

**The Republic of the Philippines
National Mapping and Resources Information Authority
Mindanao Development Authority**

**Topographic Mapping for
Peace and Development
in Mindanao
in the Republic of the Philippines**

Final Report

Summary

February 2013

Japan International Cooperation Agency

PASCO Corporation

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List of Abbreviations and Acronyms

ALOS	Advanced Land Observing Satellite
BDA	Bangsamoro Development Agency
DA	Department of Agriculture
DEM	Digital Elevation Models
DENR	Department of Environment and Natural Resources
DOTC	Department of Transportation and Communication
DGPS	Differential Global Positioning System
DPWH	Department of Public Works and Highways
GCP	Ground Control Point
GIS	Geographic Information System
GOJ	Government of Japan
GOP	Government of the Philippines
GRP	Government of the Republic of the Philippines
GPS	Global Positioning System
I/A	Implementation Agreement
J-CCCH	Joint GRP-MILF Coordinating Committee on the Cessation of Hostilities
JICA	Japan International Cooperation Agency
LGU	Local Government Unit
NAMRIA	National Mapping and Resources Information Authority
MILF	Moro Islamic Liberation Front
MinDA	Mindanao Development Authority
RPC	Rational Polynomial Coefficient
TCC	Technical Coordinating Committee

1. Outline of the Study

1.1 Background

In Mindanao, the topographic maps at a scale of 1:50,000 produced in the 1950s are still used as base maps for regional planning and infrastructure development.

In the Philippines, the National Mapping and Resource Information Authority (hereinafter referred to as “NAMRIA”) is responsible for producing, updating, and distributing topographic maps. The Authority has the potential of carrying out the tasks; however, because of shortage of funds and human resources, the potential has not realized to update the topographic maps in Mindanao. The delay has been affecting various planning and development activities: road; disaster prevention mitigation; environmental management; social services; and so forth.

In order to cope with the situation, the Government of the Republic of Philippines (hereinafter referred to as “GOP”) requested to conduct a digital mapping project at a scale of 1:50,000 in Mindanao to become the basic information for development planning and implementation in the Mindano regions to the Government of Japan (hereinafter referred to as “GOJ”).

In response to the request GOJ has conducted a preliminary study in December 2009. On January 11, 2010, both parties have signed the Implementation Arrangement to conduct the “Project on Topographic Mapping for Peace and Development in Mindanao (hereinafter referred to as “the Project”).

1.2 Objectives of the Study

The objectives of the Study are as follows:

Production of 1:50,000 digital topographical maps in all the regions in Mindanao

In accordance with the Rule and Regulations on Survey and Mapping, the digital topographic maps at a scale of 1:50,000 are produced as utilizing satellite stereo images, ground survey and existing topographic maps.

Technical assistance required for the usage of the digital topographic maps

The Project Team studies current uses of maps in organizations of the Technical Coordinating Committee members. Based on the result of the study, the Project Team presents an example application at the technology transfer seminar.

1.3 Project Area

1) Project Area

The Project area covers the entire Mindanao area including the Basilan Island and the southern island with a total are of 100,500 km².

