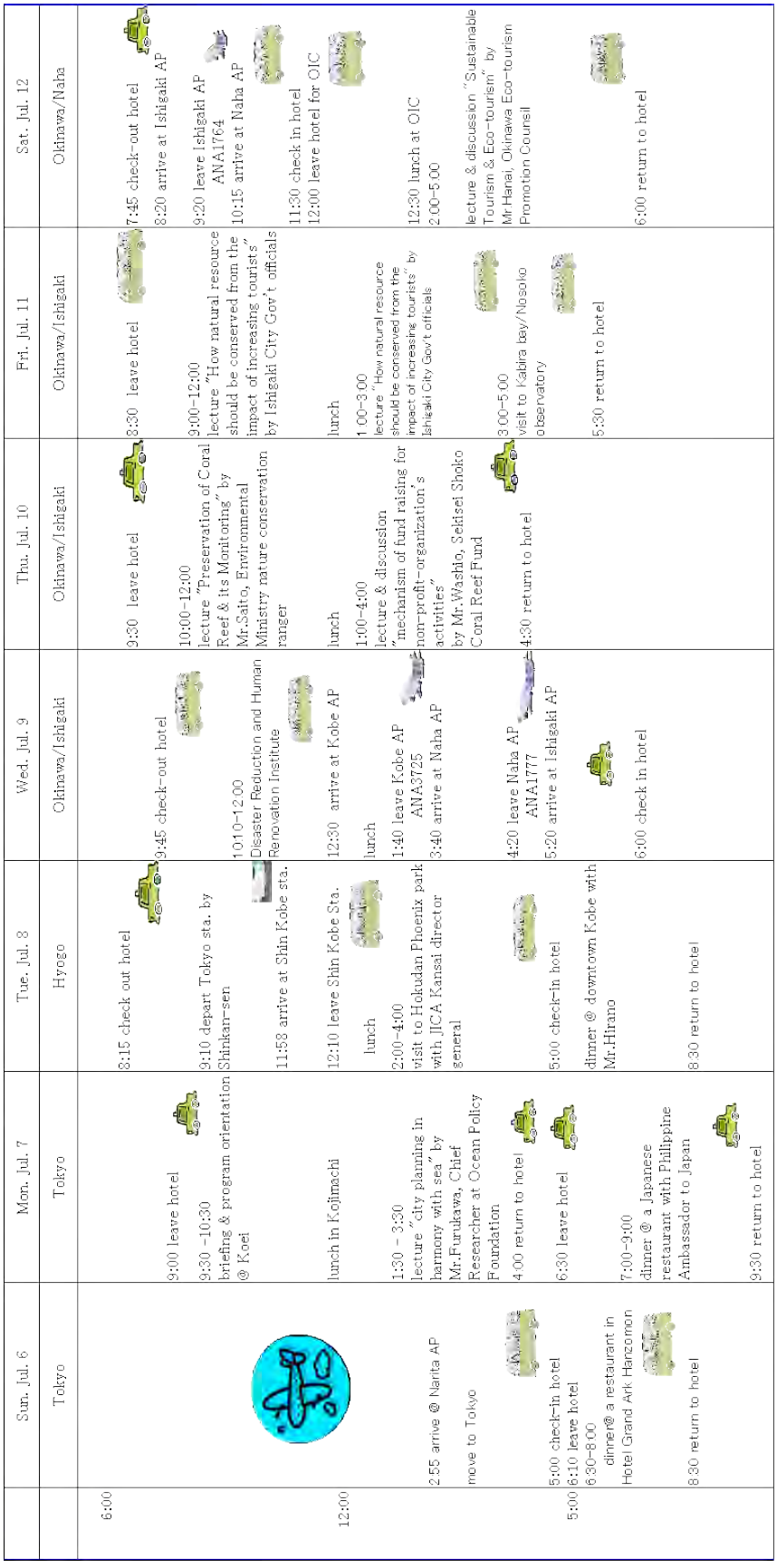


Figure 4-1. Outline of the Training in Japan

Table 4-3. List of Participants for the Training in Japan

No	Name	Position	Office
1	Edgardo M. Chatto	Governor	Province of Bohol
2	Abeleon R. Damalerio	Provincial Board Member	Province of Bohol
3	Leonila P. Montero	Mayor	Municipality of Panglao
4	Joseph Jasper A. Arcay	Councilor	Municipality of Panglao
5	John Titus J. Vistal	Provincial Planning & Development Coordinator	Provincial Palnning & Development Office
6	Josephine R. Cabarrus	Administrative Officer IV	Bohol Tourism Office
7	Ma. Mercedes E. Salinas	Municipal Planning & Development Coordinator	Municipality of Dauis
8	Esperanza J. Flores	Sanitation Inspector IV	Provincial Health Office
9	Jovencia B. Ganub	Adminstrative Officer III	Provincial Health Office
10	Maria Socorro A. Trinidad	Aquaculturist II	Bohol Environnment Management Office
11	Aida L. Evangelista	Planning Officer I	Provincial Palnning & Development Office
12	Severino Jr. L. Abonete	Driver I (Governor's Companion)	Province of Bohol

Table 4-4. Training Program for the Training in Japan



	Sun. Jul. 13	Mon. Jul. 14	Tue. Jul. 15	Wed. Jul. 16	Thu. Jul. 17	Fri. Jul. 18	Sat. Jul. 19
	Okinawa	Okinawa/Tokashiki Island	Okinawa/Aka Island	Mie	Mie/Tokyo	Tokyo	Tokyo
6:00					7:50 check out hotel	8:20 leave hotel	6:00 check-out hotel
		8:30 leave hotel	8:30 leave hotel			9:00-10:30 Action Plan Making	
	10:00 Leave hotel	9:00 leave Tomari Port	9:00 leave Tomari Port	10:00 check out hotel	8:30 program orientation 9:00-10:30 city walking		7:30 arrive at Narita AP
	10:00-5:00	9:35 arrtive at Tokashiki Isl	10:10 arrtive at Aka Port	10:30 arrive at Naha AP	10:30-2:00 visit to Toshi Island by a Kaitou Yumin Club tour guide (lunch included in the tour)	10:30-12:00 Evaluation Meeting	9:35 depart Narita JAL741
	Visit to	10:00-11:00 Observation & Discussion "Waste Water Treatment"	10:30-12:00 Lecture"Sustainable Tourism & Coral Reef Conservation" by Mr. Iwao, researcher at Akajima Marine Science Laboratory	11:40 leave Naha AP JTA252			
12:00	Chura-Umi Aquarium	lunch	lunch	1:50 arrive at Chubu Int'l AP	2:10-4:10 lecture "Sustainable Implementation of Eco-tour" by Kaito Yumin Club CEO	1:00 return to hotel	1:15 arrive at Manila
		2:00 leave Tokashiki Isl.	1:00-2:30 Lecture"Sustainable Tourism & Coral Reef Conservation" by Mr. Kakinohana, former director of Kerama Ecotourism Promotion Council	2:15 leave AP			
		2:35 arrive at Tomari Port					
		3:30-5:00 visit to Shuri Castle		5:00 Check-in hotel	4:15 arrive at Toba station		
			2:30-4:00 discussion by Mr.Iwao & Mr.Kakinohana		4:46 leave Toba station		
5:00	5:00 return to hotel	5:30 return to hotel			6:46 arrive at Nagoya sta. 6:53 leave Nagoya sta.		
			5:20 leave Aka port		8:33 arrive at Tokyo Sta.		
			6:10 arrive at Tomari port		9:00 check in hotel		
			6:30 return to hotel				

4.1.4. Procurement of Equipment

As shown in below table, total 7,786,498 yen of project equipments were procured (Table 4-5).

Table 4-5. List of Equipment Procured under the Project

Year	Item	Quantity	Cost (PHP)	Cost (Yen)
2013	(1) Desktop computer	2	79,590	190,300
	(2) Laptop computer	1	42,925	102,634
	(3) A3 colored laser photo-copier/printer	1	349,800	836,372
	(4) Projector and Projector screen	1	22,200	53,080
	(5) Satellite image	1	553,114	1,322,496
	(6) Portable T-N, T-P, COD measurement	1	124,161	296,000
		Sub-total	1,171,790	2,800,882
2014	(7) Other water quality measurement	1	2,019,049	4,738,590
	(8) Laptop computer	1	41,425	98,467
		Sub-total	2,060,474	4,837,057
2015	(9) Laptop computer	1	53,400	148,559
		Sub-total	53,400	148,559
		Total	**3,285,664**	**7,786,498**

4.2. Input by Philippine side

4.2.1. Counterpart staff (Table 4-6)

Table 4-6. Input by Province of Bohol and Concerned Municipalities

Name (position)	Responsibility	Year	Input M/M
John Titus Vistal (Provincial Planning and Development Coordina-tor)	Project Director	2013−2015	5.0
Ma. Maria Socorro Trinidad (Aquaculturist II, BEMO)	Project Manager	2013−2015	7.0
Josephine R. Cabarrus (Head, BTO)	Project Manager	2013-2015	4.0
Samuel V. Racho (OIC, BEMO)	Project Manager	2014-2015	3.0
Jovencia B. Ganub (Administrative Officer IV, PHO)	Project Manager	2013−2015	7.0
Esperanza J. Flores (Head, Environment & Sanitation Section, PHO)	Project Manager	2013−2015	7.0
Hermilo Arcaya (Project Evaluation Officer IV, PPDO)	Project Manager	2013-2015	1.0
Aida L. Evangelista (Planning Officer II, PPDO)	C/P	2013-2015	4.0
Judith U. Sumatra (Administrative Officer V, PPDO)	C/P	2013-2014	2.0
Artemio B. Alo	C/P	2013-2014	2.0

