

フィリピン国
気象観測・予測・警報能力向上プロジェクト
業務完了報告書

添 付 資 料

1. Project Design Matrix (PDM) Version 1.0
2. 業務フローチャート
3. 専門家派遣実績 (要員計画)
4. 合同調整委員会 (JCC) 議事録

Logical Framework (Project Design Matrix: PDM) (Version-1)

Project title: Project for Enhancing Capacity on Weather Observation, Forecasting and Warning

Project period: Three years (2014 – 2016)

Target group: PAGASA¹ Central Office; Southern Luzon PRSD² (as pilot) and other PRSDs (as non-pilot); Three Meteorological Radar Observation Stations (Virac/ Apari/ Guiuan); and LGUs

Target area: Operation areas of Southern Luzon PRSD (direct target); the whole country (indirect target)

Narrative Summary	Objectively Verifiable Indicators ³	Means of Verification	Important Assumptions
Super Goal: Weather related disaster is mitigated.			
Overall Goal: Capacity of all PRSDs is enhanced in terms of weather observation, forecasting and warning.	1. More than 80% of LGUs in non-pilot PRSDs agree that laymanized meteorological information is timely delivered to them.	Results of questionnaires to concerned actors	
Project Purpose: Capacity of PAGASA Central Office and Southern Luzon PRSD is enhanced in terms of weather observation, forecasting and warning.	1. Average operation rate (i.e. data are provided to PAGASA from radars) of three radars becomes more than 80% in the third year. 2. Quantitative forecasting is issued by using weather guidance. 3. More than 80% of concerned actors (i.e. OCD; PCG; LGUs in pilot PRSD) agree that laymanized meteorological information is timely delivered to them in the third year.	Data record at Central Office Issued forecast Results of questionnaires to concerned actors	Government policy on PAGASA's mandate is unchanged.
Output 1: Capacity on weather observation is improved.	1-1 Traceability of Instrument is improved through development of reference guides regarding maintenance and calibration. 1-2 Capability of more than 80% of staff engaged in the maintenance and calibration of SYNOP/ AWS stations and RADAR stations is enhanced. 1-3 Maintenance reports on respective equipment (i.e. radars, synop stations and AWS) are regularly prepared and reported to the PAGASA Central Office.	Instrument traceability record. Result of pre and post training evaluation conducted by the project Maintenance reports	
Output 2: Capacity on meteorological data analysis and forecasting is improved.	2-1 Capability of 80% of the operational staff on the use of SATAID is improved. 2-2 Software for RADAR data calibration with rain gage data is developed. 2-3 Weather guidance is developed.	Pre and post training evaluation is conducted. Development of RADAR-AWS software. Weather guidance	
Output 3: Criteria of warnings are elaborated at Southern Luzon PRSD.	3-1 Criteria of warnings are made at the provincial level.	Criteria of warnings	

<p>Output 4: Content and accessibility of meteorological information are improved.</p>	<p>4-1 Laymanized and professional information are differentiated at PAGASA's website. 4-2 Meteorological information is timely transmitted by PAGASA Central Office to concerned agencies particularly DRRMC</p>	<p>PAGASA's website Record on information transmission</p>					
<p>Output 5: Activities of awareness-raising on meteorological information are improved at Southern Luzon PRSD.</p>	<p>5-1 Program of awareness-raising is enhanced. 5-2 Result of the implementation of the program is reported.</p>	<p>Program plan Program reports</p>					
<p>Activities</p> <p>1.1 Monitor the operation of newly introduced three radars and identify issues in their operations. 1.2 Provide trainings for obtaining quality data from three radars including maintenance of facilities and equipment. 1.3 Develop a guideline and provide training on quality control of radar data. 1.4 Identify current status and issues on maintenance of AWS and Synop observatory at the Southern Luzon pilot PRSD. 1.5 Develop manuals and plans for calibration and maintenance, and inspection guideline of AWS and Synop observatory at Southern Luzon PRSD. 1.6 Provide training on calibration and maintenance based on the above plans at Central Office and Southern Luzon PRSD.</p> <p>2.1 Provide training on the operation of SATAID. 2.2 Develop software and provide training on methods to correct radar data by using surface observation data. 2.3 Provide training on weather guidance (Model Output Statistics). 2.4 Conduct of experiments on then use of GSM in WRF.</p> <p>3.1 Conduct survey on current situation of warning and identify their challenges. 3.2 Elaborate methods to improve warnings and make criteria of warnings based on the above findings.</p> <p>4.1 Identify challenges on the content of meteorological information. 4.2 Improve the content of meteorological information to be more user-friendly. 4.3 Improve ways of information dissemination to the concerned agencies particularly DRRMC. 4.4 Improve the content of website at Central Office and Southern Luzon PRSD.</p> <p>5.1 Select pilot province(s) for awareness raising activities.</p>	<p style="text-align: center;">Inputs</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">Japan side</th> <th style="width: 50%; text-align: center;">Philippines side</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;"> <p>1. Experts</p> <ul style="list-style-type: none"> • Chief Advisor/ Weather Forecasting • Surface Meteorological Observation • Radar Data Analysis • SATAID / Satellite Image Analysis • Meteorological Observation Technology • Weather Guidance • Operation and Maintenance of Radar • Weather Information / Information Technology • Weather Disaster Awareness Raising • Project Coordinator <p>2. Training in Japan</p> <p>3. Equipment</p> <ul style="list-style-type: none"> • Desktop Computer(s) • Printer(s) • Projector • Screen • Equipment related to training <p>4. Expenses</p> <p>Expenses necessary for the implementation of the Project</p> </td> <td style="vertical-align: top;"> <p>1. Counterpart personnel</p> <ul style="list-style-type: none"> • Project Director • Project Manager • Assistant Project Manager • Staff from Weather Division, PAGASA • Staff from Engineering and Technical Services Division, PAGASA • Staff from Research & Development and Training Division, PAGASA • Staff from Southern Luzon PRSD, PAGASA • Staff from National Capital Region PRSD, PAGASA <p>2. Project office and facilities</p> <p>3. Expenses</p> <p>Running expenses necessary for the implementation of the Project</p> </td> </tr> </tbody> </table>	Japan side	Philippines side	<p>1. Experts</p> <ul style="list-style-type: none"> • Chief Advisor/ Weather Forecasting • Surface Meteorological Observation • Radar Data Analysis • SATAID / Satellite Image Analysis • Meteorological Observation Technology • Weather Guidance • Operation and Maintenance of Radar • Weather Information / Information Technology • Weather Disaster Awareness Raising • Project Coordinator <p>2. Training in Japan</p> <p>3. Equipment</p> <ul style="list-style-type: none"> • Desktop Computer(s) • Printer(s) • Projector • Screen • Equipment related to training <p>4. Expenses</p> <p>Expenses necessary for the implementation of the Project</p>	<p>1. Counterpart personnel</p> <ul style="list-style-type: none"> • Project Director • Project Manager • Assistant Project Manager • Staff from Weather Division, PAGASA • Staff from Engineering and Technical Services Division, PAGASA • Staff from Research & Development and Training Division, PAGASA • Staff from Southern Luzon PRSD, PAGASA • Staff from National Capital Region PRSD, PAGASA <p>2. Project office and facilities</p> <p>3. Expenses</p> <p>Running expenses necessary for the implementation of the Project</p>	<p>Trained staff remain working at concerned stations and offices.</p>	
Japan side	Philippines side						
<p>1. Experts</p> <ul style="list-style-type: none"> • Chief Advisor/ Weather Forecasting • Surface Meteorological Observation • Radar Data Analysis • SATAID / Satellite Image Analysis • Meteorological Observation Technology • Weather Guidance • Operation and Maintenance of Radar • Weather Information / Information Technology • Weather Disaster Awareness Raising • Project Coordinator <p>2. Training in Japan</p> <p>3. Equipment</p> <ul style="list-style-type: none"> • Desktop Computer(s) • Printer(s) • Projector • Screen • Equipment related to training <p>4. Expenses</p> <p>Expenses necessary for the implementation of the Project</p>	<p>1. Counterpart personnel</p> <ul style="list-style-type: none"> • Project Director • Project Manager • Assistant Project Manager • Staff from Weather Division, PAGASA • Staff from Engineering and Technical Services Division, PAGASA • Staff from Research & Development and Training Division, PAGASA • Staff from Southern Luzon PRSD, PAGASA • Staff from National Capital Region PRSD, PAGASA <p>2. Project office and facilities</p> <p>3. Expenses</p> <p>Running expenses necessary for the implementation of the Project</p>						
			<p><u>Preconditions</u> N/A</p>				

<p>5.2 Assess local situation on the use of meteorological information.</p> <p>5.3 Analyze causes of weather related disasters.</p> <p>5.4 Identify challenges and propose list of activities to enhance awareness of local population on weather related disasters.</p> <p>5.5 Prepare materials for awareness raising activities.</p> <p>5.6 Conduct awareness raising activities and collect local feedback on awareness raising activities.</p>			
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Remark: 1. Philippine Atmospheric, Geophysical & Astronomical Services Administration

2. PAGASA Regional Services Division

3. Indicators should be refined upon the completion of the survey that is to be conducted during the initial 4-5 months of the project implementatio

Plan of Operation (Version-1)