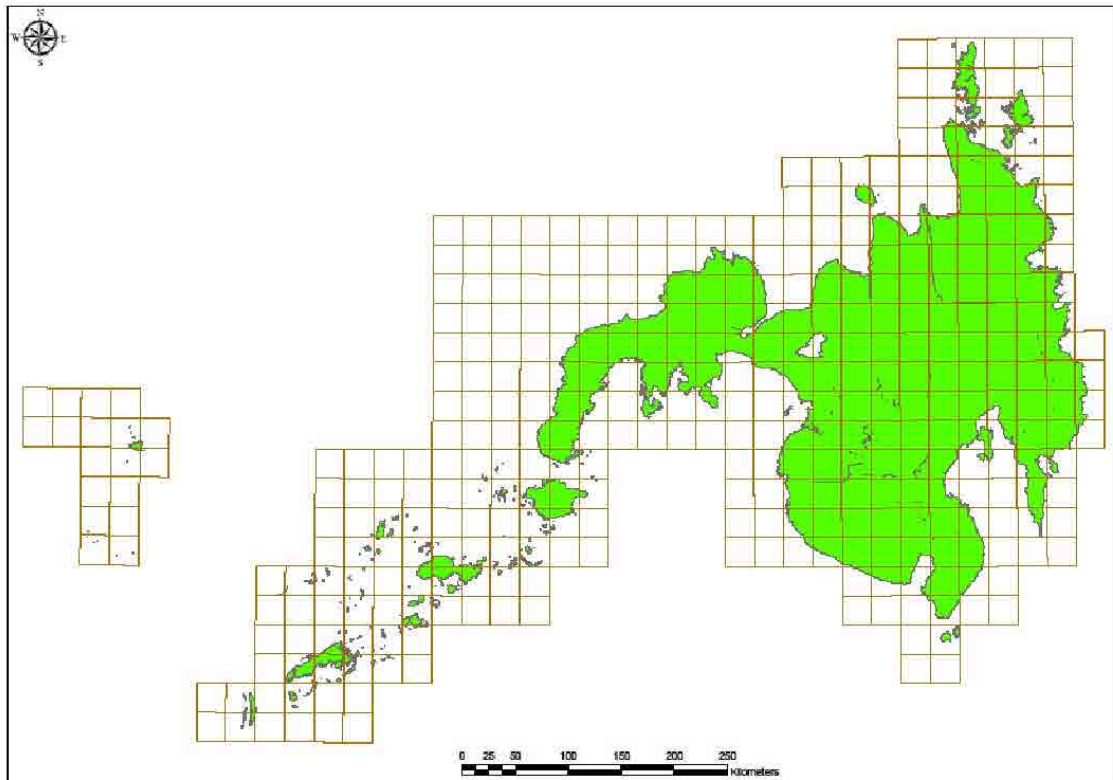


Figure 1 Project Area

2) Original Project Area

During the discussion on the Inception Report, in the beginning of the Project, the Project Area was 95,000 km² excluding the island areas of the Basilan Island and the southern islands. The counterpart organizations of NAMRIA and Mindanao Development Authority (MinDA) requested to include the Basilan Island and the southern island areas to be included in the project areas during the discussion on the Inceptions Report. The request which was included in the Minutes of Discussions on Inception Report and the request letter, to include the Basilan Island and the southern island areas, was sent to the JICA Philippine Office.

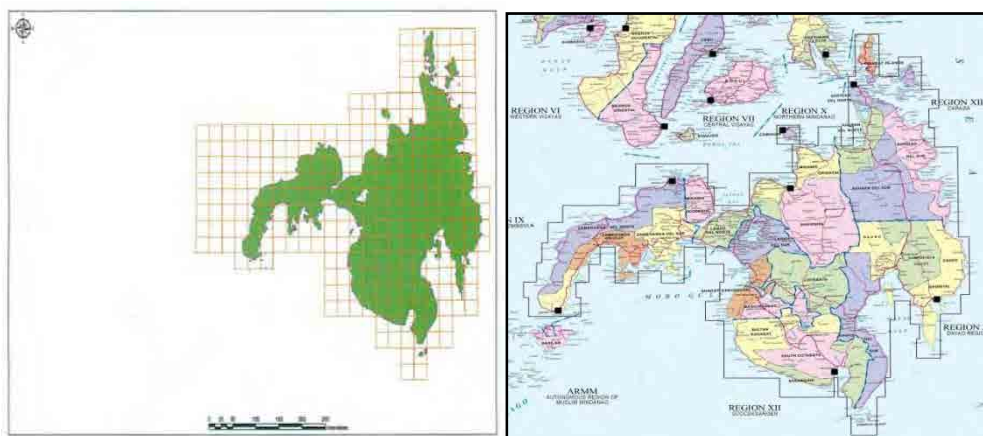


Figure 2 Original Project Area

In the beginning of the Project, the Project Team has conducted a research on securing the accuracy and operational possibility of the ground surveys. As a result of the on-site research, acquisition of the satellite images and the control point data from NAMRIA were confirmed as possible. It became clear that there was a survey and mapping company which has experiences in the island areas including bathymetric data creation. Therefore, the Project Team has concluded the implementation of the Project in the area was possible.

For this reason, JICA has changed the Project Area of the 1:50,000 digital topographic mapping to about 100,500 km² which included the Basilan Island and the southern islands.

The expansion of the project area became part of the reasons for extension for the project period.

1.4 Target Organizations of Data Application

The members of the Technical Coordinating Committee are the major targets for supporting data application. NAMRIA, MinDA, DENR, NEDA, DOTC, DA and other regional line agencies of the central government in the jurisdiction and LGUs in the Project area are the target organizations.

1.5 Amended Work Plan Items and Others

1.5.1 Change of Project Period (Partial Amendment to I/A)

In the Implementation Arrangement (I/A), the Project for Topographic Mapping for Peace and Development in Mindanao was planned to be completed in February 2012. However, completion of field identification work was delayed and completed in May 2011 because of some security issues in some areas. The counterparts and JICA had discussion over the issue, and agreed to extend the Project till March, 2013 to secure sufficient time for the work and technology transfer. On October 13, 2011, the Minutes of Meeting on Amendment of Schedule has been signed.

1.5.2 Inclusion of Bathymetric Data Specifications

On February 18, 2011 during the discussion on the Progress Report, NAMRIA notified an officer in charge of JICA Philippine Office that the specifications of the bathymetric data were included in the specifications of 1:50,000 digital topographic maps produced during the Project.

The Project Team reported NAMRIA that the bathymetric data was not included in the scope of the Project.

On February 25, 2011, NAMRIA submitted a letter of request to change the specifications to include the bathymetric data in the digital topographic maps of the Project.

The Project Team had a meeting with NAMRIA regarding the area, specifications, methods, and schedule of creating bathymetric data including availability of existing bathymetric data. After the meeting the followings were confirmed by both sides:

- The digital topographic data at a scale of 1:50,000 included the bathymetric data as default;
- The area of bathymetric mapping was 58,000 km²;
- The existing topographic maps included the bathymetric data; and
- The existing topographic data would be digitized to create the bathymetric data.

The Project Team examined the specifications, operation procedure, schedule, and quantity of bathymetric data creation based on the above information. After thorough examination, the Project Team came to the conclusion that creation of the bathymetric data was possible based on the specifications of the bathymetric data within the time schedule of the digital topographic map production at a scale of 1:50,000 with an area of 58,000 km².