(Project Development Officer I, PPDO)			
Mildred Madronero (Administrative Aide, PPDO)	C/P	2013-2015	6.0
Adelfa Salutan (Agricultural Technologist, BEMO)	C/P	2013-2015	3.0
Moises Cañete Jr. (Administrative Assistant II, BEMO)	C/P	2013-2015	1.0
Jose Garcia (Aquacultural Technician, BEMO)	C/P	2013-2015	3.0
Cecilio I. Arayata Jr. (CRM Staff, BEMO)	C/P	2014-2015	2.0
Gina Kapirig (Administrative Aide, BTO)	C/P	2013-2015	8.0
Remedios Regacho (Aquaculturist II, OPA)	C/P	2013-2015	1.0
Anna Lou B. Tiongson (Aquaculture Technician I, OPA)	C/P	2014-2015	2.0
Teodoro Lagang (Legal Officer, PLO)	C/P	2013-2014	1.0
Arsenio G. Garcia (Engineer II, PGSO)	C/P	2013−2015	5.0
Lorenz Lee Llera (Sanitation Inspector I, PHO)	C/P	2013-2015	3.0
Flordeliza Mesina (Sewage Laboratory in Charge, PHO)	C/P	2014-2015	5.0
Edgardo Petallar (Engineer II, Motorpool)	C/P	2013-2015	1.0
Jovencia S. Asilo (MPDC, Panglao Municipality)	Deputy Project Manager	2013-2015	5.0
Darwin Menorias (Tourism Officer, Panglao Municipality)	C/P	2013-2015	7.0
Julita L. Cogo (Rural Health Physician, Panglao Municipality)	C/P	2013-2015	1.0
Rogelio S. Bonao ME, Panglao Municipality)	C/P	2013-2015	1.0
Abelio Arbilo (MSSMO, Panglao Municipality)	C/P	2013-2015	1.0
Ma. Mercedes E. Salinas (MPDC, Dauis Municipality)	Deputy Project Manager	2013-2015	3.0
Christopher Nistal (Tourism Officer, Dauis Municipality)	C/P	2013-2015	5.0
Oscar B. Nistal	C/P	2013-2015	5.0

(MSSMO, Dauis Municipality)			
Joni L. Co (MHO, Dauis Municipality)	C/P	2013-2015	1.0
Alexander P. Dolauta (ME, Dauis Municipality)	C/P	2013-2015	1.0
Abeleon R. Damalerio (Chair, Committee on Environment, PGBh)	Advisory Member	-	-
Joseph Jasper Arcay Chair, Committee on Environment, Panglao Municipality)	Advisory Member	-	-
John Ericson G. Aranjuez (Chair, Committee on Environment, Dauis Municipality)	Advisory Member	-	-

4.2.2. Operational Expenses borne by the Philippines Side

A total of PHP 844,058.00 has been allocated as budget for the Project. Out of this amount, PHP 470,258.00 from Province of Bohol, PHP 365,750.00 from Municipality of Panglao and PHP 8,050.00 from Municipality of Dauis were disbursed respectively in the project period. The breakdown of the budget is shown below (Table 4-7).

Table 4-7. Operational Expenses Borne by the Philippine Side

Year	2013 (Actual)	2014 (Actual)	2015 (Budget)	Total (Budget)
Province of Bohol	16,000.00	157,686.00	296,572.00	470,258.00
Municipality of Panglao	2,000.00	15,050.00	348,700.00	365,750.00
Municipality of Dauis	1,500.00	3,200.00	3,350.00	8,050.00
			Total	844,058.00

Unit: PHP

5. LESSONS LEARNED AND RECOMMENDATIONS

5.1. Lessons learned

5.1.1. Collaboration among related Province and Municipalities

The Project commenced with the agreement between JICA and Provincial Government of Bohol. Hence, JET mainly worked with the staff from PGBh as the major C/P and started environmental protection activities in Panglao Island under the influence of the Province. However, actual implementing bodies of the various environmental protection activities are from the Barangay, and Municipal government (Brgy Bingag, LGU Dauis and Panglao) who are responsible in their respective jurisdiction Panglao Island. The *Sangguniang Bayan* (Municipal Council) of Dauis and Panglao craft ordinances while the executive branch of each municipality enforces these ordinances.

JET and the Province of Bohol partnered with the Municipality of Dauis and Panglao C/P organizations and selected necessary C/Ps from the two Municipalities. Basically, the Project emphasized on policies of the two Municipalities, and carefully made sure not to usurp individual jurisdiction of the two Municipalities as well as the province. With this arrangement, the two Municipalities positively participated in the Project, and ensured effective environmental protection for Panglao Island as well as help achieve the project goals.

5.1.2. Comprehension of Need to Proceed with Technical Cooperation

As for the monitoring of tourism resources, there was no entity that can conduct the monitoring in the two Municipalities. Even in the Province, the Marine Protected Area – Provincial Technical Working Group (MPA-PTWG) had experience to conduct survey, but there was no staff that can process, analyze and feedback (reporting) the monitoring results. JET discussed with MPA-PTWG and CRM officer of Municipality of Panglao with regard to the monitoring concerns and JET suggested introducing “Spot Check” method which is easy to conduct and analyze (common method in Japan). However, the most common method used n Bohol was the “Point Intercept transect” (PIT) method and so the Project decided to use PIT instead of spot check method. PIT method entails more cost compared to spot check method, but if it doesn’t meet the demand of C/Ps, sustainability is not assured. Training on the PIT and other basic reef monitoring tools (FVC, belt transect, etc) commenced and participated by the MPA-PTWG. The Project later compiled all the methods used and develops a monitoring manual for tourism resources. The manual was used by the local team and conducted a further a “Trainor’s Training” in order to capacitate C/Ps to handle reef monitoring and train others in the future.

5.1.3. Tourism Development with Private Cooperation

Generally private sector tends to have their own initiative for tourism development with good use of local tourism resources, such as travel agents, hotels, restaurants, and transportation companies.

One of the important points is how can the public sector contribute to tourism development efficiently and effectively. In the case of Bohol, the main organization is Bohol Tourism Office of the Province of Bohol. It has more or less 10 staffs including three (3) permanent personnel and its main tasks is to provide and promote tourism-related matters, organizing provincial and national level expo and accommodating official VIPs in Bohol. On the other hand, private tourism companies seem to have a certain level of knowledge and experiences and both public and private sector have cooperated on tourism events in a very informal manner.

In light of such situation, a new organization for new tourism development called ”Eco-tourism Promotion Program Committee” was established. This committee is public-private partnerships that will promote eco-tourism in Bohol. The current chairperson of the committee is representing a private travel agency and because of this, it gave a big boost in implementing Output 3 (Tourism Development Program), especially with her understanding, fairness, passion, and leadership skills as well as good dynamics with the BTO counterparts. One concern is future lateral spread of this program to other private travel agents. Although several travel agents joined the familiarization tours and recognized the potential of new tourism destinations in the pilot project, more cooperation among private sector is expected in the future.

5.1.4. Comprehensive Tourism Promotion with Bottom-up Approach

One of the main objectives of tourism development program is decentralization of tourism destinations, from concentrating only in Panglao Island to spreading out the whole Bohol. In line with this context, strengthening relationship between the Province of Bohol and all 48 municipalities under the province is focal work through the information sharing, opinion exchanging, and co-working. In this project, several all MTOs gathering meeting and seminars were held in order to explain and share the new concept of tourism development, to collect information and exchange opinions. Additionally the pilot project in February and March 2015 aimed at conducting actual trials with stakeholders of municipalities, and effective results obtained by it. On the other hand, several municipalities have not participated in this program because such municipalities do not have any MTOs and/or decision makers (such as Mayor) are not interested in the tourism sector, even though one of the goals of this program is “One Town One Attraction”. However, with the continuing advocacy of BTO counterparts to develop and promote these municipalities, it will not be long when all 48 municipalities will have “One Town One Attraction”.

5.1.5. Facility and Service Improvement of Tourism Destinations

In this tourism development program, the campaign promotion tours were conducted last February and March 2015 as pilot project. A total of 13 individual eco-tour sites were packaged as 3 day tours. Some of which have accommodated tourists before the campaign, on the other hand, more than half of which were not tourism destinations at the time of the project. All 13 sites

were improved because JICA supported its improvement of facilities and equipment in each site. Through these support, these sites are able to accommodate tourists not only during the campaign period, but also after the campaign. On the other hand, many other sites do not have enough facilities and equipment as tourism destinations although all have good potential with its nature and culture based tourism. Without JICA supports, it is crucial for the PGBh and municipal LGUs to provide funds in order to improve such eco-tour site.

5.1.6. Provision of basic information/knowledge on sanitation improvement and sewerage system for many concerned people as possible

DENR's activities related to water pollution control in Bohol are quite limited as of now and they give more priority to the conservation of forest resources. Monitoring of water quality in the public water body and at the major pollution sources is not sufficient. Under this situation, no proper countermeasures for the pollution sources were provided.

Basic knowledge on relevant laws and regulations and sewage treatment was provided for concerned people both in province and municipalities from the start of the project. Such arrangements made possible to establish cooperation system between JET and the Philippine side, resulted in full support by C/Ps and Sangguniang members for the preparation of draft ordinances for the management of STs and organizational set-up (creation of MSSMO). It is important to decide subject people for information provision and discussions at the initial stage of the project with necessary ranges as project needs.

5.1.7. Assistance to municipal officers for their communications with people on water pollution control and required countermeasures

Upon commencement of the project, it was found that not only residents but also LGU officials don't have sufficient experience on the water pollution control activities and less willingness to participate in the countermeasures. Therefore, after improvement of the idea by C/Ps and *Sangguniang Bayan* member through some workshops and meetings, assistance to the municipal staff was extended for the barangay community meeting in Dauis. Supplementary explanation and reference information by JET to them seemed to have been helpful to understand the need of water pollution control. Even they showed willingness to support required countermeasures for pollution abatement. Assistance by JET for the conduct of community meeting is effective under the condition that participants don't have experience on the subject matters.

5.1.8. Promotion of self-support by municipal staff increasing the chance of collaboration

The work for pilot study of STs was conducted through the collaboration by JET and provincial C/Ps from design of the facilities to monitoring of effluent. The C/Ps improved his capacity considerably and started to apply knowledge transferred by JET for the solution of problems en-

countered in the pilot study. Furthermore, coordination with municipal staff was made with willingness and showed leadership in the workshop. After getting authorization by his Department to undertake the project as a C/P, it is very effective for the improvement of his capacity to increase the opportunities for collaborate with JET in the routine work.

Currently, sewage quality examination is conducted by PHO staff using equipment donated by JICA. The staff started to apply for the results of technology transfer provided by JET through routine work in collection of water sample, examination and analysis of the examination results. It was also effective for the development of staff capacity to have increased the chances of the collaboration with JET in the routine work.

5.1.9. Provision of opportunities for the inspection of existing facilities

In the fact that there is no experience on the construction and O&M of septage treatment plant in Province of Bohol, concerned people could not visualize the system profile. They visited existing septage treatment plants thru JET in other LGUs in the country and obtained knowledge to implement construction of a septage treatment plant. The inspection of facilities near their area is helpful to get realistic and concrete idea for the first trial of construction work.