	1 st Year				2 nd Year				3 rd Year			
	MJJ	ASO	NDJ	FMA	MJJ	ASO	NDJ	FMA	MJJ	ASO	NDJ	FMA
Output 1: Capacity on weather observation is improved.												
1.1 Monitor the operation of newly introduced three radars and identify issues in their operations.	■											
1.2 Provide training on maintenance for obtaining quality data from three radars.		■	■				■		■			
1.3 Develop a guideline and provide training on quality control of radar data.												
1.4 Identify current status and issues on maintenance of AWS and Synop observatory at Southern Luzon PRSD.	■											
1.5 Develop manuals and plans for calibration and maintenance, and inspection guideline of AWS and Synop observatory at Southern Luzon PRSD.		■			■		■			■		
1.6 Provide training on calibration and maintenance based on the above plans at the Central Office and Southern Luzon PRSD.			■			■			■		■	
Output 2: Capacity on meteorological data analysis and forecasting is improved.												
2.1 Provide technical training on the operation of SATAID.		■					■		■			
2.2 Develop software and provide training on methods to correct radar data by using surface observation data.					■		■		■		■	
2.3 Provide training on weather guidance (Model Output Statistics).				■		■			■			
2.4 Conduct of experiments on then use of GSM in WRF.								■	■	■		
Output 3: Criteria of warnings are elaborated at Southern Luzon PRSD.												
3.1 Conduct survey on current situation of warning and identify their challenges.	■											
3.2 Elaborate methods to improve warnings and make criteria of warnings based on the above findings.		■					■		■	■		
Output 4: Content and accessibility of meteorological information are improved.												
4.1 Identify challenges on the content of meteorological information.	■	■										
4.2 Improve the content of meteorological information to be more user-friendly.		■		■			■	■	■			
4.3 Improve ways of information dissemination to the concerned agencies particularly DRRMC.			■		■					■		
4.4 Improve the content of website at the Central Office and Southern Luzon PRSD.			■			■	■	■	■		■	
Output 5: Activities of awareness-raising on meteorological information are improved at Southern Luzon PRSD.												
5.1 Select pilot province(s) for awareness raising activities.	■	■										
5.2 Assess local situation on the use of meteorological information.							■			■	■	
5.3 Analyze causes of weather related disasters.			■	■	■		■			■		
5.4 Identify challenges and propose list of activities to enhance awareness of local population on weather related disasters.	■			■			■			■	■	
5.5 Prepare materials for awareness raising activities.		■		■				■				
5.6 Conduct awareness raising activities and collect local feedback on awareness raising activities.		■						■		■		

Workitem	Year	2014					2015					2016					2017								
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Domestic work 1																									
(1) Data collection and survey for making work plan		(1)																							
(2) Discussion on project basic policies and implementation methods		(2)																							
(3) Settlement of draft work plan		(3)																							
Field work																									
(4) Consultation for the W/P		(4)	(4)																						
(5) Baseline survey			(5)																						
Output1 Capacity on weather observation is improved.																									
(6) Analyze current status and issues for new Radar operation		(6)																							
(7) A draft of Radar maintenance manual			(7)																						
(8) Training for new Radar maintenance						(8)	(8)maintenance			(8)	(8)maintenance														
Confirmation of maintenance activities (15) with the maintenance manual at Radar sites																	(15)								
(9) Radar data quality control guideline			(9)																						
(10) Training for radar data quality control						(10)	(10 quality control			(10)	(10 quality control														
(11) Investigation for equipment at AWS/SYNOP observatories		(11)					training1				training2														
(41) Procurement of equipment			(41)																						
(12) 'Inspection guideline' and 'Calibration and maintenance manual'			(12)																						
(13) Action plan for equipment maintenance at AWS/ SYNOP station			(13) Draft				(13)revision			(13)revision															
(14) Training for AWS/ SYNOP maintenance						(14)	(14) calibration and maintenance			(14)	(14) calibration and maintenance														
Confirmation of maintenance activities (16) with the maintenance manuals at AWS/ SYNOP observatories							(16)			(16)	(16)														
Output2 Capacity on meteorological data analysis and forecasting is improved.																									
(17) Training on the operation of SATAID			(17) training1				(17)SATAID Temporary operation			(17) training2	(17)SATAID Full-scale operation														
(18) Training on methods to correct Radar data by using surface observation data			(18) training1				(18) Temporary operation			(18) training3	(18) Temporary operation														
(19) Training on weather guidance (Model Output Statistics)			(19) training1				(19) Temporary operation of			(19) training2	(19) Temporary operation														
(40) A training in Japan										(40) Training in Japan															

Project flowchart

Appendix 2

Workitem	2014				2015				2016				2017												
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
Output3 Criteria of warnings are elaborated at Southern Luzon PRSD.																									
(20) Conduct survey on current situation of warning and identify their challenges				(20)																					(37)
(21) Elaborate methods to improve warnings and make criteria of warnings based on the findings					(21)																				
(22) Trial operation of warning criteria and its improvement in Southern Luzon PRSD									(22)Temporary operation of internal	(22)Temporary operation	(22)Temporary operation					(22)revision									
(23) Operation of warning criteria in Southern Luzon PRSD																(23)Full-scale operation									(37)
Output4 Content and accessibility of meteorological information are improved.																									
(24) Identify challenges on the content of meteorological information				(24)																					(37)
(25) Improve the content of meteorological information					(25)				(25)Temporary	(25)	(25)Temporary operation	(25)	(25)Full-scale operation	(25)Full-scale operation											
(26) Improve ways of information dissemination to the concerned agencies particularly DRRMC						(26)																			
(27) Improve the content of website at Central Office and Southern Luzon PRSD						(27)improvement1	(27)Temporary operation	(27)improvement2	(27)Temporary operation	(27)improvement3	(27)Temporary operation	(27)improvement4	(27)Full-scale												
Output5 Activities of awareness-raising on meteorological information are improved at Southern Luzon PRSD.																									
(28) Select pilot province(s) for awareness raising activities				(28)																					(37)
(30) Analyze causes of weather related disasters							(30)Analyze1	(30)Analyze1	(30)Analyze2	(30)Analyze2	(30)Analyze3	(30)Analyze4	(30)operation												
(29) Assess local situation on the use of meteorological information					(29)																				
(31) Identify challenges to enhance awareness of local population on weather related disasters					(31)Challenges Analysis	(31)Analysis of local	(31)Analysis of local	(31)Analysis of local	(31)evaluation																
(32) Prepare materials for awareness raising activities					(32)Documentation	(32)Documentation	(32)Revision	(32)Revision																	
(33) Conduct awareness raising activities and collect local feedback on awareness raising activities					(33)test	(33)activities1 (local)	(33)activities2 (local)	(33)activities3 (local)	(33)activities4 (local)																
Others																									
(34) ~(37)(43)Reports							▲ WP1																		▲ PR
(38) Monitor and evaluate																									
(39) Seminars																									
(42) Revision of project brief note																									

Activities carried out by PAGASA

**MINUTES OF MEETING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL
AND ASTRONOMICAL SERVICES ADMINISTRATION,
DEPARTMENT OF SCIENCE AND TECHNOLOGY
ON
THE TECHNICAL COOPERATION PROJECT
FOR ENHANCING CAPACITY ON WEATHER OBSERVATION,
FORECASTING AND WARNING**

Japan International Cooperation Agency (hereinafter referred to as “JICA”), the Philippine Atmospheric, Geophysical and Astronomical Services Administration, The Department of Science and Technology (hereinafter referred to as “PAGASA-DOST”) and other Philippine authorities concerned have discussed several major issues during the First Joint Coordinating Committee Meeting for the Technical Cooperation Project for Enhancing Capacity on Weather Observation, Forecasting and Warning (hereinafter referred to as “The Project”). The list of the participants is shown in Appendix 1.

Both Philippine and Japanese sides exchanged views with respect to the desirable measures to be taken by the PAGASA-DOST and the Project Team for the successful implementation of the Project.

As a result of the discussions, the PAGASA-DOST and the Project Team have agreed on the matters referred in the document attached herewith.

Quezon City
18th July 2014

Mr. Nobuo Sato
Chief Advisor and Expert on Weather
Forecasting/Administration

Dr. Vicente B. Malano
Acting Administrator,
Philippine Atmospheric, Geophysical and
Astronomical Services Administration,
Department of Science and Technology

Witness by

Mr. Noriaki Niwa
Chief Representative
JICA Philippine Office

Highlights of the Meeting

The JICA Project Team (hereinafter referred to as The JICA Team) made the presentations on “Introduction of Project”, “Challenges of PAGASA”, “For Reliable and Friendly Weather Information” and “Coordination and Public Relations” and explained the main points of The Project as follows. (Appendix 2: Handouts of JCC meeting)

1, Overview of the Project

1-1, Background

In the last few decades, JICA and PAGASA have been cooperating in establishing the systems such as the Flood Forecasting and Warning System to mitigate and prevent natural disasters and improve socio-economic conditions. In order to protect life and property from tropical cyclone damage effectively, three (3) Doppler radars have been installed in Virac, Aparri and Guiuan under Japan’s Grant Aid Assistance scheme (signed on 13th November 2009) by the request of the Government of the Philippines. It is necessary that those procured equipment and installed systems are to be fully utilized for dissemination of the meteorological and disaster related information to the public and disaster management agencies. In order to strengthen the capacity to utilize the system and disseminate the information, The Project was requested by the Government of the Philippines and was inaugurated in June 2014.

1-2, Overall Goal

Capacity of all PAGASA Regional Services Divisions (hereinafter referred to as “PRSD”) is enhanced in terms of weather observation, forecasting and warning.

1-3, Outputs

Output 1: Capacity on weather observation is improved.