In response to the plan of the Project Team, JICA agreed to include the bathymetric data with an area of 58,000 km², and decided to add the bathymetric data creation to the Minutes of Meeting on Amendment of Schedule on October 13, 2011. The list of output of the bathymetric data is in Section 1.10.

1.5.3 Resolved Issues on Topographic Map Preparation

1) Field Completion in Critical Areas

There are some critical areas, about 2% of the Project area, without the entry permits. For this reason, NAMRIA, MinDA and the JICA Project Team discussed and agreed to use secondary data in these critical areas.

2) Satellite Images

The Project Team procured the new ALOS images that covered the entire Project area. The images had cloud cover exceeding 20%; therefore, the Project Team, after discussing the matter with JICA, procured the archives of all ALOS images for the past five years and the latest SPOT images to solve the problem.

3) Work Period of Field Completion

JICA and the Project Team discussed the issues of the critical areas and the cloud situation of the satellite images with consideration of the Project period, and agreed to produce the digital topographic maps with all data acquired from the data of field completion completed by August 2012 and the satellite images already acquired.

1.6 Basic Policy Directions on Map Utilization

The Project Team has conducted the technology transfer seminar based on the results of the capacity assessment survey. The map utilization component of the Project was completed; however, there are more to be done for future map utilization. Since the topographic maps were prepared for peace and development, the uses of the maps shall be targeted to the conflict areas and development planning. With the peace agreement between the Philippine government and MILF, it will be high time to accelerate development in ARMM and succeeding Bangsamoro Government using the topographic map data, GIS data and satellite images.

1.6.1 Development Planning and Facility Management

The scale of 1:50,000 is suited for provincial and regional levels of planning. For those cities and municipalities without large scale maps can utilize the 1:50,000 topographic maps.

A general development planning model has four components in a development cycle--current analysis, planning, implementation, monitoring and evaluation. The new maps can be used in all the processes.

Regions, provinces, cities and municipalities prepare development plans based on their Physical Framework Plans and Comprehensive Land Use Plans; however, since the newly produced spatial data had not been available, such planning and development activities may not have been as rational as they should have been. Those development plans can be updated with the new topographic maps. Also, all the sectors in the central government agencies and their line agencies in Mindanao can use the new maps for their sector planning as well as to provide sector information to LGUs.

It is to note that unlike ordinary topographic maps, the GIS data are included. The GIS data shall be utilized as much as possible especially on facility and infrastructure management.

The high-resolution ortho-images can have an accuracy equivalent to 1:10,000 topographic maps; therefore, when higher accuracy is required, the images can be used for various planning and development activities.

1.6.2 Distribution of Outputs

Digital Data

All the digital data can be uploaded to the Geo-portal system developed by NAMRIA. All government agencies will have access to the system. Accessibility may depend on availability of fast connection of the internet; therefore, small LGUs without such internet connection may need another media.

Accessibility of topographic map information may be limited if the media are in digital, but the digital format is flexible and easily edited with appropriate computer equipment, while the printed maps will be printed and become available, the data shall be distributed at least to the TCC members. In fact MinDA has been preparing to distribute “e-copies.” MinDA and NAMRIA need to discuss and determine how to distribute the data to ensure data securities as they control the distribution system of digital data.

Printed Maps

Printed topographic maps would be used by all map users without computer facilities or internet connection. The printed maps will be a useful especially at primary and secondary schools.

The Project Team has confirmed that NAMRIA will prioritize printing of the new topographic maps covering the Project area with a new Computer-to-Print system to be purchased in early 2013. The current capacity of printing is about 150 map sheets with 300 copies each, but the capacity will be increased with the new equipment. Also, if the capacity of printing does not meet the demand of printed maps, NAMRIA could out-source the printing job.

1.7 Organizational Setting

The Project is implemented by four organizations: JICA; counterpart agencies (NAMRIA and MinDA); and the Project Team.

In the Project, TCC was formed to establish communication channels with LGUs in the Project area for smooth operation of the Project. The counterparts initiate formation of TCC independently as they invite LGUs and the regional line agencies in the Project area. TCC is a committee, which shares information, exchange, and coordinate members' opinions regarding aspects of topographic mapping in Mindanao.