5.1.10. Collaboration between JICA Study Team and municipal officers in the investigation and study of solid waste collection and treatment

The local consultant of JET collaborated with municipal staff of the two municipalities for the investigation and study of solid waste collection and treatment from planning stage to field survey. The municipal staff obtained basic knowledge on solid waste management. The full involvement of municipal staff in the survey will help develop future expansion of the waste treatment/disposal project. Advanced arrangements by concerned municipal offices to assign personnel and ensuring budget for the survey are requisites for successful technology transfer, as practiced in this project. Detailed arrangements with required explanations and discussions between municipal staff and local Consultant in the planning stage are also important. A draft on ecological solid waste management plan was tendered by JET to the municipality of Dauis which in turn served as a guide in the preparation of the 10-year Ecological Solid Waste Management Plan (ESWMP) of the municipality.

5.1.11. Involvement of personnel in charge of the municipalities

Investigations on the characteristics and volume of solid waste generated in the municipalities were conducted as the joint efforts of local consultants and municipal staff from planning of the survey to field survey. A basic knowledge for the solid waste management was transferred to the municipal staff through the work. In this kind of occasion, the arrangement of municipal staff shall be formally made to create easy working environment for the staff.

5.1.12. Establishment of laboratory for the examination of sewage quality

The importance of water quality monitoring in the public water body has not been fully recognized in Bohol Province. Upon understanding the need of water quality monitoring timely with adequate frequency, the laboratory becomes a requisite. After installation of the laboratory with staff members, staff concern was extended to the water pollution control and community development for the conservation of water quality in public water body.

5.1.13. Change of consciousness on sanitation improvement and water quality conservation

Technology transfer for the improvement of on-site STFs was made through the collaboration between JICA Team and C/Ps in terms of relevant laws and regulations, management organization and treatment technology. The concern to sewerage sector by the staff both in the province and municipalities was improved and they started to join the countermeasures for the improvement of water environment and communication with residents.

5.2. Recommendations

5.2.1. Implementation of Integrated Coastal Management

The Project planned and implemented several usage controls such as diving, snorkeling and beach protection. The activities were important for the protection of tourism resources in Panglao Island, and its outcome was high. However, it was not enough because the coastal areas in Panglao Island are very precious resources which are affected by various factors and changing constantly. There are complex reasons for the degradation of coastal resources such as coral reef and beach and in order to prevent the degradation, it is essential that stakeholders collaborate and manage the resources in an integrative manner.

Fishery and Coastal Resource Management Ordinance was established in Municipality of Panglao last June 2015. Utilizing the ordinance and other related ordinances, the Municipality of Panglao shall implement the integrated coastal management strategy in order to be effective. The Municipality of Dauis shall also implement the integrated coastal management using the Fishery Code of Dauis under Municipal Ordinance No. 11-B in 2011 which served as a guide in implementing coastal resource management.

5.2.2. Continuation of Scientific Council Meetings

C/P commits to continue the Panglao Island Executive Committee (PIEC). Actually, there is no significant concern to continue on the working group meetings. However there is a concern to continue holding Scientific Council meeting as it needs to invite technical advisors from outside of Bohol and the cost burden is not small.

Scientific council had provided scientific advices in a form of endorsements in order to establish

usage control on carrying capacity. It has quite important function for consensus building among stakeholders. In order for PIEC to provide adequate resolutions to the LGUs, continuation of scientific council is therefore crucial. For this reason, the secretariat of Scientific Council (PPDO) shall provide necessary budget for holding meetings and ensure continuation of Scientific Council meetings.

5.2.3. Beach dynamic study in the whole island of Panglao

The Project conducted usage control on beach use in Alona beach and found a lot of issues and concerns. Knowing the issue is not enough but knowing the origin of those issues is important. In this proposed beach profiling study, the whole dynamics of the different beaches in Panglao Island shall be thoroughly studied and mitigating and enhancement measures to conserve these sandy beaches shall be determined.

5.2.4. Parallel provisions of various kind of countermeasures to promote application of STs in line with relevant laws and regulations

After year 2014, design of STs submitted by applicants for approval from the concerned municipality complies with the standard design required. However, the design of majority of existing STs doesn't meet the requirement in the relevant laws and regulations requiring modification or renewal of the facilities. In this regard, draft municipal ordinance including penalties was prepared by concerned municipal staff and *Sangguniang Bayan* members long time ago. But it seems that further time is required for finalization of the proposed ordinance at the *Sangguniang Bayan* meeting, because of possible objection by residents, especially from low income households.

To cope with the above issues/problems, concerned municipalities shall provide various kinds of countermeasures with assistance from provincial government. The countermeasures shall include financial assistance (fund, etc.) for the construction of STs and installation of community toilet facilities for low income people as well as promotion of community participation through community development activities.

5.2.5. Early establishment of MDRRMO and strengthening and expansion of the functions of the MSSMO

Presently some staff are assigned (they have two positions in municipal office) for the management of on-site STFs at the MSSMO, which was created by an executive order of the municipal mayor. The staff have been guiding applicants to follow standard design of STs with appropriate interpretation.

The management system for on-site STFs has been established locating MSSMO under MDRRMO, which is to be installed in the municipality in use of budget allocated by National

Government. However, upon construction of a septage treatment plant, O&M of faculties are required. The function of MSSMO shall be extended to undertake construction and O&M of septage treatment system.

5.2.6. Issues and recommendation of for standardization of modified ST

The construction cost of additional facilities for modified ST Method 1 and Method 2 was minimized to P3,500 to P5,000. However, construction cost for the conventional type ST with the capacity of 5 persons is estimated at P50,000 which seems to be difficult to raise the cost, especially for law income households. In this regard, assistance for the construction of standard ST shall be firstly extended. Presently, provincial government through PHO has been providing financial assistance for the construction of sanitary toilet facilities (equipment and materials equivalent to P2,000/household in 2014 and that equivalent to P850 from 2015). Similar assistance by LGUs shall be provided for the construction of STs.

5.2.7. Issued on treatment of effluents discharged from commercial establishments

Through the survey, it was confirmed that the sewage discharged from restaurants has considerably high concentration in organic substances and nutrients. Highly polluted sewage is directly discharged into underground without sufficient treatment of conventional STs. Application of modified ST method 3 (Japanese Johkasou) is recommended in this survey. However, without proper pre-treatment of oils before being discharged into the ST, it will cause operation defects as same as what we experienced in the pilot project.

Through the survey, it was revealed that a lot of oils are being discharged into ST from restaurants. Installation of a proper grease trap is regulated in Code of Sanitation but the most of establishments has problem of it design or its maintenance status. On the other hand, they have difficulty on cleaning grease trap due to lacking disposal site in Bohol.

In the fact that there is no public septage treatment plant in Panglao Island, private owners are responsible for the proper disposal of wastes for their business continuation until the realization of septage treatment. These days, the LGUs started to prepare the project for the construction of septage treatment plant. The project shall consider the treatment and disposal of collected oil together with its re-use.

5.2.8. Additions/revisions to existing ordinances to include construction and O&M of a septage treatment plant

Since the purpose of the project was set to manage on-site STFs, revised ordinance limited to a general description on the construction and O&M of the septage treatment plant. However, presently all concerned people are eager to construct a septage treatment plant based on the confirmation on the feasibility of the construction project as well as the improved idea for water pollution control.

Prior to the construction of a septage treatment plant, revisions/additions to the relevant existing ordinance are required considering collection of septage charges after getting concurrence by concerned top management. The ordinance shall be considered countermeasures for low income households as discussed in the above item (1).

5.2.9. Preparatory work for the construction of a septage treatment plant and O&M of the facilities

Prior to the implementation of the construction project, a decision shall be made on project implementing body considering utilization of private sector and provincial assistance, and financial source/s to be used. In this connection Management committee for the implementation of the project (so called Steering Committee) shall be established immediately. Under the committee, technical staff shall be assigned including construction, O&M, Community Development, ordinance set-up and financial management. The leadership by concerned offices of the province is important for the conduct of action plan prepared by C/Ps coinciding with the road map which was discussed at the workshops.

5.2.10. Establishment of a management unit in the provincial government for the implementation of the septage management project

To achieve a sustainable tourism development through the future, it is important to provide countermeasures to major pollution sources together with direct countermeasures to tourism related activities. Under the difficulty to construct a sewerage system in Panglao Island, the construction and O&M of a septage treatment plant is a priority need to complete the septage management system aside from the improvement of STs.

The leadership by concerned provincial office is very important for successful implementation of the project in application of appropriate technology and financial arrangements. However, presently, the recognition on the need of water pollution to meet Water Act is not sufficient in Province of Bohol. Thus, even there are many offices related environmental protection, allocation of budget and human resources is not properly made in the province to provide countermeasures including monitoring of public water bodies.

Under the above conditions, reinforcement of BEMO in the provincial government shall be made for the implementation of septage treatment project. Proper staff shall be assigned to the office with responsibility and authorization as well as budgetary arrangements. In the implementation of the project without experience on the similar project, managerial assistance may be necessary including improvement of relevant laws and regulations, setting up and operation of an implementing unit and construction and O&M of facilities. Even if the managerial assistance may be extended by the Consultant, strengthening of provincial office headed by assigned Project Manager

is a requisite for successful implementation of the project.

5.2.11. Establishment of laboratory for sewage quality examination and promotion of understanding on the need of the improvement of the sanitation conditions and conservation of public water bodies

Generally, the need of water quality conservation in the public water bodies is not recognized properly in the developing countries. In this regard, for the promotion of understanding on sewerage sector, the positive involvement of concerned local staff shall be arranged for the project to improve sanitation conditions and water quality in the public water bodies through collaboration by concerned staff. With a full understanding by local staff concerned on the need of monitoring of water quality, the laboratory shall be effectively used, which is the first step for the achievement of water quality conservation.