Output 2: Capacity on meteorological data analysis is improved.

Output 3: Criteria of warnings are elaborated at Southern Luzon PRSD.

Output 4: Contents and accessibility of meteorological information are improved.

Output 5: Activities of awareness rising on meteorological information are improved at Southern Luzon PRSD.

1-4, Project Area

National Capital Region (hereinafter referred to as NCR) and Southern Luzon PRSD

1-5, Experts

Long-term experts:

Mr. Nobuo Sato: Chief Advisor and Expert on Weather Forecasting/ Administration

Ms. Yumi Schultz: Project Coordinator and Expert on Public Relation/ Training Planning

Short-term experts:

Mr. Chuji Yamamoto: Leader of Short-term Expert team/ Weather Disaster Awareness Raising

Mr. Michihiko Tonouchi: Deputy Leader of Short-term Expert team/ SATAID

Mr. Hiroshi Matsubara: Weather Observation Technologies

Mr. Koji Mitsuhashi: Weather Information and ICT

Weather Guidance Expert

Radar Operation and Maintenance Expert

Weather Information Awareness Expert

1-6, Trainings

Nov. 2014: Guidance-1, SATAID-1

Feb. 2015: RADAR maintenance-1, RADAR data quality control-1,
AWS/SYNOP maintenance-1 and RADAR data usage-1

May 2015:Guidance-2

Jul. 2015: RADAR data usage-2

Oct. 2015:Guidance-3

Nov. 2015: RADAR maintenance-2, RADAR data quality control-2 and
AWS/SYNOP maintenance-2

Feb. 2016: SATAID-2 and RADAR data usage-3

1-7, Seminars

Nov. 2014: “Typhoon and storm surge”

Jul. 2015: “Disaster prevention activity at local level”

Mar. 2017: “Weather information for reduction of natural disaster risks”

1-8, Material Production

-RADAR maintenance manual (Maintenance manual, Maintenance report and Manual for troubles)

-RADAR data quality control guideline (Operation report, RADAR data quality control and Quality control manual)

-Manuals for maintenance and calibration

-Trial weather guidance for the pilot provinces

-Educational materials for public awareness

1-9, Revision of Project Design Matrix

The Project Design Matrix (hereinafter referred to as PDM) (Version-0) was once set as attached on 24th January 2014. However, concerning to the loss of Guiuan Radar in Eastern Samar, the support until September 2015 can be included into the project without revising the current PDM.

In addition, indicators should be reviewed to be practical ones through The Project coordinators’

meeting and mutual monitoring conducted by The JICA Team, PAGASA and JICA Philippine Office.

1-10, JCC members

Chairperson: Administrator of PAGASA

Members of Philippine Side

PAGASA: Weather Division, Engineering and Technical Service Division, HMD, R&D and Training, PRSD (Northern Luzon, NCR, Southern Luzon, Visayas, Mindanao)

DOST- International and Technical Cooperation Unit, NEDA, OCD, PCG, DepEd, DILG and Others appointed by PAGASA

Members of Japanese Side

Chief Representative of JICA Philippines

Experts dispatched by JICA

Mission Member dispatched by JICA

Other person(s) concerned appointed by JICA

2, Key Points of The Project

2-1, Challenges for PAGASA

The Project Chief Advisor identified that the quality assurance of observations including verification of forecast / warning products, exchange of observation data among governmental agencies and LGUs, coordination among Governmental agencies and the public, Numerical Weather Prediction (hereinafter referred to as NWP) development, high speed communication links nationally and Internationally, and automatization of daily tasks are significantly crucial.

2-2, Implementation Policies of The Project

The Project is implemented based on the following six (6) policies, (i) to transfer Japan's experience and skills under close coordination and cooperation with JMA, (ii) to conduct works based on WMO policies, (iii) to contribute to other countries through accurate observation and prompt data forwarding, (iv) to record all technical transfer activities (i.e. activities for radar operation, maintenance, AWS maintenance and inspection, radar data, SATAID, weather guidance usage, web site improvement and public awareness raising activities) into documents for reference and verification in the future, (v) to ensure appropriate technical skills to support the above (iv) transferred through the review and improvement of documents and (vi) to produce and improve public awareness materials based on feedback from users.

2-3, Public Awareness

In relation to public awareness, important keys are; (i) to take a holistic view of the public/target groups and end users; (ii) to determine appropriate media (mass media/print media/ internet and others) and; (iii) to ensure media is user friendly.

2-4, Counterpart Cost

JICA informed that the counterpart cost to be essentially covered by the Philippine side. The counterpart cost includes, i.e., the installation fee for JICA supported equipment, Counterpart (hereinafter referred to as C/P) domestic travel fee, and the registration fee for the conferences, etc. In case if there are difficulties for the Philippine side, JICA will consider covering the cost based upon the official request from the Philippine side.

2-5, Terms to be confirmed

*Materials for the baseline survey

- + Observation/maintenance manuals (Radar & Automatic Weather Observation System)
- + Forecast procedure manuals and guidelines
- + Weather information samples to be issued to the concerned authorities and to the public
- + Direct user list of weather information (include types of communication tool)
- + Educational activity schedule and materials

Discussions of the Meeting

The followings are the main subjects discussed and/or agreed during the JCC meeting.

1, Pilot Provinces for Awareness Raising Activities

The Philippine side requested to have pilot provinces excluding Albay province due to the reason that the level of disaster awareness in Albay province is relatively high compared to other provinces. The JICA Team explained that a pilot province can be re-examined; however, the pilot province must be within the pilot PRSD since all the outputs and activities are linked each other. Both side agreed to discuss further details in the coordinators' meeting in order to set the pilot province(s).

2, Radar Maintenance Training

The Philippine side requested to have the radar maintenance training not only for the personnel from Virac and Aparri radar stations, but also from Guiuan radar station and the Central Office. The JICA Team replied that the personnel from Guiuan radar station can also join the trainings in Virac and Aparri.

3, Collaboration with Philippines Meteorological Society

The Project manager (The Philippine side) is also the president of Philippines Meteorological Association (hereinafter referred to as PMS) and PMS has a close partnership with PAGASA since most of the members are from PAGASA. Therefore, the Project manager (The Philippine side) mentioned that PMA welcomes the idea to cooperate with The JICA Team. PMS conducts the annual convention, which is scheduled on November 2014 and invites the JICA Team as a resource speaker to introduce The Project.

4, Dvorak Technique Training

The Philippine side requested to have an additional lecture on Dvorak technique during the training on SATAID. The JICA Team replied that experts from Japan Meteorological Agency (hereinafter referred to as JMA) are scheduled to arrive at PAGASA in autumn 2015. The training will focus on the analyses of tropical disturbances including Dvorak techniques using images from the next generation Himawari-8 satellite, which will be launched in October 2014.

5, Numerical Weather Prediction

The Philippine side requested The JICA Team to draw up a Numerical Weather Prediction (hereinafter referred to as NWP) development plan for PAGASA. The JICA Team replied that it is essential to think of a long span of time since NWP requires a lot of technical expertise and time to operate it properly. The JICA Team added that a plan for NWP development in PAGASA can be provided considering the JMA plans / experiences.

6, Electronic Public Awareness Campaign

The Philippine side asked whether the project also deals with the electronic version of the public awareness campaign used in considering the growth of social media in the Philippines. The JICA Team replied that this matter will be discussed in The Project coordinators' meeting since the baseline survey team including an expert on Information and Communication Technology is scheduled to come in August 2014.

(End of discussion)

Appendix 1: List of participants of JCC meeting

Appendix 2: Hand-outs of JCC meeting

**MINUTES OF MEETING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL
AND ASTRONOMICAL SERVICES ADMINISTRATION,
DEPARTMENT OF SCIENCE AND TECHNOLOGY
ON
PROJECT FOR ENHANCING CAPACITY ON WEATHER OBSERVATION, FORECASTING
AND WARNING**

Japan International Cooperation Agency (hereinafter referred to as “JICA”), the Philippine Atmospheric, Geophysical and Astronomical Services Administration, The Department of Science and Technology (hereinafter referred to as “PAGASA-DOST”) and other Philippine authorities concerned have discussed several major issues during the Second Joint Coordinating Committee (hereinafter referred to as “JCC”) Meeting for the Project for Enhancing Capacity on Weather Observation, Forecasting and Warning (hereinafter referred to as “J-POW Project”) on 27th November, 2014 in Seameo Innotech. The list of the participants is shown in Appendix 1.

Both Philippine and Japanese sides exchanged views with respect to the desirable measures to be taken by the PAGASA-DOST and the Project Team for the successful implementation of the Project.

As a result of the discussions, the PAGASA-DOST and the Project Team have agreed on the matters referred in the document attached herewith.

Quezon City, 27th November 2014

Mr. Nobuo Sato
Chief Advisor and Expert on Weather
Forecasting/Administration

Witness by

Mr. Noriaki Niwa
Chief Representative
JICA Philippines Office

Dr. Vicente B. Malano
Acting Administrator,
Philippine Atmospheric, Geophysical and
Astronomical Services Administration,
Department of Science and Technology

Highlights of the Meeting

The JICA Philippine office made the presentation titled “Updates of JICA’s program” and explained the further strategy development at PAGASA. The JICA Project Team (hereinafter referred to as The J-POW project Team) made the presentations on “Status of J-POW Project”, “Presentation of revised PDM, PO and C/P list” and “Presentation on the Development of Quantitative Precipitation Forecast” and explained the current status of The Project as follows. (Appendix 2: Handouts of JCC meeting)

1, Updates of JICA’s program

In the last few decades, JICA and PAGASA have been cooperating in establishing the systems such as the Flood Forecasting and Warning System to mitigate and prevent natural disasters and improve socio-economic conditions.