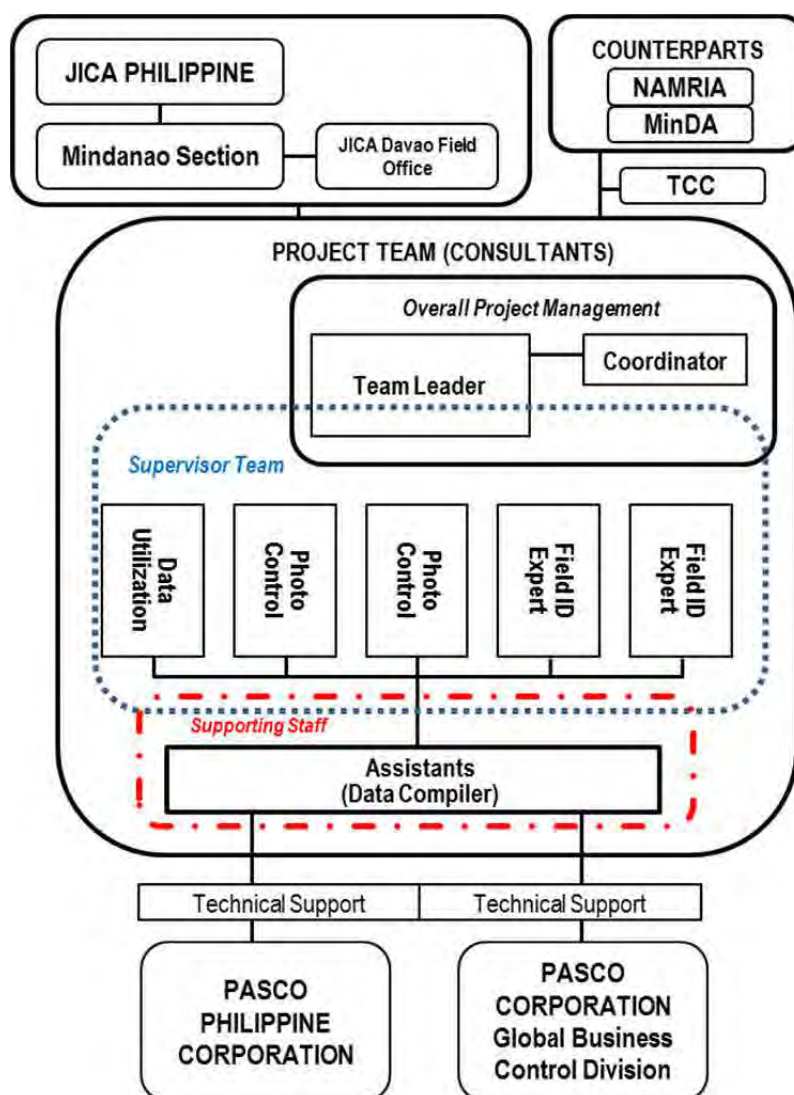


Figure 3 Organization Setting for Project Implementation

Table 1 Project Participants

Project Team Member		
Mr. Yutaka Kokufu	Team Leader, Field Identification/Field Completion	
Mr. Kazunobu Kamimura	Map Utilization	
Mr. Koichi Kamimura	Control Point Survey 1	
Mr. Koichi Wakisaka	Control Point Survey 2	
Mr. Kiyofumi Tamari	Field Identification/Field Completion 1	
Mr. Toshinori Otsu	Field Identification/Field Completion 2	
Mr. Kensuke Kimura	Project Coordination/Field Identification, Field Completion	
JICA		Note
Mr. Akihito Sanjo	Peace Building and Urban and Regional Development Division 1, Peace Building and Urban and Regional Development Group, Economic Infrastructure Department	
Ms. Ai Wakamiya	Urban and Regional Development Division 2, Urban and Regional Development Group, Economic Infrastructure Department	March, 2010

Mr. Kaori Higashi	Urban and Regional Development Division 2, Urban and Regional Development Group, Economic Infrastructure Department	April, 2010 - March, 2012
Mr. Sho Takano	Peace Building and Urban and Regional Development Division 1, Peace Building and Urban and Regional Development Group, Economic Infrastructure Department	April, 2012
Ms. Saori Fukuhara	Peace Building and Urban and Regional Development Division 1, Peace Building and Urban and Regional Development Group, Economic Infrastructure Department	May, 2012 - February, 2013
Mr. Masafumi Nagaishi	Philippine Office, Senior Representative	March, 2010 - September, 2010
Mr. Shinichi Masuda	Philippine Office, Senior Representative	October, 2010 - March, 2013
Mr. Masashi Yamamoto	Philippine Office, Representative	March, 2010 - April, 2011
Ms. Shiho Akamatsu	Philippine Office, Project Formulation Adviser	April, 2010 - March, 2012
Ms. Chieko Yokota	Philippine Office	April, 2012 - October, 2012
Ms. Yoko Ujike	Philippine Office, In-house Consultant	October, 2012 - February, 2013
Ms. Maria Celestina Totanes	Philippine Office, In-house Consultant	March, 2010
Mr. Hernan Pineda	Philippine Office, In-house Consultant	April, 2010 - March, 2012
Ms. Mary Bernadette P. Suarez	Philippine Office, In-house Consultant	March, 2010 - February, 2013
Technical Coordinating Committee Members		
Counterpart	National Mapping and Resource Information Authority	
Mr. Jose Galo P. Isada, Jr.	Director, Mapping & Geodesy Department	
Mr. Ruel DM. Belen	Asst. Director, Mapping & Geodesy Department	
Ms. Ofelia T. Castro	Division Chief, Photogrammetry Division	
Mr. Ronaldo C. Gatchalian	Officer-in-Charge, Geodesy and Geophysics Division	
Mr. Joaquin T. Borja, Jr.	Officer-in-Charge, Cartography Division	
Mr. Jose Villanueva	Engineer II, Cartography Division	
Ms. Sheila Eugenio	Engineer III, Cartography Division	
Ms. Jane Roque	Engineer III, Cartography Division	
Ms. Imelda Cabatay	Engineer II, Cartography Division	
Counterpart	NAMRIA BINONDO OFFICE	
Comm. Romeo I. Ho	Director, Hydrography Department	
Capt. Virgilio P. Antonio	OIC – Asst. Director, Hydrography Department	
Capt. Jacinto M. Cablayan	OIC – Asst. Director, Hydrography Department	
Counterpart	Mindanao Development Authority	
Ms. Janet M. Lopez	Director for Operation	
Ms. Corazon Ginete	Asst. Secretary	
Ms. Charlita Escano	Chief, Economic Development Specialist	
Ms. Joan Barrera	Supervisor, Economic Development Specialist	
Mr. Ernesto Tomas	OIC- Chief, Office of Knowledge Management	
Mr. Raymond Tejano	Information Technology Officer 1	
Ms. Donna Jane Dumanig	Economic Development Specialist	
National Line Agencies	Department of Energy and Natural Resources	
	National Economic Development Authority	
	Department of Interior and Local Government	
	Armed Forces of the Philippines	
	Department of Agrarian Reform	