Attachments

Attachment -1 Project Design Matrix (PDM)

Project Design Matrix (PDM)

Ver. 02

Project Name: Sustainable Environment Protection Project for Panglao
Target Area: Panglao Island and Balicasag Island
Target Group: Staff of Provincial Government of Bohol, Municipality of Dauis and Municipality of Panglao
Duration: May 2013-October 2015 (Total approximately 2 years and 6 months)

May 16 2014

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumption
Overall Goal The sustainable tourism development is achieved after completion of the new airport construction.	• Panglao Island Executive Committee becomes the official organization of PGBh in charge of decision making. It shall periodically evaluate and update management activities based on the monitoring data.	• Minutes of the Panglao Island Executive Committee meetings	• Stakeholders such as relevant organizations, residents, and private sector relate to environmental management in and around Panglao Island positively.
Project Purpose To protect Environment of Panglao Island from increasing tourists estimated after completion of the new airport construction and to improve effluent quality discharged from the on-site sewage treatment facilities (STFs).	• Tourism usage control in and around Panglao Island has started with the concept of adaptive management. • Countermeasures to improve effluent quality from on-site STFs have started.	• Minutes of the Panglao Island Executive Committee meetings • Progress reports and the completion report of the project	• Necessity measures including budget allocation for environmental management are continued by relevant organizations. • Areas in and around Panglao Island are not damaged by massive natural disasters.
Outputs [Application of Adaptive Management] 1. Possible basic framework for implementing “Adaptive Management” under which usage control on carrying capacity is established.	1. Panglao Island Executive Committee and Scientific Committee are established.	• Minutes of the Panglao Island Executive Committee and Scientific Committee meetings • Executive Order by the Governor • Progress reports and the completion report of the project	• Drastic economic changes that affect the environmental management policy in Panglao Island and Balicasag Island do not occur during the project period.
2. Basic system of “Adaptive Management” under which usage control on carrying capacity is applied in Panglao.	2.1 Initial figures of carrying capacity has been established based on the monitoring results and decision makings are carried out at the Panglao Regional Executive Committee in the tourism usage control. 2.2 Administrative guidelines for official use, which include the basic system of adaptive management are prepared.	• Monitoring reports • Minutes of the Panglao Regional Executive Committee meetings • Progress reports and the completion report of the project • Administrative guidelines for officials’ use	• Personnel and resources necessary for monitoring activities are ensured.
3. Consideration of Sustainable Tourism Development in Bohol Province to Continue “Adaptive Management” for Surrounding Areas of Panglao Island.	3.1 The concept of Bohol tourism development is clarified and trials of tourism bases development are implemented as pilot activity.	• Bohol Provine Tourism Development Guideline • Progress reports and the completion report of the project	• Quake restoration from the large earthquake hit in October 2013 proceeds smoothly.
[Improvement of effluent quality discharged from the on-site STFs] 4. Effective and realistic laws and regulations for the construction and the management of the on-site STFs are proposed.	4. Effective and realistic draft control plan including periodical inspection and possible penalties are presented for both tourism facilities and general household to be approved by the Panglao Regional Executive Committee.	• Minutes of the Panglao Regional Executive Committee meetings • Progress reports and completion report of the project	• Concerned residents and owners of tourism facilities agreed.
5. Effective and realistic management systems to control on-site STFs covering Panglao Island are established.	5. Management systems to control on-site STFs including roles of the concerned organization’s staff are established and approved by the Panglao Regional Executive Committee.	• Minutes of the Panglao Regional Executive Committee meetings • Progress reports and completion report of the project	• Bohol Province, Dauis Municipality, and Panglao Municipality cooperate in the construction of the new management framework.
6. Possible design of the septic tanks with improved capacity (satisfying design capacity of on-site STFs with the improvement of effluent quality) is proposed.	6.1 Appropriate types of on-site STFs in Panglao Island are presented. Pilot plant construction for its verification is carried out. Standard drawings for the improved STFs and their draft O&M manual are prepared for approval of the Panglao Regional Executive Committee. .	• Minutes of the scientific committee meetings • Progress reports and completion report of the project	
7. Preliminary design of septage treatment plant and assistance for preparation of sustainable management system including alternative financial arrangements	7. Feasibility of the construction of septage treatment facility is verified and Implementation framework is planned. .	• Feasibility study report for the construction, operation and maintenance of septage treatment facility.	

Activities

1-1 Collect information on the current situation of stakeholders for environment conservation
1-2 Analyze issues and develop the operation structure of the Panglao Region Executive Committee and Scientific Committee
1-3 Hold sector-wise workshops to hotels, diving shops, tourism agencies, fishery cooperatives, etc.
1-4 Establish the Panglao Region Executive Committee
1-5 Establish the Scientific Committee

2-1 Collect data of the existing monitoring surveys of environmental conditions in Panglao.
2-2 Conduct the baseline survey of tourism resources
2-3 Prepare implementation plan of "Adaptive Management" based on the information related to "Carrying Capacity"
2-4 Establish target areas to be protected
2-5 Prepare the periodical monitoring manual and commence the monitoring
2-6 Set the initial figures of carrying capacity of the target areas and develop the usage control plan
2-7 Implement pilot trials to control the maximum number of tourists, tourist facilities and so on in the target area
2-8 Revise and modify the figures of carrying capacity and usage control plan based n the result of pilot trials
2-9 Hold a workshop for nature guides
2-10 Revise the existing guide system on the "Adaptive Management" and usage control on carrying capacity
2-11 Formulate and carry out training programs for guides and relevant people based on the revised guide system
2-12 Prepare administrative guidelines for the use by officials
2-13 Inspection of tourism usage control activities in Philippines

3-1 Review of tourism resources and tourism development in Bohol province
3-2 Clarification of concept related to tourism of Bohol province
3-3 Preparation of guideline of tourism development for Bohol province
3-4 Enhancement on dissemination and understanding towards the implementation of tourism development guideline for the whole Bohol province
3-5 Plan of eco-tour development based on the tourism development guideline
3-6 Implementation of pilot project
3-7 Development of web portal site for tourism information of Bohol province
3-8 Preparation of tourism information materials for Bohol province

4-1 Conduct seminar for C/P (Confirmation of component approach, data base survey, etc)
4-2 Collect and summarize information on the existing laws & regulations on the onsite STFs
4-3 Conduct interview survey with concerned parties
4-4 Study of an effective management system in regulation, inspection and provision of possible penalties
4-5 Conduct Seminar for C/P (Confirmation of component approach, data base survey, etc)
4-6 C/P will study required change of laws and regulations together with guidelines/manuals
4-7 Collaboration by concerned parties to come up with a proposal on the required SW and change of laws and regulations/guidelines
4-8 Conduct Seminar on proposed Laws and Regulations
4-9 Discuss with concerned governmental offices on the findings and draft proposal on laws and regulations
4-10 Get initial concurrence from top management of concerned offices (province and municipality)
4-11 Assist C/P and Sanggunian members for additions/revisions to existing laws and regulations
4-12 Review proposed draft municipal ordinances based on inspection results on existing septage treatment systems in the Philippines
4-13 Get concurrence from the Panglao Island Executive Committee on the modified/revised laws and regulations through explanations and discussions
4-14 Prepare manuals/reference materials for the field activities by relevant officials and conduct training for them
4-15 Complete the process for revisions/modifications of existing laws and regulations and follow up in the field
4-16 Provide Supplemental countermeasures for the implementation of an effective system
4-17 Propose revisions/modifications of existing laws and regulations based on the experience up to the end of 2014

Input

Japan

Experts
- Leader
- Deputy Leader
- Sustainable Tourism Development
- Ecosystem Conservation
- Coral Reef Monitoring
- Organizational Management
- On-site System
- Tourism Base Development
- Tourism Information Maintenance
- Water Quality Analysis
- Solid Waste and Compost
- Project Coordinator
- Local experts

Equipment
- Mobile water quality analyzer for T-N, T-P, COD
- T-N measurement reagent
- T-P measurement reagent
- COD measurement reagent
- Waste water analysis equipment

Philippines

Counterpart
- Project Director
- Project Manager
- Institutional Development
- Monitoring
- Carrying Capacity
- Usage Control
- Marine Ecosystem Management
- Environmental Education
- On-site System

Other staff
- Administrative staff

Facilities
- Office space

Equipment
- Office equipment

Existing documents and data

5-1 Collect information on the existing structures for the management of on-site STFs including a financial study
5-2 Study an appropriate structure for management of on-site STFs
5-3 Study to establish laboratory for sewage examination and discussions with concerned provincial offices
5-4 Study on the arrangement of the office with staff members with reference to the establishment of sewage laboratory and discussions with concerned provincial offices
5-5 Identify present issues and problems on existing offices and staff concerned to manage on-site STFs in compliance with existing laws. Training will also be done during the work considering proposed municipal ordinances.
5-6 Recommend required organizational arrangements with staff members based on the experience for the management of on-site STFs
5-7 Explain to and get concurrence from Panglao Island Executive Committee on the new organizational arrangements
5-8 Study for financial arrangements to ensure newly created office for the management of on-site STFs
5-9 Arrange required staff for the management of on-site STFs including employment of staff,as required
5-10 Hold workshop for the staff to manage on-site STFs
5-11 Implement the work for about 1 month according to new arrangements
5-12 Evaluate the results of field work by the new organizational set-up and study on the countermeasures, as required
5-13 Exchange of information and cooperation with selected owners of on-site STFs and septage collection companies
5-14 Summarize issues and problems on the organizational arrangements for further improvement
5-15 Recommend future organizational improvement needs
5-16 Procurement of sewage quality examination equipment
5-17 Establish laboratory for sewage quality examination
5-18 Conduct training on basic knowledge for water quality examination
5-19 Conduct training on the manner of examination
5-20 Prepare a manual for sewage quality examination
5-21 Conduct training on the analysis and evaluation of sewage samples

6-1 Conduct investigations on existing on-site STFs
6-2 Prepare database for on-site STFs
6-3 Study of effective on-site STFs
6-4 Conduct bidding for pilot plant construction
6-5 Construct pilot plants
6-6 Collect data and study on pilot plants to establish standard design of ST

- Principal members in each activity do not leave/transfer during the entire project period.

Preconditions

- The security in the target area does not change for the worse.
- New Bohol airport construction project is carried out.