2, Status of J-POW Project m

2-1, Output 1-a “Capacity development on Radar observation and Radar Data Quality Control”

In the last few decades, JICA and PAGASA have been cooperating in establishing the systems such as the Flood Forecasting and Warning System to mitigate and prevent natural disasters and improve socio-economic conditions.

2-2, Output 1-b “Capacity development on weather observation”

In the last few decades, JICA and PAGASA have been cooperating in establishing the systems such as the Flood Forecasting and Warning System to mitigate and prevent natural disasters and improve socio-economic conditions.

2-3, Output 2-a “Capacity development on weather forecast SATAID and Radar Connection”

In the last few decades, JICA and PAGASA have been cooperating in establishing the systems such as the Flood Forecasting and Warning System to mitigate and prevent natural disasters and improve socio-economic conditions.

2-4, Output 2-b “Capacity development on Weather Guidance”

In the last few decades, JICA and PAGASA have been cooperating in establishing the systems such as the Flood Forecasting and Warning System to mitigate and prevent natural disasters and improve socio-economic conditions.

2-5, Output 3 “Criteria of warnings are elaborated at Southern Luzon PRSD”

In the last few decades, JICA and PAGASA have been cooperating in establishing the systems such as the Flood Forecasting and Warning System to mitigate and prevent natural disasters and improve socio-economic conditions.

2-6, Output 4 “Improvement of contents and accessibility on meteorological information”

In the last few decades, JICA and PAGASA have been cooperating in establishing the systems such as the Flood Forecasting and Warning System to mitigate and prevent natural disasters and improve socio-economic conditions.

2-7, Output 5 “Improvement of awareness-raising activities at Southern Luzon PRSD”

In the last few decades, JICA and PAGASA have been cooperating in establishing the systems such as the Flood Forecasting and Warning System to mitigate and prevent natural disasters and improve socio-economic conditions.

3, Presentation of revised PDM, PO and C/P list

3-1, PDM

In the last few decades, JICA and PAGASA have been cooperating in establishing the systems such as the Flood Forecasting and Warning System to mitigate and prevent natural disasters and improve socio-economic conditions.

3-2, PO

In the last few decades, JICA and PAGASA have been cooperating in establishing the systems such as the Flood Forecasting and Warning System to mitigate and prevent natural disasters and improve socio-economic conditions.

3-3, C/P list

In the last few decades, JICA and PAGASA have been cooperating in establishing the systems such as the Flood Forecasting and Warning System to mitigate and prevent natural disasters and improve socio-economic conditions.

4, Presentation on the Development of Quantitative Precipitation Forecast

1-1, Background

In the last few decades, JICA and PAGASA have been cooperating in establishing the systems such as the Flood Forecasting and Warning System to mitigate and prevent natural disasters and improve socio-economic conditions.

In order to protect life and property from tropical cyclone damage effectively, three (3) Doppler Radars have been installed in Virac, Aparri and Guiuan under Japan's Grant Aid Assistance scheme (signed on 13th November 2009) by the request of the Government of the Philippines. It is necessary that those procured equipment and installed systems are to be fully utilized for dissemination of the meteorological and disaster related information to the public and disaster management agencies. In order to strengthen the capacity to utilize the system and disseminate the information, The Project was requested by the Government of the Philippines and was inaugurated in June 2014.

1-2, Overall Goal

Capacity of all PAGASA Regional Services Divisions (hereinafter referred to as "PRSD") is enhanced in terms of weather observation, forecasting and warning.

1-3, Outputs

Output 1-a: Capacity development on Radar observation and Radar Data Quality Control

Output 1-b: Capacity development on weather observation.

Output 2-a: Capacity development on weather forecast SATAID and Radar Connection.

Output 2-b: Capacity development on Weather Guidance

Output 3: Criteria of warnings are elaborated at Southern Luzon PRSD.

Output 4: Improvement of contents and accessibility on meteorological information.

Output 5: Improvement of educational activities in Southern Luzon PRSD.

1-4, Project Area

National Capital Region (hereinafter referred to as NCR) and Southern Luzon PRSD

1-5, Experts

Long-term experts:

Mr. Nobuo Sato: Chief Adviser and Expert on Weather Forecasting/ Administration

Ms. Yumi Schultz: Project Coordinator and Expert on Public Relation/ Training Planning

Short-term experts:

Mr. Chuji Yamamoto: Leader of Baseline Survey team/ Raising Public Disaster Awareness Expert

Mr. Michihiko Tonouchi: Deputy Leader/SATAID
Mr. Hiroshi Matsubara: Weather Observation Technologies
Mr. Koji Mitsuhashi: Weather Information and ICT
Mr. Ryusuke Taira - Weather Guidance Expert
Mr. Hiroshi Yamaguchi - Radar Operation and Maintenance Expert
Ms. Shizuko Komatsu – Raising Public Awareness Expert

1-6, Trainings

Nov. 2014: Guidance-1, SATAID-1
Feb. 2015: Radar maintenance-1, Radar data quality control-1,
AWS/SYNOP maintenance-1 and Radar data usage-1
May 2015: Guidance-2
Jul. 2015: Radar data usage-2
Oct. 2015: Guidance-3
Nov. 2015: Radar maintenance-2, Radar data quality control-2 and
AWS/SYNOP maintenance-2
Feb. 2016: SATAID-2 and RADAR data usage-3

1-7, Seminars

Nov. 2014: “Typhoon and storm surge”
Jul. 2015: “Disaster prevention activity at local level”
Mar. 2017: “Weather information for reduction of natural disaster risks”

1-8, Material Production

-Radar maintenance manual (Maintenance manual and report; and Troubleshooting Manual)
-Radar data quality control guideline (Operation report, Radar data quality control and Quality control manual)
-Manuals for maintenance and calibration
-Trial weather guidance for the pilot provinces
-Educational materials for public awareness

1-9, Revision of Project Design Matrix

The Project Design Matrix (hereinafter referred to as PDM) (Version-0) has one set attached on 24th January 2014. However, concerning to the loss of Guiuan Radar in Eastern Samar, the support until September 2015 can be included into the project without revising the current PDM.

In addition, indicators should be reviewed to be practical once through Project coordination meeting and mutual monitoring conducted by JICA Team, PAGASA and JICA Philippine Office.

1-10, JCC members

Chairperson: Administrator of PAGASA

Members of Philippine Side

- I. PAGASA: Weather Division, Engineering and Technical Service Division, FPMD, RDTD, PRSD (NCR, Northern Luzon, Southern Luzon, Visayas and Mindanao)

DOST- International and Technical Cooperation Unit, NEDA, OCD, PCG, DILG, PCIEERD and Others appointed by PAGASA

Members of Japanese Side

Chief Representative of JICA Philippines
Experts dispatched by JICA
Mission Member dispatched by JICA
Other person(s) concerned appointed by JICA

2, Key Points of the Project

2-1, Challenges for PAGASA

The Project Chief Advisor identified that the quality assurance of observations including verification of forecast / warning products, exchange of observation data among government agencies and LGUs, coordination among Government agencies and the public, Numerical Weather Prediction (hereinafter referred to as “NWP”) development, high speed communication links national and International, and automation of daily tasks are significantly crucial.

2-2, Implementation Policies of the Project

The Project is implemented based on the following six (6) policies, (i) to transfer Japan’s experience and skills under close coordination and cooperation with JMA, (ii) to conduct works based on WMO policies, (iii) to contribute to other countries through accurate observation and prompt data forwarding, (iv) to record all technical transfer activities (i.e. activities for Radar operation, maintenance, AWS maintenance and inspection, Radar data, SATAID, weather guidance usage, web site improvement and public awareness raising activities) into documents for reference and verification in the future, (v) to ensure appropriate technical skills to support the above (iv) to conduct training activities through continuous verification and evaluation of processes and outputs and (vi) to produce and improve public awareness materials based on feedback from users.

2-3, Public Awareness

In relation to public awareness, important keys are; (i) to take a holistic view of the public/target groups and end users; (ii) to determine appropriate media (mass media/print media/ internet and others) and; (iii) to ensure media is user friendly.

2-4, Counterpart expenditure

JICA informed that the counterpart expenses to be essentially covered by the Philippine side. The counterpart expenses include, i.e., the installation fee for JICA supported equipment, Counterpart (hereinafter referred to as C/P) domestic travel fee, and the registration fee for the conferences, etc. In case if there are difficulties from Philippine side, JICA will consider to shoulder the expenses upon the official request of the Philippine side.