	National Commission on Indigenous People
	Department of Agriculture
	National Irrigation Administration
	Regional Disaster Coordination Council
	Department of Public Works and Highways
	Land Management Sector
	Mines and Geosciences Bureau
	Environmental Management Bureau
	National Statistics Office
	Forest Management Sector
	Department of Tourism
	Office of Civil Defense
	Housing and Land Use Regulatory Bureau
Provinces	Provincial Planning and Development Offices
Cities	City Planning and Development Offices
Others	Other Academic and Research Institutes
	Autonomous Region of Muslim Mindanao
	Bangsamoro Development Agency

1.8 Major Conferences and Meetings

The Project Team had series of conferences and meetings with the JICA Philippines Office, NAMRIA, MinDA, J-CCCCH, LGUs in Mindanao, ARMM, MILF, and the contractors.

The meetings are categorized into major meetings, technical coordinating committee meetings, and coordination meetings.

The copies of minutes of meetings and meeting records are attached in Appendices of the Main Report.

Table 2 Major Meetings and Discussion Records

Date	Subject	Place
April 23, 2010	Meeting on Minutes of Discussions on Inception Report	Richmonde Hotel, Ortigas
December 8, 2011	Explanation and Discussion of Interim Report; Confirmation of the Minutes of Meeting for the coordination Meeting on November 29, 2011 in Davao City	Conference Room, NAMRIA
April 8, 2010	Distribution and Explanation of Inception Report	MGD Multi-purpose room, NAMRIA
April 12, 2010	Discussion of Inception Report	MGD Multi-purpose room, NAMRIA
April 19, 2010	Meeting on Inception Report	Conference Room, MinDA
April 26, 2010	Discussion on the Specifications of 1:50,000 Topographic Map	Director's Office, NAMRIA
August 9, 2010	Explanation of Inception Report	ARMM Office, Cotabato
September 16, 2010	Explanation of Inception Report	MILF Office, Cotabato
November 7, 2012	Technical Transfer Seminar and Final TCC Meeting	The Ritz Hotel at Garden Oases, Davao City
November 9, 2012	Technical Transfer Seminar and Final TCC Meeting	N Hotel, Cagayan De Oro City

Table 3 TCC Meetings and Discussion Records

Date	Subject	Place
July 27, 2010	Holding the Seminar (Project Launching & Technical Coordinating Committee)	Marco Polo Hotel, Davao City
July 27, 2010	Technical Coordinating Committee 1	Marco Polo Hotel, Davao City
September 7, 2010	Holding TCC in General Santos	Tierra Montana Hotel, General Santos City
September 8, 2010	Holding TCC in Zamboanga	Pasonanca, Zamboanga
September 9, 2010	Holding TCC in Cagayan de Oro	Dynasty Court Hotel, Cagayan De Oro City
September 15, 2010	Meeting on Project Status	ARMM Office, Cotabato
January 24, 2012	Technical Coordinating Committee 2	Microtel Inns and Suites, Davao City
January 25, 2012	Technical Coordinating Committee 2	Tierra Montana Hotel, General Santos City
January 27, 2012	Technical Coordinating Committee 2	Dynasty Court Hotel, Cagayan De Oro City
January 27, 2012	Technical Coordinating Committee 2	Grand Astoria Hotel, Zamboanga City
January 31, 2012	Technical Coordinating Committee 2	El Manuel Hotel, Cotabato City
May 10, 2012	Technical Coordinating Committee 3	Grand Men Seng Hotel, Davao City
May 11, 2012	Technical Coordinating Committee 3	Del Rio Splash Hotel, Koronadal City
May 14, 2012	Technical Coordinating Committee 3	Estosan Hotel, Cotabato City
May 15, 2012	Technical Coordinating Committee 3	Almont Hotel, Butuan City
May 16, 2012	Technical Coordinating Committee 3	Dynasty Court Hotel, Cagayan De Oro City
May 16, 2012	Technical Coordinating Committee 3	Pagadian Bay Plaza Hotel, Pagadian City
November 07, 2012	Technical Coordinating Committee 4	The Ritz Hotel at Garden Oases, Davao City
November 09, 2012	Technical Coordinating Committee 4	N Hotel, Cagayan De Oro City