7-1 Investigate existing septage treatment systems in the Philippines
7-2 Project sludge volume to be generated in Panglao Island
7-3 Investigate quality and quantity of solid waste being generated in Panglao Island
7-4 Investigate on the present usage of fertilizer and project its future demand in Panglao Island
7-5 Prepare preliminary design of septage treatment plant
7-6 Estimate capital and O&M cost of septage treatment plant
7-7 Study on project implementing body/s
7-8 Study and prepare preliminary design of a septage treatment plant

Attachment -2 List of Major Activities of Output 1-3

List of Major Activities of Output 1-3

Year	Month/Date	Title
2013	May 23	Kick-Off Meeting on Sustainable Environment Protection Project for Panglao Island
2013	July 4	Coral reef monitoring seminar by Dr. Satoshi Nojima
2013	July 10	Meeting on the methodology to be used for the baseline coral reef survey
2013	July 11	Orientation workshop on project for new officials
2013	July 15	Component 1 Counterpart Meeting on the SEPP Timeline of Activities
2013	July 24	Component 1 Counterpart Seminar on the Executive Committee and Roles of counterparts
2013	August 12	Component 1 Seminar on the Legal Framework of SEPP in Panglao and the establishment of Panglao Island Executive Committee (PIEC)
2013	September 4	Facilitators Meeting for Sector-wide Consultation Workshop
2013	September 15 & 16	Alona Beach visitor counting survey, Alona Beach Questionnaire survey And Balicasag Island boat survey
2013	Sept. 17-20, 25& 26	Sector-wide Consultative Workshop (Dauis & Panglao: MFARMC, Dive shops, Tour Guides, Boat operators, Youth, Women, Fisherfolks, Hotels and Restaurants, LGU Officials, PGBh Officials & Counterparts, Support Group, Scientific Committee and NGOs)
2013	November 17 & 21	Tourist Exit Survey
2014	Jan	Drafting of the Coral Reef Monitoring Manual for Adaptive Management in Panglao by Dr. Satoshi Nojima
2014	Feb 3	Approval of the PIEC Ordinance # 2014-002 by the Sangguniang Panlalawigan (SP) of the Provincial Government of Bohol (PGBh)
2014	Feb 6	1st PIEC Plenary Meeting in Bohol Tropics.
2014	Feb 11	Orientation on the coral reef monitoring protocols
2014	Feb 24-Mar 1	Joint Coral Reef Monitoring by the MPA-TWG composite team (JICA-SEPP, PADAYON-BMT and MPA-PTWG).
2014	Mar 13	2nd Plenary Workshop on SEPP in Panglao Municipality
2014	Mar 26-28	Carrying capacity workshop by SU-IEMS attended by BEMO, OPA, DA-BFAR, DENR, Padayon-BMT
2014	Apr 21	1ST Tourism and Conservation Working Group (TCWG) Meeting at Bohol Bee Farm, Brgy Dau, Dauis, Bohol
2014	May 12 & 18	Tourist Exit Survey
2014	May 16-17	Alona Beach visitor counting survey
2014	May 18 & 25	Hinagdanan Cave questionnaire survey
2014	May 19-20	Local guide training workshop on tour guiding techniques at Hinagdanan Cave
2014	May 21-25	Pilot testing the Cave UC protocol in Hinagdanan cave
2014	May 22	1st Scientific Council (SC) Meeting at Metro Center Hotel, Tagbilaran, Bohol.
2014	Jun 24	2nd TCWG meeting at Bohol Bee farm, Dauis, Bohol
2014	Jun 25	Snorkeling surveys (weekday) in Balicasag Is
2015	Jul 1-4	Study tour in Cebu and Negros Oriental
2014	Jul 7-10	Dive center survey in Panglao Is.

2014	Jul 6-19	Training in Japan
2014	Jul 12	Snorkeling surveys (weekend) in Balicasag Is
2014	Jul 14	Salvage zone survey in Alona Beach by BEMO, BTO, LGU Panglao, JICA-SEPP
2014	July 25,28, 30	Presentation/Discussion of Eco-Tourism Promotion Program with Atty. Nunag(PTC Pres., Ms. Dumaluan (PTC Executive Director and BTO Head
2014	Aug 1	2nd PIEC Board of Directors Meeting for TCWG
2014	Aug 4	Eco-Tourism Promotion Program Meeting with Municipal Tourism Officers and Bohol Tourism Office
2014	Aug 6	Eco-Tourism Promotion Program Meeting with Provincial Tourism Council
2014	Aug 12	Meeting for the Implementation of Eco-Tourism Promotion Program with BTO, Academe, Transport Group, DAR, DTI, Tour Guides, & Travel Agents)
2014	Sep 15	Divers Counting Survey (Weekend) in Balicasag Is
2014	Sep 16	Public hearing of the revised EUF Ord. and Business of Diving Ord. in Panglao SB Hall
2014	Sep 25	3rd TCWG meeting at Linaw beach resort and restaurant, Panglao, Bohol
2014	Sep 12	1st Snorkeling workshop (Snorkeling protocols for local guides) in Panglao SB Hall
2014	Sept 14 & 15	Tourist Exit Survey
2014	Sep 17	Introduction of draft monitoring manual for the adaptive management of tourism resources
2014	Sep 27	Divers counting survey (weekend) in Balicasag Island
2014	Sep 28	Hinagdanan cave perception survey on bird removal
2014	Oct 1	2nd Snorkeling protocol workshop in BIDR, Balicasag Island
2014	Oct 1	Divers counting survey (weekday) in Balicasag Island
2014	Oct 15	Site visitation of JICA Country Representative
2014	Oct 24	Special Brgy session for the presentation of result of Hinagdanan cave perception survey on bird removal in Brgy Hall of Bingag
2014	Oct 29	3rd Snorkeling workshop on BISGA re-organization in BIDR, Balicasag Island
2014	Nov 5	Orientation on the proposed advance reservation system (ARS) for divers for Balicasag Island by Isea.Inc
2014	Nov 16 & 17	Tourist Exit Survey
2014	Nov 26-28	Basic Q GIS seminar, Casa Rey, Tagbilaran City, Bohol
2014	Dec 2 & 12	Eco-Tourism Campaign Tour Demonstration
2014	Dec 15	2nd Scientific Council Meeting, Bohol Tropics, Tagbilaran City, Bohol
2014	Dec 18	4th TCWG meeting at Bohol Bee Farm, Dauis, Bohol
2014	Jan 27	2nd PIEC Plenary Meeting
2015	Feb 5-6	Trainor's training on periodic tourism resource monitoring, Casa Rey, Tagbilaran City
2015	Feb 9-13	Reef monitoring survey
2015	Feb 16-20	Data base training workshop (data encoding and processing)
2015	Feb 23-27	Data base training workshop (data analysis and technical writing)
2015	Mar 8	Hinagdanan Cave Survey
2015	Mar 11 & 14	Divers counting survey and Snorkeling Survey in Balicasag Island
2015	Mar 19	5th TCWG meeting at Panglao SB Hall, Panglao, Bohol

2015	Mar 20	Public presentation of 2015 coral reef monitoring result
2015	Mar 23	Stakeholders meeting on water quality monitoring in Doljo, Bellevue resort, Doljo, Panglao, Bohol
2015	Mar 27	Special session on proposed revision of Hinagdanan Cave Ordinance
2015	Apr 13	Implementation of advance reservation system (ARS) for Balicasag Island diving.
2015	Apr 19	Hinagdanan Cave Survey
2015	May 15	Hinagdanan cave assessment by DENR-CENRO Tagbilaran City, Bohol
2015	May 17 & 18	Tourist Exit Survey
2015	May 19	3rd Scientific Council Meeting, Bohol Tropics, Tagbilaran City, Bohol
2015	Jun 5	Meeting on Hinagdanan Cave data gaps by DENR-CENRO and JICA-SEPP
2015	Jun 24	6th TCWG meeting at Dauis SB Hall, Dauis, Bohol
2015	July 3	CRM Plan of Panglao review workshop
2015	July 21-24	Hinagdanan Cave Biodiversity Assessment
2015	Aug 6-7	Baseline assessment on tourism-related reef damage

Attachment -3 List of Major Activities of Output 4-7

List of Major Activities of Output 4-7

Year	Month/Date	Title
2013	May 23	Kick-Off Meeting on Sustainable Environment Protection Project for Panglao Island
2013	June 17	First sewage component C/P meeting (Explanation/confirmation on the contents of IR, collection of information)
2013	June 20	First overall workshop for the Sewage Component (Explanation of the component)
2013	July 02	JET Courtesy Call to Gov. Chatto (Discussion on the Sustainable Environment Protection Project)
2013	July 11	Orientation workshop on project for new officials
2013	July 18	Workshop for sewage component implementation for C/Ps of Province and Municipalities (data base preparation, detailed survey, etc.)
2013	July 29-30	Meeting with C/Ps of Dauis and Panglao for schedule arrangements to meet real conditions
2013	Aug 23	Second sewage component workshop (present problem analysis, study on relevant laws for management of individual STFs)
2013	Oct 3-4	Workshop for the preparation of draft ordinances in Dauis
2013	Oct 8-9	Workshop for the preparation of draft ordinances in Panglao
2013	Dec 5	Workshop for continuation of Database management
2014	Jan 27-Feb5	Field Inspection to existing STP in Luzon and Dumaguete City
2014	Feb 6	1st Panglao Island Executive Committee or PIEC Plenary Meeting in Bohol Tropics.
2014	Feb 12	Orientation on septage treatment system for governor and provincial staff
2014	Feb 20	Orientation on septage treatment system for municipal staff
2014	Mar 2	Orientation on septage treatment system for municipal staff
2014	Mar 12	Workshop for work manual of LGUs for the management of individual STF
2014	Mar 13	2nd Plenary Workshop on SEPP in Panglao Municipality
2014	Apr 21	1st PIEC WMWG (waste management working group) meeting
2014	May 12	Workshop for set up of organization to manage 0n-site STFs in Panglao
2014	May 13-16	Workshop for set up of organization to manage 0n-site STFs in Dauis
2014	May 21	Dauis WMWG discussions on manual
2014	May 22	2nd PIEC WMWG meeting
2014	May 30	Panglao WMWG discussions on manual with Task Force
2014	July 1	1st Board of Directors Meeting for WMWG
2014	Jul 2-7	Management of on-site STFs for Panglao and Dauis Task Force (Bohol Plaza: 23persons)
2014	Jul 17	Barangay Captain Meeting (Dauis) on issues and problems on existing ST and need of Ordinance modifications
2014	Aug 22	3rd PIEC WMWG Meeting
2014	Sep 8-Nov 4	Waste Water Quality Analysis Training
2014	Sep 30	Clarification/ sharing of present status on ST management and find solution on issues and problems
2014	Dec 5	Sharing of status of the Sewerage Component of the Project to set up

		concrete supporting system in the overall project implementing system
2014	Dec 11	4th PIEC WMWG Meeting
2015	Jan 27	2nd PIEC Plenary Meeting
2015	Feb 11	Seminar for the utilization of used oil
2015	Feb 26-27	Site visit to Dumaguete Septage Treatment Facility with Filipino Counterparts
2015	Mar 6	Review of performance of sewerage component and presentation on modified ST through pilot study
2015	Mar 31	Open Forum for Construction of a Septage Treatment Plant
2015	Apr 7	Follow up workshop for Construction of STP and Application of Modified ST (Explanation and discussions on completed Reports)
2015	May 28	5th PIEC WMWG Meeting
2015	Jun 11	Overall and Final Workshop for the evaluation of performance by C/Ps and sharing of Present issues and problems in the municipalities for the operation of septage management system
2015	Aug 12	3rd Board of Directors Meeting for TCWG and WMWG

Attachment -4 Memorandum of Understanding on Road Map

MEMORANDUM OF UNDERSTANDING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
THE PROVINCIAL GOVERNMENT OF BOHOL
ON
SUSTAINABLE ENVIRONMENT PROTECTION PROJECT (SEPP) FOR PANGLAO

Japan International Cooperation Agency (hereinafter referred to as "JICA"), and the Provincial Government of Bohol (hereinafter referred to as "PGBh"), Municipal Government of Panglao and Municipal Government of Dauis, mutually agreed upon the road map to be followed by PGBh after completion of the Sustainable Environment Protection Project (hereinafter referred to as SEPP) toward achievement of overall goal of SEPP per Attached Document.