2-5, Terms to be confirmed

*Materials for the baseline survey

- + Observation/maintenance manuals (Radar& Automatic Weather Observation System)
- + Forecast procedure manuals and guidelines
- + Weather information samples to be issued to the concerned authorities and to the public
- + Direct user list of weather information (include types of communication tool)
- + Educational activity schedule and materials

Discussions of the Meeting

- I. The meeting started at 09:25AM
- II. The meeting was presided over and call to order by Acting Administrator Dr. Vicente Malano and gave an overview of the project and some issues raised during the last JCC Meeting that was held last July. Thanking the support of the JICA Experts on this project and the participants attended the meeting.
 - Dr. Landrico Dalida welcoming the attendees presents on this meeting and gave some introduction of the project.
 - Some remarkable words from Mr. Takahiro Morita, Senior Representative of JICA Philippine Office, thanking PAGASA for acknowledging this on-going J-POW Project.
- III. The first presentation was presented by Mr. Hayato Nakamura, Project Formulation Adviser, updating everyone on the on-going JICA program. Since PAGASA have requested JICA to support awareness activities, JICA had formed two groups, which are the JOCV and SV. JICA also send a short term volunteer for Yolanda rehabilitation. The groups have started the awareness activity in Albay and Leyte. In January next year, the group will start to distribute the awareness materials in Antique and Kalibo, Aklan. Also JICA creates a partnership program with counterparts from Japan in different regions but this project still for preparation for the next project of JICA with PAGASA. Yolanda Rehabilitation is until March 2015. Dr. Malano commended this rehabilitation as a fast track project in Guiuan. J-POW Project has plans in PRSD for awareness on February 2015. J-POW will expand the awareness plan in Visayas and other regions. July is the month of awareness activity. Hoping that other regions will also benefit in this awareness activity led by PAGASA.
- IV. The second presenter is Mr. Chuji Yamamoto, the Leader of the Technical Expert Team for the progress of J-POW Project. He gave some introduction of the project which start last May 2014 and expected to finish by March or August 2017. Started to discussed the following output:
 - a. Output 1-a (Radar maintenance and operation). Keyword for this activity issues on operation, maintenance of facilities and equipment and guideline which provide training on quality control.

Mr. Yamamoto recommends comprehensive manuals, for operation skills of generators, power supply and radar. The team had visited the radar sites in Aparri, Viract and Guiuan. The following are the status of their observations and reports. Consumables and inspection are not effectively used in some sites. Some generators operating hours are not in good condition example in Aparri 100hrs/mon, Virac 160hrs/mon and Guiuan 500hrs/mon in which Guiuan should have 702hrs/mon and should operate 17hrs per day. In Guiuan the generator fuel cannot read and need to change the battery to run operationally. The only operating hours read from Guiuan radar is 2000hrs in 4mon. Mr. Yamamoto also recommends a periodic inspection of the machine, review and upgrade of the comprehensive manual to develop data quality control guidance and conducting training for maintenance and observation data. In connection with Output 1-a, some information have been raised by Dr. Malano.

 - *Dr. Malano asked the team if there are investigations made to discover the problem encountered in the generator that was used only half of the month in radar site while this generator are frequently used than the commercial power.*
 - *As per Mr. Sato, commercial power is frequently unstable which due to trigger the problem of generator.*
 - *As per Dr. Malano, the problems encountered from the Radar site are due to the supply of commercial power not by PAGASA.*
 - *Mr. Yamamoto confirmed that it is not a problem of PAGASA because of unstable commercial*

power change and the status is recorded in the report.

- b. Output 1-b (Surface observation, calibration and inspection). The keyword is Traceability system international (SI) an example of this is the degrees in temperature in one country which should not be different from other country. This activity is to identify the current status and issues on maintenance and training for calibration and maintenance of AWS and Synop observatory in SL PRSD. Because the Virac radar site covers the pilot province of Sorsogon and Northern Samar but has different calibration result, in which they have supposed to have the same result. An exchange of question and answer has been raised.
- *Ms. Bobot asked regarding traceability, if it suggest all calibration data should be available to PAGASA which pertains to AWS. Mr. Yamamoto said that traceability is also recommended by WMO.*
 - *Mr. Matsubara suggests to PAGASA a proper maintenance of AWS system, as the result of the survey found that there are defective AWS on the site.*
 - *According to Dr. Malano, it is hard to maintain the AWS when it has no manual instrumentation, but those that has, AWS are properly maintained.*
 - *Dir. Tabell of DILG, asked that although AWS has function to measure the temperature, rain gauge, etc., is there other devices provided by AWS which have different components.*
 - *According to Dr. Malano, it is depend on the manufacturers that provide AWS, as other manufacturer can integrate other functions to other system like AWS manufactured by Data Logger.*
- c. Output 2-a (SATAID and Radar data analysis). The keyword is SATAID means Satellite Animation and Interactive Diagnosis provide by JMA which has many functions for weather analysis and quantitative weather forecast and QPE means Quantitative Precipitation Estimation is to get an accurate result and to correct Radar data in intensity of rainfall and rain gauge data, which launched last October, through a proper arrangement if this is still operational until July, the team will conduct a SATAID training. Currently, SATAID are already used in WFS, TAMSS, AMSS and MDIES to monitor cloud situation and NWP forecast. But Radar data and AWS data are not used for SATAID. QPE confirmed rain gauge station which can provide hourly precipitation data is almost 40. Mr. Yamamoto recommends using SATAID by PAGASA and QPE to use in Virac. Sharing of information between PAGASA and JICA experts.
- *Dr. Malano asked the team if SATAID is capable of integrating all radar data. Mr.Sato answered this as NO, as this is not provided in the software itself. This was previously discussed by Mr. Tonouchi to PAGASA that during the baseline survey, he requests to PAGASA to provide him the data format of the power radar so that he will search for the software and he promised to find ways to integrate the PAGASA radar to SATAID program.*
 - *Dr. Malano, asked in case the radar is Japanese made, should all the radar data have the same format, if that is the case all radar formats can be integrated in SATAID. This was confirmed by Raymond to Dr. Malano.*
 - *Dr. Malano asked the team if by using the existing facilities of PAGASA, can PAGASA received information from Himawari without any upgrading. As per Mr. Sato, in using Himawari, it could be 15x more high speed in receiving data.*
 - *Dr. Malano suggests to upgrade the existing facilities in order to receive all Himawari data through internet.*
- d. Output 2-b (Weather Guidance). The keyword is Weather Guidance a method to translate GPV means Grid Point Value which was resulted to Numerical Weather Prediction output to contact weather forecast. Weather guidance improved the 3 hourly data of Synop observation and should be archived as digital basis. It should be recorded in real time basis.
- e. Output 3 (Criteria of warning are elaborated in SLPRSD) to discuss by Mr. Sato.

- f. Output 4 (Content and accessibility of meteorological information) to improve the web information and to be more user friendly. Dissemination of weather forecast to DRRMO and other concerned government agencies. PAGASA Web pages have found mixed information. Comments and suggestions are shared.
- *Dr. Malano asked the team if they made an assessment considering Project NOAH site for meteorological services, this should be integrated with PAGASA website.*
 - *Dr. Malano asked for some justification on how the media raised the awareness of the people yet all the weather information are coming from PAGASA.*
 - *Dr. Cayanan asked to elaborate the “mixed” with other information in website, will PAGASA need to separate the website of PAGASA H.O. to PRSD. Mr. Yamamoto explains that upon observation, the website of NCR PRSD are different from Southern Luzon PRSD.*
 - *According to Dir. Tabell of DILG, on their observation, PAGASA website is already improved, he suggests that the homepage should show the current information on real time weather updates.*
 - *Dr. Malano suggests the team to organise the PAGASA website.*
 - *Mr. Yamamoto assured PAGASA that they will improve the website by February and will add more new ideas for improvement of the website with consultation and approval of PAGASA before implementation.*
- g. Output 5 (Awareness raising activity). Select a pilot province to assess the situation and to prepare materials for awareness raising activity. This activity also conducted in PAGASA head office and SLPRSD. The team will provide pamphlets, posters for the improvement of educational materials.
- *Dr. Malano inquires the team, if there are activities related to DepEd for the elementary grades school, example of it is pamphlets leaflets and flyers. (comics, etc.)*
 - *As per Ms. Yumi, during their previous visit in Southern Luzon, they observed that DepEd need to be provided and to distribute educational materials in schools. Dr. Malano suggests to use a special design for the young ones.*
 - *Dr. Cayanan suggests the assessment to launch this through Google global information system for dissemination of public awareness activity.*
- V. Mr. Sato reported the updates of Logical Framework (Project Design Matrix: PDM). Mr. Sato also raised some issues during the last JCC and giving an update on each issue.
- *Dr. Malano suggests to include in Project Purpose of OVI as no. 4 “More than 80% of forecasters pass on the use of Numerical Methodology products”. Dr. Cayanan also suggests to include the suggestion of Dr. Malano. (for further discussion with JICA)*
 - *Dr. Malano suggests to include in Project Purpose of Output 2. In OVI “the capacity building of regional forecaster and for meteorology group with the use of SATAID since JMS provides data of output and how to interpret data from GSM and ABS”. (for further discussion on coordination meeting)*
 - *Ms. May Ash from NEDA raised some question, regarding capacity building should consider a turn over personnel of PAGASA to induced the knowledge system, the information are stated with the organization (As Dr. Malano, the aspect of turnover of personnel PAGASA will be addressed to the organization of PAGASA, for further discussion)*
- VI. Mr. Raymond presented the updated list of counterpart that during the 1st JCC Meeting, it was only presented by Project Director, Project Manager and Coordinator from PAGASA. Currently, PAGASA added the counterpart from different division. And since the project has 5 Outputs, PAGASA in addition presented a creation of Technical Working Group (TWG) to focus on achievement of each output. To name the group as Meteorological Instrument Group, Radar Maintenance Group, SATAID Group, Weather Guidance Group, Web Information Group and Public Awareness Group. QPE on data calibration group will be discussed tomorrow on the Special Seminar.