Table 4 Technical Meetings and Discussion Records

Date	Subject	Place
August 2, 2010	Technical Briefing on Field Identification work for Contractor And Explanation of Safety Standards by JICA	Assistant Director's Office, NAMRIA
December 2, 2010	Technical Meeting (1/2) on Field Survey by Contractors	Microtel Inns and Suites, Davao City
December 3, 2010	Technical Meeting (2/2) on Field Survey by Contractors	Microtel Inns and Suites, Davao City
December 14, 2010	Meeting on Critical Area of Field Identification by Contractors (2)	MGD Multi-purpose room, NAMRIA
December 16 2010	Meeting on Critical Area of Field Identification by Contractors	MGD Multi-purpose room, NAMRIA
December 29, 2010	Meeting on Critical Area of Field Identification by Contractors	MGD Multi-purpose room, NAMRIA
January 20, 2011	Technical Meeting on Field Survey and Project Status	MGD Multi-purpose room, NAMRIA
January 21, 2011	Meeting on Critical Area of Field Identification by Contractors	MGD Multi-purpose room, NAMRIA
January 25, 2011	Meeting on Critical Area of Field Identification by Contractors	MGD Multi-purpose room, NAMRIA
January 27, 2011	Meeting on Critical Area of Field Identification by Contractors	MGD Multi-purpose room, NAMRIA
January 28, 2011	Meeting on Critical Area of Field Identification by Contractors	MGD Multi-purpose room, NAMRIA
February 11, 2011	Technical Meeting on Field Survey	Meeting room , Microtel, Davao
May 18, 2011	Technical Meeting on Field Survey	MGD Multi-purpose room, NAMRIA
May 23, 2011	Meeting of Project Status	MGD Multi-purpose room, NAMRIA
August 12, 2011	Technical Meeting on Requested Bathymetric Data by NAMRIA	Director's Office, NAMRIA
August 16, 2011	Technical Meeting on Project Status	Assistant Director's Office, NAMRIA
February 7, 2012	Clarification on the Layers for the topographic Maps; Schedule of 3rd TCC Meetings	MGD Multi-purpose room, NAMRIA
February 7, 2012	Technical Briefing on Field Completion and Safety Management Meeting	MGD Multi-purpose room, NAMRIA
August 23, 2012	Project Progress Reporting; Conformation of Specification of 1:50,000 of Topographic Map	MGD Multi-purpose room, NAMRIA
October 24, 2012	Technical Meeting (JICA Project Team and NAMRIA)	MGD Multi-purpose room, NAMRIA

Table 5 Coordination Meetings and Discussion Records

Date	Subject	Place
July 8, 2010	Meeting on preparation for the Seminar	MGD Multi-purpose room, NAMRIA
July 13, 2010	Meeting on preparation for the Seminar	Conference Room, MinDA
July 28, 2010	Discussion on the Short List for the Conduct of Field Survey and Ground Control Survey	Director's Office, NAMRIA
August 9, 2010	Meeting on Security clearance of J-CCCH	Estosan Hotel, Cotabato City
August 31, 2010	Meeting on Security Control of field survey work	Assistant Director's Office, NAMRIA
September 2, 2010	Meeting on Project Steering Committee	Conference Room, NAMRIA
December 3, 2010	Meeting on Project Coordination	Conference Room, MinDA
February 18, 2011	Meeting on Project Coordination	MGD Multi-purpose room, NAMRIA
May 25, 2011	Meeting on Project Coordination	Conference Room, MinDA
May 30, 2011	Meeting of Project Status	MGD Multi-purpose room, NAMRIA
November 29, 2011	Discussion on Interim Report Presentation Schedule; Discussion on TCC Activities and Schedule (Handout: Formation of TCC)	Conference Room, MinDA
May 18, 2012	Progress of the TCC Meetings	Conference Room, MinDA
July 24, 2012	Project Progress Reporting; Schedule of Technical Transfer Seminar	Conference Room, MinDA
August 28, 2012	Project Progress Reporting; Schedule of Technical Transfer Seminar	Conference Room, MinDA
September 28, 2012	Project Progress Reporting; Technical Transfer Seminar	Conference Room, NAMRIA
October 12, 2012	Confirmation of Seminar Details	Conference Room, NAMRIA

1.9 Safety-Management

One of the most significant aspects of the Project was safety and security in conducting the field work. During the field identification work, the Project Team managed safety and security of the Project Team members and subcontractors based on the safety and security standards of the JICA Philippine Office and the Embassy of Japan with supports from NAMRIA and MinDA.

The Project Team followed the safety standards of the “Guidelines of Travel to Mindanao” by the JICA Philippine Office in conducting the survey work when work to be conducted in Mindanao.

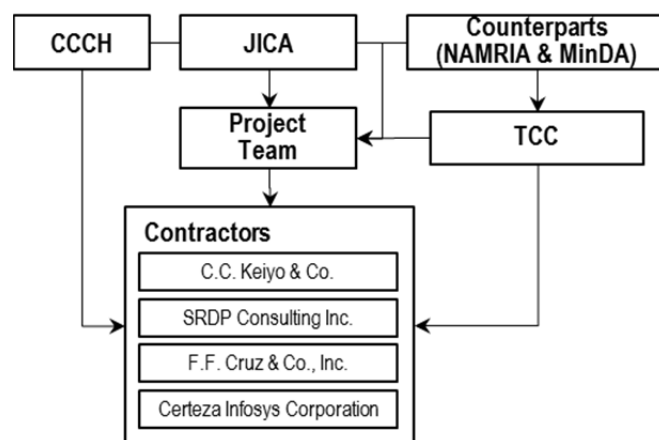


Figure 4 Safety and Security Management and Emergency Communications Structure

1.10 Outputs

JICA shall prepare and submit the following reports and final products of to the counterpart.