August 31 2015

JIN WAKABAYASHI
Director
Southeast Asia and Pacific Department
Japan International Cooperation Agency (JICA)

EDGAR M. CHATTO
Governor
Province of Bohol

Hon. Leonila P. Montero
Mayor
Municipality of Panglao
Province of Bohol

Hon. Marietta T. Sumaylo
Mayor
Municipality of Dauis
Province of Bohol

Mr. Shinichiro Tanimoto
Leader
JICA Expert Team

Atty. John Titus J. Vistal
PPDC and Project Director
Province of Bohol

THE ATTACHED DOCUMENT

1. Background

JICA, PGBh, Municipal Government of Panglao and Municipal Government of Dauis, have implemented the "Sustainable Environment Protection Project for Panglao" (SEPP), from May 2013 up to present.

Towards the end of the Project, the Bohol Project Team together with the support of JICA Expert Team had been producing seven outputs, and achieving the project purpose i.e. "To protect the environment of Panglao Island from increasing tourists estimated after the completion of the New Bohol Airport Construction (NBAC) and to improve effluent quality discharged from the on-site sewage treatment facilities (STFs)". However, after careful evaluation of the current intervention and achievement of the overall goal, i.e. "The sustainable tourism development is achieved after completion of the New Bohol Airport construction", the degrees of the environmental protection and effluent quality improvement are considered insufficient and need to be continued for the long term.

Hence, Bohol Project Team with the support of JICA Expert Team prepared a road map in which necessary activities even after the end of the Project are written so that the efforts towards achieving the overall goal are well understood. The PGBh, Municipal Government of Panglao and Municipal Government of Dauis also committed to JICA to implement these activities.

2. Vision

Negative impact to the environment is adequately controlled to realize sustainable tourism development in Panglao Island.

3. Road Map to Achieve the Vision

The road map is described in the series of Tables shown herein below. Explanations of additional activities for each output are as follows.

3.1 Output 1: A framework for environmental management and sustainable tourism resource use in Panglao Island is established

PIEC meetings must be continued as the framework for environmental management and sustainable tourism resource use in Panglao Island. PIEC should continue to meet regularly.

Table 1. Supplemental activity for PIEC after project ends.

Activity	Method	Timeline	Implementing Body
PIEC meetings	Secretariat will organize members and hold meetings.	-	Secretariat (PPDO, BEMO, PHO)

3.2 Output 2: Adaptive management with usage control of tourism resources on carrying capacity is deployed in Panglao Island

Monitoring is a core activity in adaptive management of tourism resources, and it is indispensable to revise the carrying capacity and usage control if the need arises. Monitoring of tourism resources and tourism use must therefore be continued.

Although adaptive management had been introduced in Panglao Island, it has not become firmly established yet. The cycle must be repeated regularly in order to institutionalize the process.

In particular for coastal resources, several usage controls should be applied consistently, which is recognized as an integrated costal resource management (ICRM) strategy.

Beach protection is also necessary for ICRM. It is not only usage control, but also physical measure to prevent further beach erosion. It is highly recommended to continue implementing the beach protection after having enough experience of usage control, together with the assistance of local or foreign experts.

The recommended usage controls for Hinagdanan Cave should also be continued in order to sustain the tourism activity in the area.

Table 2. Supplemental activity for adaptive management on tourism resources after project ends.

Activity	Method	Timeline	Implementing Body
Monitoring of tourism resources	PGBh and Panglao Municipality will collaborate using the monitoring manual	Twice in a year	PGBh and Panglao Municipality
Monitoring of tourism use	BTO will conduct same monitoring activities done during the project period	Three times in a year	BTO, CRMO/MTO
Adaptive management of diving (formulation and adoption of ordinance)	Sangguniang Bayan (SB) of Panglao will discuss the amendments requested by the Panglao Municipal Executive Department	May 2016	SB of Panglao, Panglao Municipality CRMO/MTO
Adaptive management of diving (implementation)	Panglao Municipality will implement the amended ordinance	June 2016 to March 2017	Panglao Municipality, CRMO/MTO
Adaptive management of CRM and boat docking area (enactment of ordinance)	Sangguniang Bayan (SB) of Dauis will discuss the enactment of new ordinance	July 2016	SB of Dauis, Municipality of Dauis, CRMO/MTO
Adaptive management of CRM and boat docking area (implementation)	Dauis Municipality will implement the ordinance	July 2016 to May 2017	SB of Dauis, Municipality of Dauis, CRMO/MTO
Adaptive management of fishery (implementation)	Panglao and Dauis Municipality will implement fishery code	October, 2015 to June 2016	Municipality of Panglao and Dauis, CRMO/MTO
Adaptive management of fishery (amendment of code)	Sangguniang Bayan (SB) of Panglao and Dauis will discuss the amendments requested by the Panglao and Dauis Municipal Executive Department	February 2017	SB of Panglao and Dauis, Municipality of Panglao and Dauis, CRMO/MTO
Beach protection survey	Mayors will request the SB of Panglao and Dauis to pass a resolution to conduct beach protection survey and provide list of mitigating measures	February 2017	SB of Panglao and Dauis, Municipality of Panglao and Dauis, CRMO/MTO
Beach protection (Approval of selected mitigating measure)	PIEC and Scientific Council (SC) will recommend and SB will approve the selected mitigating measure	September 2017	SB of Panglao and Dauis, Municipality of Panglao and Dauis, CRMO/MTO
Beach protection (Preparation)	Mayor to request the SB of Panglao and Dauis to pass a resolution appropriating funds for the approved beach erosion mitigating measures	November 2017	SB of Panglao and Dauis, Municipality of Panglao and Dauis, CRMO/MTO
Beach protection	Conduct of a public bidding for	February 2018	Municipality of

(implementation)	construction of approved beach erosion mitigating measures		Panglao and Dauis, CRMO/MTO
Adaptive management for Hinagdanan cave	Dauis Municipality and Barangay Bingag will continue the adaptive management	January 2016	Dauis Municipality and Barangay Bingag

3.3 Output 3: Consideration of Sustainable Tourism Development in Bohol Province to Continue "Adaptive Management" for Surrouuding Areas of Panglao Island

The program "Eco tourism Bohol" which was launched last February 2015 and supported by JICA SEPP for sustainable tourism development in Bohol should continue as one of the most important tourism concepts of Bohol by BTO (Bohol Tourism Office) in the Province of Bohol and PTC (Provincial Tourism Council).

Main activities of the program are the following: 1) development and improvement of Eco tour sites in all municipalities aiming at "One Town One Eco-tour"; 2) development and improvement of the Website (www.boholtourismph.com), and 3) marketing campaign/ promotion of BTO to local and foreign markets.

Since the program aims for community-based tourism, participation of all municipalities to the program is necessary.

Table 3. Supplemental activity for the Eco tourism Bohol program after project ends.

Activity	Method	Timeline	Implementing Body
Public awareness and marketing campaign of "Eco tourism Bohol" mainly in Bohol	All municipalities, tour operators, and tour guides will conduct the activity, led by BTO (Province of Bohol) and supported by PTC (Provincial Tourism Council).	March 2016	All Municipalities and BTO (Province)
Marketing campaign to tour operators and media outlets from Manila & Cebu	BTO will conduct the activity, supported by all municipalities and PTC.	April 2016 to March 2017	BTO (Province) and all Municipalities
Marketing campaign to foreign countries which are high ranking in terms of visitor arrivals	BTO will conduct the activity with DOT to promote Eco-tourism Bohol to foreign countries with high ranking arrivals.	April 2017 to 2018	BTO (Province) and DOT
Updating and improving the Website regularly to increase visitor traffic	BTO will conduct the activity regularly.	March 2016	BTO (Province)
Updating new eco-tour site and new package tours	All municipalities will conduct the activity and supported by BTO.	2018	All Municipalities and BTO (Province)
Upgrading the Website for foreign visitors (such as reservation system)	BTO will conduct the activity supported by DOT.	April 2017 to 2018	BTO (Province)
Development of new eco-tour sites (the goal is one town one eco-tour)	All municipalities (MTO), tour sites and BTO will conduct the activity in collaboration with tour operators, tour guides and PTC.	2018	All Municipalities, tour sites and BTO (Province)
Improvement of newly discovered eco-tour sites	All municipalities (MTO), tour sites will implement the activity supported by BTO and PTC.	2018	All Municipalities and tour sites
Proposals and advises on the development of tourism	BTO will conduct the activity supported by PTC and DOT.	April 2017 to 2018	BTO (Province)

facility and infrastructures			
Packaging of eco-tour sites for day-trip and overnight trip	BTO will conduct the activity supported by PTC.	September 2016	BTO (Province)
Community-based packaging of eco-tour sites for day-trip and overnight trip	All municipalities (MTO), tour sites will conduct the activities, supported by BTO and PTC.	October 2016 to 2018	All Municipalities

3.4 Output 4: Effective and realistic laws and regulations for the construction and the management of the on-site STFs are proposed.

Draft of ordinance related to construction and maintenance of septic tanks has been proposed, but not approved by Sangguniang Bayan in each LGU. There is no ordinance regarding proper treatment of septage. For sustainable management of septic tanks, an ordinance related to the construction of septage treatment plant is urgently needed to be established. The tariff collection system for septage collection and treatment is necessary.

Table 4. Supplemental activity for the effective and realistic laws and regulations after project ends.