VII. Quantitative Precipitation Forecast was presented by Mr. Nobuo Sato, Chief Adviser of J-POW Project. The two ways of forecast rainfall are Kinematic and Dynamic. Kinematic is time extrapolation of heavy rainfall area (QPF) and Dynamic is solving the fluid dynamics equations (NWP). The most advanced NWP research carried out 11 Peta Flops computer (K-computer) means 1000 times of computer. Showing an example of the forecast rainfall 18 hours beforehand.

To know the precipitation areas QPE should be carried out and by tracking a heavy precipitation area, QPF was developed. The improvement of accuracy is in reference to the online data of ARG and JMA observation data.

The warning is already issued in every municipality. The QPE and QPF are now used to compute Soil water index and Runoff index; QPE, QPF and SWI are used in warning in landslide; QPE, QPF and Runoff Index used to issue warnings on flooding.

Mr. Sato presented a setting Criteria of Warning/Advisory. The Scattered Diagram easily defines the measurement precipitation of rainfall showing the result of rainfall.

Though K-computer is not enough, Riken is developing Exa Flops computer means 100,000 times of computer in order to predict intense & torrential precipitation. JMA upgrade their computer system every 5 years. Mr. Sato recommends the needs of more observation data, weather data and more automatic rain gauges.

- DILG, Dir. Tabell pledged to donate one(1) ARG to PAGASA.
- As per Dr. Cayanan, the presentation is carried out in the situation in Japan. Dr. Cayanan asked to assess the situation to forecast an hourly or at least linear.
- As per Mr. Sato, PAGASA should use the random observation to AWS to increase the number of ARG database. Time is not too expensive to resolve ARG.
- According to Dr. Malano, Japan has 800mm of rain fall in five days and Philippines have 1000mm of rain fall in one day.
- PAGASA continuously improving their services, planning to assert more facilities the number of observations. Furthermore, there are also private observatory company around. Dr. Malano suggests the other observatory facilities must be integrate with the observation facilities of PAGASA. Although PAGASA has existing 2000 observation facilities.
- For preparation of soil water index, will be provide by JICA Philippine office as per request by Dr. Manalo.
- OCD, requires LGUs on NDRRM post.
- For PAGASA, 187 have some stations installed a river basins
- Project NOAH established more than 1000 river basins
 - o 600 AWS
 - o 400 ARG
- All are integrated in PAGASA system.

Closing remarks from Dr. Cayanan and assured everyone for more improvement in products and services in the near future as the purpose of this project. Thanking everyone for continued support to PAGASA. Also thank the JICA for the support.

(End of discussion)

Appendix 1: List of participants of JCC meeting

Appendix 2: Hand-outs of JCC meeting

MINUTES OF MEETING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL
AND ASTRONOMICAL SERVICES ADMINISTRATION,
DEPARTMENT OF SCIENCE AND TECHNOLOGY
ON
PROJECT FOR ENHANCING CAPACITY ON WEATHER OBSERVATION,
FORECASTING AND WARNING

Japan International Cooperation Agency (hereinafter referred to as "JICA"), the Philippine Atmospheric, Geophysical and Astronomical Services Administration, The Department of Science and Technology (hereinafter referred to as "PAGASA") and other Philippine authorities concerned have discussed several major issues during the Third Joint Coordinating Committee (hereinafter referred to as "JCC") Meeting for the Project for Enhancing Capacity on Weather Observation, Forecasting and Warning (hereinafter referred to as "J-POW Project") on 9th July 2015 in PAGASA.

Both Philippine and Japanese sides exchanged views with respect to the desirable measures to be taken by the PAGASA and the Project Team (hereinafter referred to as "the Team") for the successful implementation of the Project.

As a result of the discussions, the PAGASA and the Team have agreed on the matters referred in the document attached herewith.

Quezon City, 9th July 2015

Mr. Nobuo Sato
Chief Advisor and Expert on Weather
Forecasting/Administration
J-POW Project

Dr. Vicente B. Malano
Acting Administrator
Philippine Atmospheric, Geophysical and
Astronomical Services Administration,
Department of Science and Technology

Witness by

Mr. Takahiro Morita
Senior Representative
JICA Philippines Office

Dr. Esperanza O. Cayanah
Chief
Weather Division
Philippine Atmospheric, Geophysical and
Astronomical Services Administration,
Department of Science and Technology

Highlights and Discussions of the Meeting

The Team and PAGASA Counterparts made the presentations on “J-POW Project Progress Report” for each output followed by the video presentation named “1st Year Anniversary: J-POW project”. The JICA training plan in Japan scheduled in October of 2015 (Appendix1: Agenda of 3rd JCC meeting) was also introduced. After the presentations, the revised Project Design Matrix (hereinafter referred to as “PDM”) version 1 was proposed by PAGASA and the revised PDM and other matters regarding the Project were discussed. The main issues presented, discussed and terms agreed are as follows:

1. Revision of PDM

PAGASA proposed revisions of PDM from version-0 to Version-1 as follows:

Activities

- 1) “2-4 Conduct of experiments on the use of Global Spectral Model (GSM) in Weather Research and Forecasting (WRF).” should be added.
- 2) The phrase of “and propose list of activities“ should be inserted in the statement of 5-4.

Objectively Verifiable Indicators (OVI)

- 3) 1-1, 1-2, 2-1 and 2-2 are described as practical indicators shown in Appendix 2.

Means of Verification (MV)

- 4) 1-1, 1-2, 2-1 and 2-2 are described as practical means shown in Appendix 2.
- 5) The word ‘Action Plan’ in MV 5-1 and 5-2 should be replaced by ‘Program’ to cover Output 5 activities properly.

JCC members discussed the proposed PDM as follows:

Major discussion regarding revisions of PDM

1) Activity 2-4

JCC members confirmed and agreed to add Activity 2-4 by giving advices to PAGASA who will conduct experimental runs using WRF model with Japan Meteorological Agency (JMA) GSM as input data.

2) Activity 4-2

PAGASA mentioned the necessity to enhance its mobile application and JCC members agreed that the enhancement of mobile application is included under the existing activity “4-2 Improvement the contents of meteorological information to be more user-friendly”.

3) Activity 5-4

JCC members agreed to add the phrase to Activity 5-4 to describe Output 5 activities properly.

4) OVI and MVs

JCC members agreed to revise OVI and MVs as proposed.

Finally JCC members agreed on the revisions mentioned above and proposed to JICA the revised PDM Version-1. The revisions made on PDM are shown in the table below and the PDM Version-1 and Plan of Operation Version-1 are attached as Appendix 2.

[Revision on PDM]

Revised PDM	PDM version 0
Activities	
<u>2-4 Conduct of experiments on the use of GSM in WRE.</u>	
5-4. Identify challenges <u>and propose list of activities</u> to enhance awareness of local population on weather related disasters.	5-4. Identify challenges to enhance awareness of local population on weather related disasters
OVI	
5-1 <u>Program</u> of awareness-raising is enhanced.	5-1 Action plan of awareness-raising is enhanced.
5-2 Result of the implementation of the <u>program</u> is reported.	5-2 Result of the implementation of action plan is reported.

2. Miscellaneous

1) Radar

PAGASA informed that the communication system via VSAT of Aparri radar has problems due to salty winds and the observed data cannot be sent by via VSAT. PAGASA already reported to the manufacturer of the radar about the situation and requested to take relevant measures. However, the problems have not been solved.

PAGASA also informed that Virac radar has electric power fluctuation which brings frequent use of power generator and may cause severe damage to the radar. PAGASA requested the Team to propose a recommendation plan to protect the radar from such fluctuation. The team informed that they would formulate a set of recommendations for PAGASA.

2) PAGASA Services Handbook

The Team proposed to produce 'PAGASA Services Handbook' to be launched during the "World Meteorological Day" on 23rd March 2017 and asked that an editorial board is to be organized in July to August of 2015. PAGASA recommended including the Congress as one of the stakeholders. JCC agreed to the above proposal and recommendation.

(End of meeting)

Appendixes:

1. Agenda of 3rd JCC meeting
2. PDM Version-1 and Plan of Operation Version-1

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3rd Joint Coordination Committee (JCC) Meeting for J-POW PROJECT
(JICA Project for Enhancing Capacity on Weather Observation, Forecasting and Warning)

Amihan Conference Room, Science Garden, PAGASA
9:00 AM - 12:00 PM on 9th July 2015

Agenda

08:30 AM

Registration

09:00 - 09:20 AM

Welcome Remarks:

Dr. Vicente B. Malano

Acting Administrator, PAGASA and Project Director, J-POW

Opening Message:

Mr. Takahiro Morita

Senior Representative, JICA Philippine Office

09:20 - 09:30 AM

"1st Year Anniversary: J-POW Project"

09:30 - 10:45 AM

"J-POW Project Progress Report"

Weather Observation (Output-1), Meteorological Data Analysis (Output-2a) and Meteorological Information (Output-4)

Mr. Michihiko Tonouchi

Deputy Leader, Technical Expert Team, J-POW Project

Weather Guidance (Output-2b)

Dr. Masao Mikami

Deputy Leader, Technical Expert Team, Japan Meteorological Business Support Center

Mr. Raymond C. Ordinario

Weather Specialist I, Weather Division, PAGASA

Warning Criteria (Output-3)

Mr. Nobuo Sato

Chief Advisor and Expert on Weather Forecasting/Weather Administration, J-POW Project

"SL-PRSD's Heavy Rainfall Warning System" (Output-3)

Ms. Lilian N. Guillermo

Senior Weather Specialist, SL-PRSD, PAGASA

Awareness Raising Activities (Output-5)