1. Inception Report

Ten (10) copies in English at the commencement of the Project

2. Interim Report

Ten (10) copies in English within twenty-first (21) months after the beginning of the Project

3. Draft Final Report

Ten (10) copies in English within Thirty-five (35) month after the beginning of the Project

4. Final Report

Twenty (20) copies in English within two (2) months after the receipt of the comments on the Draft Final Report

5. Final products (Deliverable)

5-1 One (1) set of Satellite Images

5-2 One (1) set of Ortho-Image Maps

5-3 One (1) set of ground control point coordinates

5-4 One (1) set of 1:50,000 scale digital topographic maps data for printing which includes 58,000 sq.km of nautical chart area

5-5 One (1) set of 1:50,000 scale digital topographic maps data for GIS applications which includes 58,000 sq.km of nautical chart area

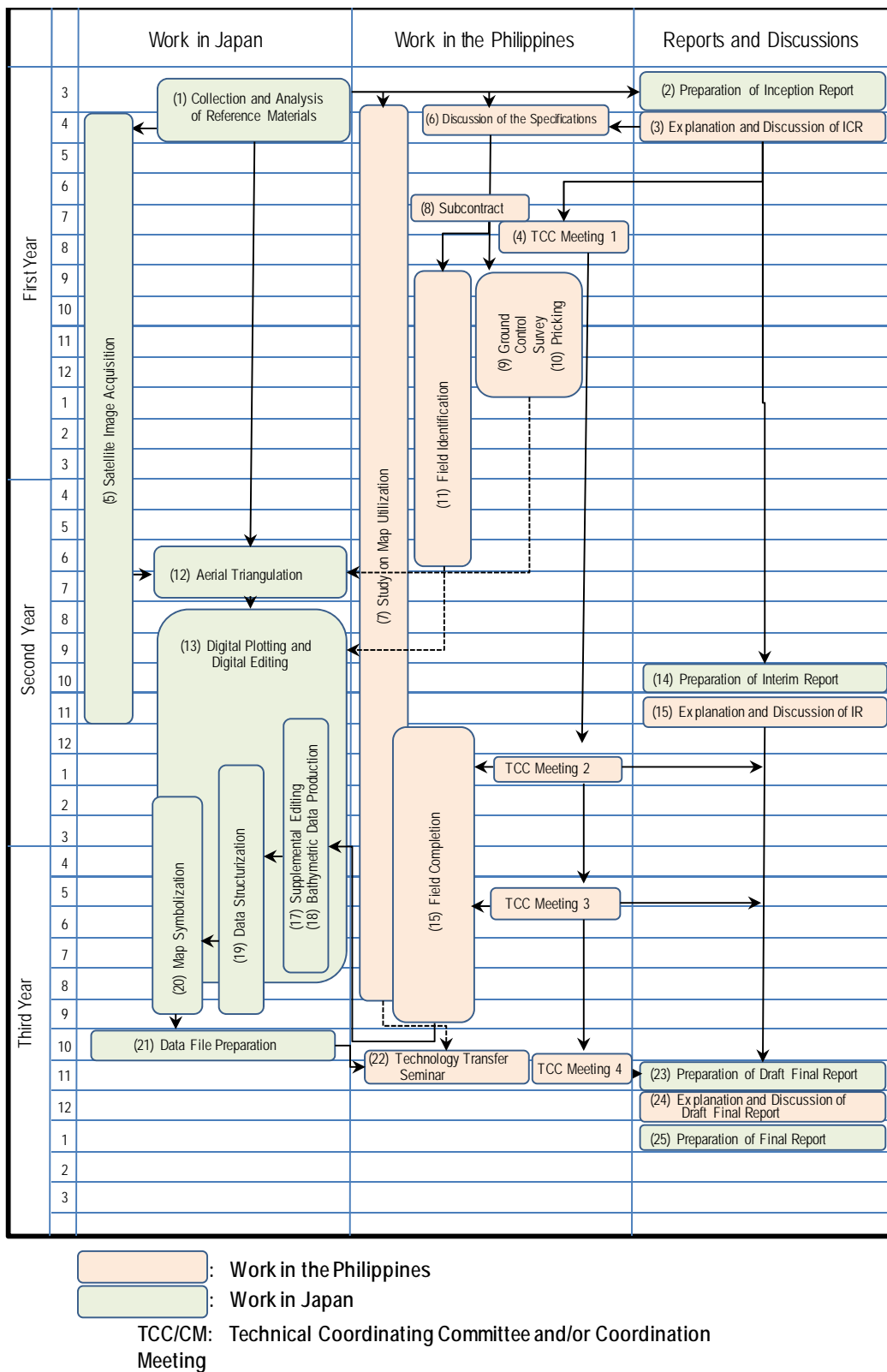


Figure 5 Project Work Flow

2. Project Work Items Completed

Completed work items are summarized in the following table.