Activity	Method	Timeline	Implementing Body
Draft of the Ordinance on Septic Tank	By Sangguniang Bayan of each LGU(Draft is completed)	By November 2015	Municipality of Dauis and Municipality of Panglao
Draft of an ordinance of Septage treatment (Amendment of the ordinance stipulated above)	Implementation body of septage treatment, septage collection fee, fee collection method, etc shall be defined in the ordinance	By December 2015	Municipality of Dauis and Municipality of Panglao
Public Hearing	Public voices shall be reflected on the draft of the amendment ordinance	By February 2016	Municipality of Dauis and Municipality of Panglao
Resolution by PIEC	Discussion in PIEC	By February 2016	PIEC
Establishment of the ordinance of septage treatment	By Sangguniang Bayan of each LGU	By March 2016	Municipality of Dauis and Municipality of Panglao

3.5 Output 5: Effective and realistic management systems to control on-site STFs covering Panglao Island are established.

The Municipal Disaster Risk Reduction Office (MDRRMO) has been planned to be established for the purpose of among others, septic tank management in each LGU. The organizations, however lack administrative guidance experiences such as licensing, monitoring, improvement of improper structure and maintenance. The implementation body for septage treatment has not been established either.

The manner of preparation of the database for the existing septic tanks has been developed. However the data collection by each LGU to cover entire municipalities has not yet been completed. Each LGU shall continuously conduct the data collection to cover entire municipalities.

Sewage analysis laboratory has been established in PHO, PGBh for monitoring water pollution in public water bodies including effluent from septic tanks. The laboratory shall continuously be utilized for the work. In the future, the laboratory shall have a formal license authorized by DENR.

Table 5. Supplemental activity for the effective and realistic management of septage treatment system after project completion.

Activity	Method	Timeline	Implementing Body
Continuation of database preparation on Existing Septic tanks	Each municipality shall collect data to cover all households and buildings in the municipality.	By June 2016	Municipality of Dauis Municipality of Panglao
Administrative guidance for renewal/ modification of existing inappropriate septic tank (increasing the possible number of septic tanks for desludging)	The activity requires government subsidy for improvement. PGBh shall discuss with concerned national government agencies to get financial assistance.	Continuously	PGBh Municipality of Dauis Municipality of Panglao
Establishment of the implementating body for the construction of septage treatment plant and commercial operation.	After establishment of the concerned ordinance, the project implementating body shall be established.	By June 2016	Municipality of Dauis Municipality of Panglao (PGBh)
Establishment of the tariff collection system for septage treatment	The tariff rate shall be set. The collection system shall be developed in each municipality.	By August 2017	Municipality of Dauis Municipality of Panglao
Continuation of sewage quality analysis by PGBh for the sustainable septage management system	PHO shall continuously carry out the analysis work. PGBh shall prepare necessary budget and resources for the work.	Continuously	PHO, PGBh

3.6 Output 6: 6. Possible design of the septic tanks with improved capacity (satisfying design capacity of on-site STFs with the improvement of effluent quality) is proposed.

Manuals for the standard design and construction work for improved septic tanks have been provided for the concerned municipalities. From now on, these manuals, should be applied for the planned septic tanks. Municipal Septage and Sewage Management Office (MSSMO) will manage all planned septic tanks.

Table 6. Supplemental activity for sustained monitoring of improved septic tank after project completion

Activity	Method	Timeline	Implementing Body
Check and guide applicants for the application of standard septic tanks and continuous monitoring on the constructed septic tanks	Proposed septic tanks by applicants shall be checked by MSSMO to meet the requirements of standard septic tank. Adequate field inspection shall be conducted by MSSMO during and upon construction of facilities.	Continuously, when application is submitted	Municipality of Dauis Municipality of Panglao

3.7 Output 7: 7. Preliminary desigu of septage treatment plant and assistance for preparation of sustainable management system including alternative financial arrangements

Desludging from septic tanks is necessary in order to achieve expected treatment efficiency of the facilities. Therefore, septage treatment plant should be constructed immediately in the subject area.

Table 7. Supplemental activity for the Septage Treatment Plant Construction after project completion.

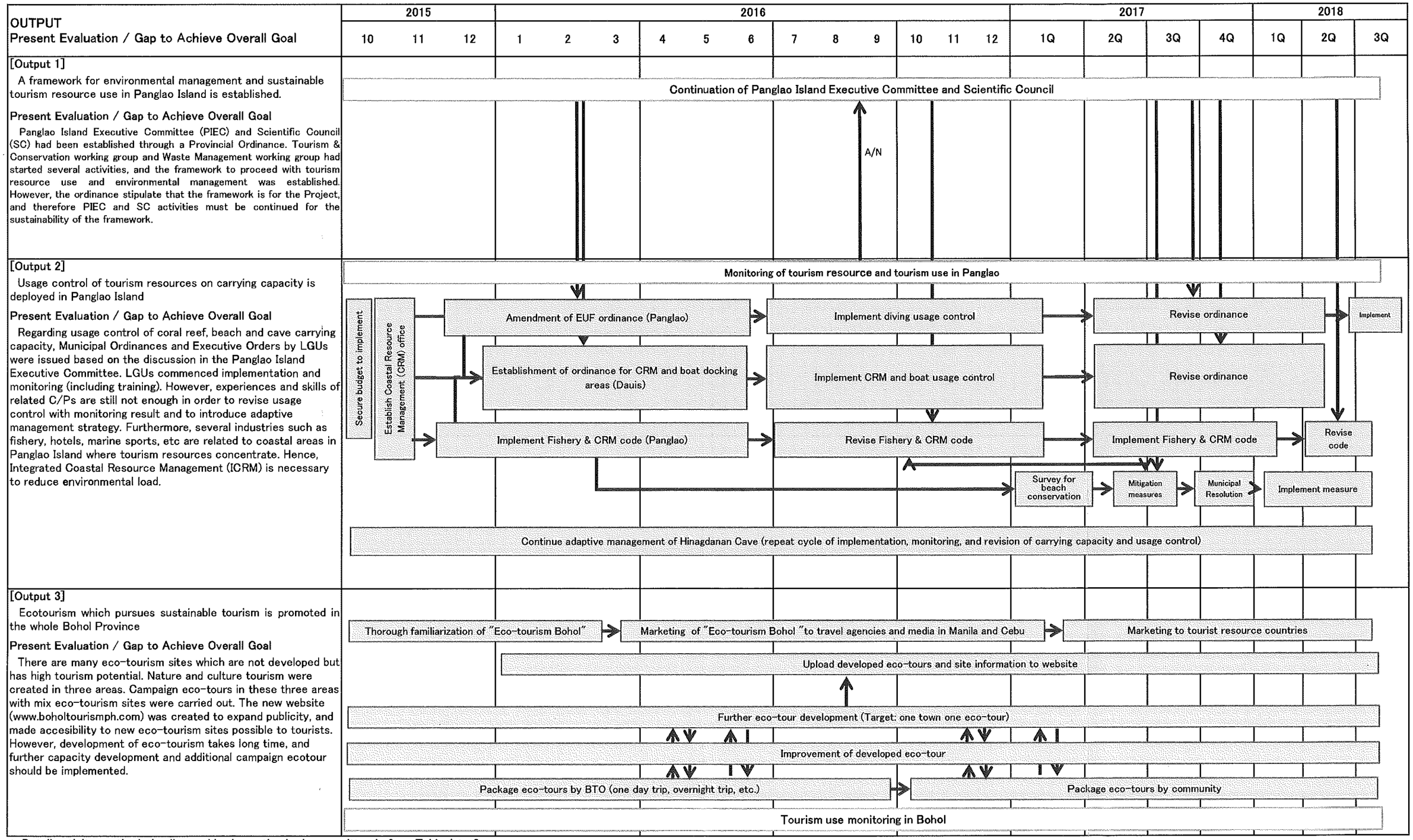
Activity	Method	Timeline	Implementing Body
Land Acquisition for the construction of the septage treatment plant	The potential identified site located in Bingag, Dauis, shall be purchased by Municipality of Dauis. The cost will be shared with Municipality of Panglao	By end of 2015	Municipality of Dauis
Finance Arrangement	Implementating body shall decide the finance arrangement through discussion with PGBh. (Loan or Grant) Implementating body shall set Operation & Maintenance cost and decide tariff system.	By June 2016	PGBh/ concerned municipalities
*spell out IEE (IEE) and necessary permission from DENR	Implementating body shall carry out IEE and necessary activities to get approval from concerned organizations. Implementating body may need to hire a consultant.	By December 2016	Implementating body Consultant
Detailed Design	By hiring a consultant, detailed design shall be carried out.	By February 2017	Implementating body Consultant
Tender Preparation and Contractor selection	Bidding for the selection of contractor shall be made with assistance from Consultant.	By May 2017	Implementating body Consultant
Septage Treatment Plant Construction (1st Stage)	After the contractor selection, with assistance by the consultant for construction supervision work, the construction shall be carried out.	By November 2017	Implementating body Contractor
Commissioning	After construction of the plant, test operation shall be carried out by the contractor. The implementating body shall collect septage by the use of a vacuum car (needs to purchase the cars before commissioning)	By January 2018	Implementating body Contractor
Commercial Operation	Before the completion of the construction work, the plant shall be turned over to the implementating body. Collection of charges for desludging shall be practiced by each municipality.	From February 2018	Implementating body

Appendix: Figure of Road Map (Summary)

Figure of Road Map to Achieve the Overall Goal after the End of the Project (Summary of Section 3)

Overall Goal: The sustainable tourism development is achieved after completion of the New Bohol Airport construction

Project Purpose: To protect the environment of Panglao Island from increasing tourists estimated after completion of the New Bohol Airport construction and to improve effluent quality discharged from the on-site STFs



*: Detail activity, method, timeline and implementing body are written in from Table 1 to 3