Dr. Masao Mikami

JICA Training in Japan

Mr. Ryusuke Taira

Expert on Weather Guidance, J-POW Project

J-POW Project PR

Yumi Schultz

Project Coordinator/ Public Relations Specialist, J-POW Project

10:45 - 11:00 AM

Break

11:00 - 11:15 AM

"Presentation of the Revised Project Design Matrix (PDM) "

Dr. ESPERANZA O. CAYANAN

11:15 - 11:50 AM

Open Forum

11:50 - 12:00 NN

Closing Remarks

Dr. ESPERANZA O. CAYANAN

Chief, Weather Division, PAGASA and Project Manager, J-POW

12:00 NN-

Lunch

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Logical Framework (Project Design Matrix: PDM) (Version-1)

Project title: Project for Enhancing Capacity on Weather Observation, Forecasting and Warning

Project period: Three years (2014 – 2016)

Target group: PAGASA¹ Central Office; Southern Luzon PRSD² (as pilot) and other PRSDs (as non-pilot); Three Meteorological Radar Observation Stations (Virac/ Apari/ Guiuan); and LGUs³

Target area: Operation areas of Southern Luzon PRSD (direct target); the whole country (indirect target)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Super Goal: Weather related disaster is mitigated.			
Overall Goal: Capacity of all PRSDs is enhanced in terms of weather observation, forecasting and warning.	1. More than 80% of LGUs in non-pilot PRSDs agree that laymanized meteorological information is timely delivered to them.	Results of questionnaires to concerned actors	
Project Purpose: Capacity of PAGASA Central Office and Southern Luzon PRSD is enhanced in terms of weather observation, forecasting and warning.	1. Average operation rate (i.e. data are provided to PAGASA from radars) of three radars becomes more than 80% in the third year. 2. Quantitative forecasting is issued by using weather guidance. 3. More than 80% of concerned actors (i.e. OCD ⁴ ; PCG ⁵ ; LGUs in pilot PRSD) agree that laymanized meteorological information is timely delivered to them in the third year.	Data record at Central Office Issued forecast Results of questionnaires to concerned actors	Government policy on PAGASA's mandate is unchanged.
Output 1: Capacity on weather observation is improved.	1-1 Traceability of Instrument is improved through development of reference guides regarding maintenance and calibration. 1-2 Capability of more than 80% of staff engaged in the maintenance and calibration of SYNOP/ AWS ⁶ stations and radar stations is enhanced. 1-3 Maintenance reports on respective equipment (i.e. radars, synop stations and AWS) are regularly prepared and reported to the PAGASA Central Office.	Instrument traceability record. Result of pre and post training evaluation conducted by the project Maintenance reports	
Output 2: Capacity on meteorological data analysis and forecasting is improved.	2-1 Capability of 80% of the operational staff on the use of SATAID ⁷ is improved. 2-2 Software for radar data calibration with rain gage data is developed. 2-3 Weather guidance is developed.	Pre and post training evaluation is conducted. Development of RADAR-AWS software. Weather guidance	

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Output 3: Criteria of warnings are elaborated at Southern Luzon PRSD.	3-1 Criteria of warnings are made at the provincial level.	Criteria of warnings	
Output 4: Content and accessibility of meteorological information are improved.	4-1 Laymanized and professional information are differentiated at PAGASA's website. 4-2 Meteorological information is timely transmitted by PAGASA Central Office to concerned agencies particularly DRRMC ^a	PAGASA's website Record on information transmission	
Output 5: Activities of awareness-raising on meteorological information are improved at Southern Luzon PRSD.	5-1 Program of awareness-raising is enhanced. 5-2 Result of the implementation of the program is reported.	Program plan Program reports	
Activities	Inputs		Trained staff remain working at concerned stations and offices.
	Japan side	Philippines side	
1.1 Monitor the operation of newly introduced three radars and identify issues in their operations. 1.2 Provide trainings for obtaining quality data from three radars including maintenance of facilities and equipment. 1.3 Develop a guideline and provide training on quality control of radar data. 1.4 Identify current status and issues on maintenance of AWS and Synop observatory at the Southern Luzon pilot PRSD. 1.5 Develop manuals and plans for calibration and maintenance, and inspection guideline of AWS and Synop observatory at Southern Luzon PRSD. 1.6 Provide training on calibration and maintenance based on the above plans at Central Office and Southern Luzon PRSD. 2.1 Provide training on the operation of SATAID. 2.2 Develop software and provide training on methods to correct radar data by using surface observation data. 2.3 Provide training on weather guidance (MOS) ⁹ . 2.4 Conduct of experiments on then use of GSM ¹⁰ in WRF ¹¹ . 3.1 Conduct survey on current situation of warning and identify their challenges. 3.2 Elaborate methods to improve warnings and make criteria of warnings based on the above findings. 4.1 Identify challenges on the content of meteorological information. 4.2 Improve the content of meteorological information to be more user-friendly. 4.3 Improve ways of information dissemination to the concerned agencies particularly DRRMC.	1. Experts • Chief Advisor/ Weather Forecasting • Surface Meteorological Observation • Radar Data Analysis • SATAID / Satellite Image Analysis • Meteorological Observation Technology • Weather Guidance • Operation and Maintenance of Radar • Weather Information / Information Technology • Weather Disaster Awareness Raising • Project Coordinator 2. Training in Japan 3. Equipment • Desktop Computer(s) • Printer(s) • Projector • Screen • Equipment related to training 4. Expenses Expenses necessary for the implementation of the Project	1. Counterpart personnel • Project Director • Project Manager • Assistant Project Manager • Staff from Weather Division, PAGASA • Staff from Engineering and Technical Services Division, PAGASA • Staff from Research & Development and Training Division, PAGASA • Staff from Southern Luzon PRSD, PAGASA • Staff from National Capital Region PRSD, PAGASA 2. Project office and facilities 3. Expenses Running expenses necessary for the implementation of the Project	Preconditions N/A

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<p>4.4 Improve the content of website at Central Office and Southern Luzon PRSD.</p> <p>5.1 Select pilot province(s) for awareness raising activities.</p> <p>5.2 Assess local situation on the use of meteorological information.</p> <p>5.3 Analyze causes of weather related disasters.</p> <p>5.4 Identify challenges and propose list of activities to enhance awareness of local population on weather related disasters.</p> <p>5.5 Prepare materials for awareness raising activities.</p> <p>5.6 Conduct awareness raising activities and collect local feedback on awareness raising activities.</p>			
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Remark: 1. Philippine Atmospheric, Geophysical and Astronomical Services Administration, 2. PAGASA Regional Services Division, 3. Local Government Unit, 4. Office of Civil Defense, 5. Philippines Coast Guard, 6. SYNOP: Surface Synoptic Observations and AWS: Automatic Weather Station, 7. Satellite Animation and Interactive Diagnosis, 8. Disaster Risk Reduction Management Committee, 9. Model Output Statistics, 10. Global Spectral Model, 11. Weather Research and Forecasting.

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Plan of Operation (Version-1)

	1 st Year				2 nd Year				3 rd Year			
	MJJ	ASO	NDJ	FMA	MJJ	ASO	NDJ	FMA	MJJ	ASO	NDJ	FMA
Output 1: Capacity on weather observation is improved.												
1.1 Monitor the operation of newly introduced three radars and identify issues in their operations.	■											
1.2 Provide training on maintenance for obtaining quality data from three radars.		■	■				■		■			
1.3 Develop a guideline and provide training on quality control of radar data.		■	■				■					
1.4 Identify current status and issues on maintenance of AWS and Synop observatory at Southern Luzon PRSD.	■	■										
1.5 Develop manuals and plans for calibration and maintenance, and inspection guideline of AWS and Synop observatory at Southern Luzon PRSD.		■			■		■			■		
1.6 Provide training on calibration and maintenance based on the above plans at the Central Office and Southern Luzon PRSD.			■			■			■		■	■
Output 2: Capacity on meteorological data analysis and forecasting is improved.												
2.1 Provide technical training on the operation of SATAID.		■					■		■			
2.2 Develop software and provide training on methods to correct radar data by using surface observation data.		■			■		■		■		■	
2.3 Provide training on weather guidance (Model Output Statistics).		■			■		■		■		■	
2.4 Conduct of experiments on then use of GSM in WRF.							■	■	■	■		
Output 3: Criteria of warnings are elaborated at Southern Luzon PRSD.												
3.1 Conduct survey on current situation of warning and identify their challenges.	■											
3.2 Elaborate methods to improve warnings and make criteria of warnings based on the above findings.		■					■		■	■		
Output 4: Content and accessibility of meteorological information are improved.												
4.1 Identify challenges on the content of meteorological information.	■	■										
4.2 Improve the content of meteorological information to be more user-friendly.		■					■		■			
4.3 Improve ways of information dissemination to the concerned agencies particularly DRRMC.			■		■		■		■		■	
4.4 Improve the content of website at the Central Office and Southern Luzon PRSD.			■		■		■		■		■	
Output 5: Activities of awareness-raising on meteorological information are improved at Southern Luzon PRSD.												
5.1 Select pilot province(s) for awareness raising activities.	■	■										
5.2 Assess local situation on the use of meteorological information.	■	■					■		■		■	
5.3 Analyze causes of weather related disasters.			■		■		■		■		■	
5.4 Identify challenges and propose list of activities to enhance awareness of local population on weather related disasters.	■	■			■		■		■		■	
5.5 Prepare materials for awareness raising activities.		■					■		■		■	
5.6 Conduct awareness raising activities and collect local feedback on awareness raising activities.		■					■		■		■	

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This report includes the responsible part of the consultant team as well as responsible part of the long term experts and short term experts.