Table 6 Major Achievements of the Project

No.	Work Item	Major Achievement
1	Collection and Analysis of Reference Materials (Work in Japan)	Prior to the Project implementation, relevant maps related data and information were collected from JICA, NAMRIA, and organizations.
2	Preparation of Inception Report (Work in Japan)	The Inception Report was prepared including implementation methods and schedule for the entire project period and work plan for the field work.
3	Explanation and Discussion of Inception Report (Work in the Philippines)	The Project Team presented the Inception Report to NAMRIA on April 12, 2010 and to MinDA on April 19, 2010. The contents were discussed and agreed. The counterparts requested to include the Basilan island and the southern islands to cover entire area of Mindanao which is about 100,500 km ² and to conduct a capacity assessment survey.
4	Holding a TCC Meeting (Work in the Philippines)	TCC was formed for the purpose of supporting the data-validation work and field works. The members consisted of the counterpart agencies and members from LGUs in Mindanao. The TCC meetings were held four batches: the first batch from July to September in 2010; the second batch in January 2012; third batch in May 2012; and the fourth batch in November 2012. The meetings were also held in the offices of the ARMM government and MILF.
5	Satellite Imagery Acquisition (Work in Japan)	The acquisition of the satellite images, ALOS and SPOT images, necessary for the Project was commenced in March 2010 and completed in December, 2011.
6	Discussion on the Specifications (Work in the Philippines)	The specifications used for the topographic maps in the Project were discussed on April 26, 2010, and the Project Team and the counterparts agreed to use the Specifications 2008, JICA/NAMRIA.
7	Study on Map Utilization (Work in the Philippines)	The Project Team conducted an interview and questionnaire surveys to assess capacity levels of map utilization to the TCC members. The questionnaire sheets were distributed on July 27, 2010, and collected during the TCC meetings in January, 2010 and May, 2010.
8	Arrangement of Subcontracting Work	On June 28, 2010, selection of subcontractors started. During the meeting, a short-list was prepared to contract the work on control point survey, pricking (leveling), field identification and field completion. The field identification and field completion works were divided into three areas. The bidding was conducted from July 9, 2010 to July 19, 2010. One subcontractor was awarded for the control point survey and pricking (leveling); three subcontractors were awarded to conduct field identification and field completion in the three areas.
9	Control-Point Survey (Work in the Philippines: Subcontract)	The subcontractor started the control point survey required for aerial triangulation on September 13, 2010. By December 25, 2010, the data of 315 points required for topographic mapping were acquired.
10	Pricking (Leveling) (Work in the Philippines: Subcontract)	The subcontractor conducted the pricking work of leveling required for aerial triangulation. The 220 points of work planned was completed by December 25, 2010.
11	Field Identification (Work in the Philippines: Subcontract)	The three subcontractors conducted field identification work from September 13, 2010. All the work was completed by May 31, 2011. The field identification covered the entire Project area of Mindanao -- 100,500 km ² .

No.	Work Item	Major Achievement
12	Aerial Triangulation (Work in Japan)	With the acquired satellite data, control point data and pricking data, the aerial triangulation work started in June 2011 and completed by the end of July 2011.
13	Digital Plotting and Digital Editing (Work in Japan)	The satellite data, satellite aerial triangulation data and data from field identification were used for plotting and editing. The work started in August 2011 and completed by the end of December 2011. The area covered was the entire Project area with a total area of 100,500 km ² . The number of map-sheets became 227.
14	Preparation of Interim Report (IT/R) (Work in Japan)	The Interim Report covered all the progress since the agreement on the Inception Report: changes in schedule; issues to be resolved; and contents and schedule of remaining work.
15	Explanation and Discussion of Interim Report (IT/R) (Work in the Philippines)	The contents of the Interim Report was presented and agreed on December 8, 2011 in NAMRIA. In the discussion, the change of the digital mapping area from about 95,000 km ² to 100,500 km ² was reported. The change of schedule--the original from March 2010 to March 2012 to from March 2010 to February 2013-- was confirmed as it was agreed as in M/M on Amendment of Schedule dated on October 13, 2011. It was confirmed that the digital topographic maps prepared during the Project will be completed using the existing secondary data and the data from the field surveys.
16	Field Completion (Work in the Philippines: Subcontract)	Field completion for clarifying uncertainties during digital plotting and editing and for confirming place names and administration boundaries was prepared and commenced from November 2011. All the work of field completion was completed by August 13, 2012. The area covered was the entire Project area with a total area of 100,500 km ² .
17	Supplemental Editing (Work in Japan)	The bathymetric data from the exiting charts with a total area of 58,000 km ² were incorporated to the digital topographic data which had incorporated the field completion data.
18	Bathymetric Data Production	The data from field completion and addition place names from the TCC members were edited to finalize the 1:50,000 digital topographic data.
19	Data Structurization (Work in Japan)	Structurizaition was performed to create digital data used for GIS from the final digital topographic data edited in the process of supplemental editing.
20	Map Symbolization (Work in Japan)	The final data from the supplemental editing process was used to create symbolized data for printing.
21	Data File Preparation (Work in Japan)	The data for GIS, data for printing and ortho-photo map data at a scale of 1:50,000 were organized and stored in DVD.
22	Holding a Technology Transfer Seminar (Work in the Philippines)	The technology transfer seminar was held twice: November 7, 2012 in Davao; and November 9, 2012 in Cagayan de Oro. The results of capacity assessment were reported and tutorial videos for basic operation were distributed.
23	Preparation of Draft Final Report (Work in Japan)	The Draft Final Report which includes all the aspects of the Project, was prepared.
24	Discussion of Draft Final Report (Work in the Philippines)	The contents of the Draft Final Report were discussed and agreed.
25	Preparation of Final Report (Work in Japan)	As reflecting the results of the discussion on the Draft Final Report, the Final Report was prepared.