OUTPUT Present Evaluation / Gap to Achieve Overall Goal	2015 10 11 12	2016 1 2 3 4 5 6 7 8 9 10 11 12	2017 1Q 2Q 3Q 4Q	2018 1Q 2Q 3Q
[Output 4] Effective and realistic laws and regulations for the construction and the management of the on-site STFs are proposed. **Present Evaluation / Gap to Achieve Overall Goal** The draft ordinance related to construction and maintenance of septic tanks has been proposed including renewal of existing septic tanks, but it has not not yet been approved by sangguniang bayan in each LGU. There is no ordinance on proper treatment of septage from septic tanks. For sustainable management on septage collection, treatment and disposal,an ordinance related to the construction and operation of septage treatment plant is urgent to be established. The tariff collection system for septage collection and treatment is also necessary.	Establishment of the Ordinance on the proper management of Septic Tanks Establishment of the ordinance of septage		
[Output 5] Effective and realistic management systems to control on-site STFs covering Panglao Island are established. **Present Evaluation / Gap to Achieve Overall Goal** MDRRMO is planned to be established, which will includ MSSMO for septic tank management in each LGU. The organizations however lack administrative guidance and further experiencesincluding licensing, monitoring, improvement of improper existing septic tanks. Because the database to cover all existing septic tanks has not been completed, an accurate number of septic tanks which don't allow for desludging has not been clarified. Sewage analysis laboratory has been installed in provincial government for the monitoring of water pollution status including the effluent quality of septic tanks. The laboratory shal be authorized by DENR in the future as a formal organization.	Continuation of sewage quality analysis by Provincial Government for the sustainable management of septic tanks Establishment of the implementation body for septage treatment plant construction Establishment of implementation body for commercial operation Continuation of database accumulation on Existing Septic Administrative guidance for renewal/modification of inappropriate septic tanks	Establishment of the tariff collection system Registration to DENR	
[Output 6] Possible design of the septic tanks with improved capacity (satisfying design capacity of on-site STFs with the improvement of effluent quality) is proposed. **Present Evaluation / Gap to Achieve Overall Goal** Design examples with standard specifications for the improved septic tanks have been proposed and approved by the working group 2(Waste Management). But, the proposed facilities have not yet been practiced in teh field. Thus, sustainable performance has not been confirmed requiring long term monitoring of the pilot facilities (septic tanks).	Establishment of a system for oil collection and selling of biodiesel oil Installation of machine to treat used kitchen oil convert it to Standard septic tank construction and sustained monitoring		
[Output 7] Preliminary design of septage treatment plant and assistance for preparation of sustainable management system including alternative financial arrangements **Present Evaluation / Gap to Achieve Overall Goal** F/S (preliminary design) for the construction of septage treatment plant was prepared and shared among concerned parties. A septage treatment plant is necessary for sustainable septage management for on-site sewage treatment system. The construction of the plant is urgent for teh conservation of sea water quality.	Land Acquisition Finance Arrangement IEE and necessary permission Detailed Design Tender Preparation and Contractor Septage Treatment Plant Construction (1st Stage) Commercial Operation		

*: Detail activity, method, timeline and implementing body are written in from Table 4 to 7

Attachment -5 List of Collected Information and Materials

作成者： JICA Expert Team

主管部長	文書管理課長	主管課長

情報管理課長	図書資料室受付印

収集資料リスト(List of Collected Materials)

平成 27 年 9 月 XX 日作成

地　域	アジア	調査団等名称	新ボホール空港建設に係る持続可能型環境保全プロジェクト	調査の種類	技術協力プロジェクト	作成部課	
国　名	フィリピン			現地調査期間	2013/5 - 2015/9	担当者氏名	

番号	資料の名称	形態	版型	ﾍﾟｰｼﾞ数	ｵﾘｼﾞﾅﾙ･ｺﾋﾟｰの別	部数	収集先名称又は発行機関	寄贈・購入(価格)の別	取扱区分	利用表示	利用者所属氏名	納入予定日	納入確認欄
Serial No.	**Title**	**Type**	**Size**	**Total Page**	**Original/ Copy**	**No.**	**Provided or Issued by**	**Free/ Purchase**			**Person in charge**	**Date**	**Sign**
1	Fisheries Code_Philippines_RA8550	Electric file	A4	38	Copy	1	DENR	Free					
2	R.A_9147_wildlife_Act	Electric file	A4	10	Copy	1	DENR	Free					
3	Provincial Ordinance No. 2014-002. Establishing the Panglao Island Executive Committee for Sustainable Environmental Protection Project.	Hard copy	A4	6	Copy	1	PPDO	Free					
4	Municipal Ordinance No. 03 Series of 2008. An Ordinance Providing for the Establishment of Environmental Users Activity System in the Municipality of Panglao, Bohol, and Inposing Fees thereof. Municipal	Hard copy	A4	8	Copy	1	Municipality of Panglao	Free					
5	Municipal Ordinance No. 12 Series of 2014. An Ordinance Amending Municipal Ordinance No. 03 Series of 2008 Entitled: “An Ordinance Providing for the Establishment of Environmental Users Activity System in the Municipality of Panglao, Bohol, and Imposing Fees Therof”	Hard copy	A4	12	Copy	1	Municipality of Panglao	Free					
6	Municipal Ordinance No. 11 Series of 2014. An Ordinance Regulating the Business of Diving in the	Hard copy	A4	4	Copy	1	Municipality of Panglao	Free					

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	Municipality of Panglao, Bohol Promulgating the Rules and Regulations thereof.												
7	Provincial Ordinance No. 2012-026. Requiring Mandatory Accreditation by the Philippine Commission on Sports Scuba Diving of Diving Establishments in the Province of Bohol.	Hard copy	A4	6	Copy	1	Municipality of Panglao	Free					
8	Executive Order No. 9 (Mayor of Panglao) Series of 2014. Enforcing the Sulvage Zone and Easement along the Shorelines of this Municipality and Creating the Salvage Zone Enforcement Team for the Purpose.	Hard copy	A4	2	Copy	1	Municipality of Panglao	Free					
9	Barangay Ordinance No. 03 Series of 2014. An Ordinance Modifying Ordinance No. 01, Series of 2008 “Known as Regulating Taking a Bath at Hinagdanan Cave”	Hard copy	A4	2	Copy	1	Barangay Bingag	Free					
10	Barangay Ordinance No. 01 Series of 2015. An Ordinance Amending the Barangay Ordinance No. 03, Series of 2014 Entitiled Regulationg Taking a Bath at Hinagdanan Cave	Hard copy	A4	3	Copy	1	Barangay Bingag	Free					
11	Comprehensive Land Use Plan 2011-2020, Panglao	Electric file	A4	165	Copy	1	Municipality of Panglao	Free					
12	Comprehensive Land Use Plan 2011-2020, Dauis	Electric file	A4	140	Copy	1	Municipality of Dauis	Free					
13	Stockwell, B. et al, 2007, Balicasag Island Risk Assessment: Estimating the carrying capacity of coral reefs for SCUBA diving at Balicasag Island, Panglao, Bohol	Hard Copy	A4	21	Copy	1	SUAKCREM (Siliman University)	Free					
14	Hawkins, J. P. and Roberts, C. M., 1997, Estimating the Carrying Capacity of Coral Reefs for Scuba Diving	Hard Copy	A4	4	Copy	1	SUAKCREM (Siliman University)	Free					

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15	Sudara, S. and Nateekarnchanalapm S., 1998, Impact of Tourism Development on the Reef in Thailand.	Hard Copy	A4	6	Copy	1	SUAKCREM (Siliman University)	Free					
16	Huttche, C. et al, 2002, Sustainable Coastal Tourism Handbook for the Philippines	Hard Copy	A4	6	Copy	1	SUAKCREM (Siliman University)	Free					
17	Garrod, B. and Wilson, J. C., 2005, Marine Ecotourism Issues and Experiences	Hard Copy	A4	231	Copy	1	SUAKCREM (Siliman University)	Free					
18	Alcala, A. C. et al, 2008, Directory of Marine Resorves in the Visayas, Philippines	Hard Copy	A4	177	Copy	1	SUAKCREM (Siliman University)	Free					
19	Alcala, E. et al, 2007, Assessment of the Biophysical Conditions of Caves Promoted for Ecotourism in Mabinay, Negros Oriental, Philippines.	Hard Copy	A4	11	Copy	1	SUAKCREM (Siliman University)	Free					
20	Structure Based on Clustering of Offices in Bohol Province	Hard Copy	A4	2	Copy	1	BEMO	Free					
21	Report on the 2013 Socio-Economic Survey on Balicasag Island	Hard Copy	A5	21	Copy	1	Social Economic and Environment management Cluster	Free					
22	Executive Order No. 533 (President). Adapting Integrated Coastal Management as a National Strategy to Ensure the Sustainable Development of the Country's Coastal and marine Environment and Resources and Establishing Supporting Mechanisms for its Implementation	Hard Copy	A5	6	Copy	1	Social Economic and Environment management Cluster	Free					
23	Code on Sanitation of the Philippines (septage related)	Hard copy	A4	5	Copy	1	Government of the Philippines	Free					
24	Clean Water Act	Hard copy	A4	10	Copy	1	-do-	Free					

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25	Operations Manual on the Rules and Regulations governing Domestic Sludge and Septage	Hard copy	A4	5	Copy	1	-do-	Free					
26	National Plumbing Code of the Philippines	Hard copy	A4	10	Copy	1	-do-	Free					
27	Revised National Plumbing Code	Hard copy	A4	15	Copy	1	-do-	Free					
28	Presidential Decree 198	Hard copy	A4	5	Copy	1	-do-	Free					
29	Local Government Code (related parts)	Hard copy	A4	5	Copy	1	-do-	Free					
30	Revised Panglao Island Tourism Estate (PITE) Guidelines	Hard copy	A4	5	Copy	1	PIEC	Free					
31	Presidential Decree No. 1152 (1977),	Hard copy	A4	5	Copy	1	Government of Philippines	Free					
32	Environmental Code	Hard copy	A4	5	Copy	1	Government of Philippines	Free					
33	Bohol Sanitation Code	Hard copy	A4	5	Copy	1	Bohol Provincial Government	Free					
34	Bohol Environment Code (Draft)	Hard copy	A4	5	Copy	1	-do-	Free					
35	Revised Effluent Regulations of 1990, Revising and Amending the Effluent Regulations of 1982	Hard copy	A4	3	Copy	1	Government of Philippines	Free					
36	Operations Manual on the Rules and Regulations Governing Domestic Sludge and Septage	Hard copy	A4	43	Copy	1	USAID	Free					
37	City Septage Management System	Hard copy	A4	16	Copy	1	Dumaguete City Water District	Free					
38	An Ordinance Establishing a Septage Management	Hard copy	A4	13	Copy	1	Dumaguete City	Free					

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	System in the City of Dumaguete												
39	Technology Options for Wastewater and Septage Treatment	Hard copy	A4	30	Copy	1	Maynilad	Free					
40	USAID-Rotary San Fernando Sewerage and Septage Management Program	Hard copy	A4	15	Copy	1	USAID, International h_2O	Free					
41	An Ordinance Amending Chapter 16 of the Sanitation Code of the City of San Fernando	Hard copy	A4	13	Copy	1	San Fernando City	Free					
42	Planning, Establishment and Operation of Waste Management and Ecology Centere including Landfill in Bayawan City, Negros Oriental	Hard copy	A4	60	Copy	1	Dr. Johannes Paul, GIZ-AHT, Udo Lange AHT Group AG, Essen, Germany	Free					
								Free					

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