**MINUTES OF MEETING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL
AND ASTRONOMICAL SERVICES ADMINISTRATION,
DEPARTMENT OF SCIENCE AND TECHNOLOGY
ON
PROJECT FOR ENHANCING CAPACITY ON WEATHER OBSERVATION,
FORECASTING AND WARNING**

Japan International Cooperation Agency (hereinafter referred to as "JICA"), the Philippine Atmospheric, Geophysical and Astronomical Services Administration, The Department of Science and Technology (hereinafter referred to as "PAGASA") and other Philippine authorities concerned have discussed several major issues during the Fourth Joint Coordination Committee (hereinafter referred to as "JCC") Meeting for the Project for Enhancing Capacity on Weather Observation, Forecasting and Warning (hereinafter referred to as "J-POW Project") on 28th January 2016 at SEAMEO Innotech in Quezon city.

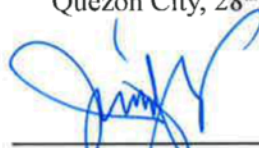
Both Philippine and Japanese sides exchanged views with respect to the desirable measures to be taken by the PAGASA and the Project Team (hereinafter referred to as "the Team") for the successful implementation of the Project.

As a result of the discussions, the PAGASA and the Team have agreed on the matters referred in the document attached herewith.

Quezon City, 28th January 2016



Mr. Nobuo Sato
Chief Advisor and Expert on Weather
Forecasting/Administration
J-POW Project



Dr. Vicente B. Malano
Acting Administrator,
Philippine Atmospheric, Geophysical and
Astronomical Services Administration,
Department of Science and Technology

Witness by



Mr. Takahiro Morita
Senior Representative
JICA Philippines Office



Highlights and Discussions of the Meeting

The Team and PAGASA Counterparts made the presentations on “J-POW Project Progress Report” for each output. The “Highlights and Businesses Arising from Previous JCC meeting” and “Training held in Japan (Appendix1: Agenda of 4th JCC meeting) were also introduced. The main issues presented, discussed and terms agreed are as follows:

1, Highlights

[This section is duplicated, should be delete?]

J-POW final goal is to enhance capacity on weather observation, forecasting and warning in the Philippines. For this purpose, J-POW project has started since May 2014 with 7 sub-teams from Output-1a to Output 5, which aim the activities on Radar Maintenance (O-1a), Surface Observation (O-1b), SATAID (O2-a), Guidance (O-2b), Warning Criteria (O-3), Weather Information (O-4), and Awareness Raising (O-5), respectively. From the end of June 2015, each WGs stepped up their activities from Survey Phase to Implementation Phase. Until the end of 2015, J-POW has carried out various activities for improving traceability of instrument and for better operation and observation quality of Radars. Lectures and trainings for weather guidance were also practiced intensively for developing operational temperature forecast. For introducing warning criteria at the provincial level, lectures and discussion on the warning criteria were done. For dissemination of more user-friendly information, mobile phone app has been developed. And for raising awareness on severe weather and decreasing disaster risk, practice on seminar at elementary schools and broadcast of radio clips has been carried out, too.

1) Output-1a (Radar Maintenance)

Regular basic maintenance and regular performance check is being implemented by PAGASA at Aparri. However, reports for trouble shooting or repair are not enough.

In order to step up maintenance in higher level, the senior radar engineer training is scheduled at Virac from 15th February to 11th March 2016.

The configuration of observation angles for PAGASA radar should be discussed in order to eliminate ground/sea clutters as well as to enable rainfall observation near the radar site.

2) Output-1b (Weather Observation)

In 2015, based on the results of baseline inspection (low accuracy of calibration equipment, traceability not secured, and instrumental error), Working Group (WG) members visited more than 18 sites and made verification on the precision/accuracy of the indicated values of operational barometers used in the station. Proper observation procedures and accuracy of the weather report are expected to be secured through training, practice and lectures by J-POW project. Also standard barometer sets were handed over for use in calibration and inter-comparison of barograph at stations. 3 JMA short term experts exchange knowledge and inter-comparison for traceability of instruments in early March.

3) Output-2a (Meteorological Data Analysis)

PAGASA already uses satellite data and SATAID, however, satellite analysis is not enough due to the emergence of the new ‘HIMAWARI8/9 products’,. , The satellite analysis training on ‘SATAID usage for new satellite’ and ‘Dvorac method ’is scheduled from 15th to 19th February 2016.

Radar product team is trying to make calibrated radar data with rain gauges data, however, enough data for the analysis is not collected. The team plans to install Southern Luzon Rain Gauge Network for gathering additional rain gauge data and calibrate radar data with rain gauge data.

4) Output-2b (Weather Guidance)

The activities of Technical Working Group on weather guidance were reported. The results of their experiments showed the good potential of weather guidance for the improvement of the accuracy of operational forecast of PAGASA.

The plan of operational use of the guidance in the forecast work was also reported.

5) Output-3 (Warning Criteria)

In order to build a warning criteria at the provincial level, review on severe weather bulletin (PSWS), storm watch, and activities in the target provinces was done. Based on this inspection,

training and lectures on precipitation forecast system in JMA and discussion on the importance of calibration of radar images by rain gauge network data were carried out. Finally, discussion and consulting on warning criteria in SLPRSD and examination of usage of rain gauge data for warning criteria were also carried out.

[Alternative summary for OUTPUT3 presentation suggested by Sato-san]

Consultation Meeting on Disaster Risk Reduction (DRR) were conducted at Albay, Northern Samar and Sorsogon by PAGASA and provincial/city/municipality DRR management Offices (DRRMOs). They conduct exercises and awareness activities against natural hazards and make up hazard maps. PAGASA issued severe weather bulletins, description on strong wind is mentioned, however, description on accumulated rainfall relates to landslide and flood is not enough. The rainfall forecast should be reported depending on Numerical Weather Prediction (NWP) and in regards to NWP improvement we have to ask for the international community.

6) Output-4 (Meteorological Information)

In order to improve the content of meteorological information to be more user-friendly and ways of information dissemination to the concerned agencies particularly DRRMC, the following activities have been done; J-POW project team surveyed the requirements and challenges of users, designed apps for mobile device, built Website for mobile device, and provided Google Analytics training to WG members.

7) Output-5 (Awareness Rising Activities)

A set of educational materials that help pupils to learn weather-related disasters as well as radio clips for the general public have been developed. In August 2015, two pre-test awareness seminars were held at elementary schools located in the capitals of pilot provinces. In November 2015, the 1st series of awareness seminars were held at four elementary schools located in the pilot provinces. Radio clips on "Bagyo" and storm surge were broadcasted in the target areas for a week around the time of the 1st awareness seminars.

8) Training held in Japan

(Meteorological Training Course, held Sep.14 – Dec.12) were reported by the participant. A PAGASA staff attended this training.

The contents and results of JICA's Weather Forecasting Training (The training in Japan of J-POW project, held Oct.12 – Oct.24) were also reported by the participant. 4 members of PAGASA staff attended this training.

2. Discussions

1) Output-1a (Radar Maintenance)

PAGASA understands commercial electricity power problems and already started negotiation with electric companies to fix problems. The Team informed the rusty door joints problem at Virac and Aparri to PAGASA. PAGASA responded to address the problems.

The 'Senior Radar Engineers training' for 4 weeks in Virac by Mr. Wakabayashi is scheduled from 15th February to 11th March 2016.

2) Output-1b (Weather Observation)

PAGASA intends to change from mercurial barometers to digital barometers due to UNEP Minimata Convention which is about the banning of the use of mercury to take effect by 2020. The change is also based on the "Commission for Instruments and Methods of Observation (hereinafter referred to as "CIMO") - Sixteenth session: Abridged final report with resolutions and recommendations" reported by CIMO in 2014. Calibration policies for digital barometers will be required.

PAGASA inquired how often calibration should be implemented and the Team informed that every 5 years the calibration of regional and national standards with international standards is recommended by means of travelling standards as suggested from the CIMO Guide, "Guide to Meteorological Instruments and Methods of Observation", and synoptic stations should be inspected once every 1 year or no less than once every two years. The calibration may also depend

on the recommendation of manufacturers. The barometer calibration policy should be discussed between Regional Instrument Center (hereinafter referred to as "RIC") Manila and RIC Tsukuba during RIC Tsukuba short term training scheduled in March 2016, and PAGASA and the Team agreed to have discussion in the training.

The Team found there exist differences between observed barograph value from PAGASA and analyzed typhoon pressure around typhoon center. The difference was pointed out by Japan Meteorological Agency (JMA). PAGASA also pointed out that observation by mercury barometer is correctly implemented. PAGASA and the Team should make it clear why such differences exist and its reason. PAGASA requested the Team to report this matter during the training in March 2016. The training will be on the 'Calibration and Equipment Maintenance' for 3 days in Quezon city and survey at Southern Luzon PRSD by RIC Tsukuba and JMA experts. The training is scheduled from 7th to 15th of March 2016.

3) Output-2a (Meteorological Data Analysis)

A training on 'Satellite Analysis' for 1 week in Quezon by JMA 3 experts is scheduled from 15th to 19th of February 2016.

4) Output-2b (Weather Guidance)

PAGASA requested development and trial for wind guidance. The team explained that the Team develops operational temperature guidance by Kalman Filter at first then tries to develop precipitation guidance. The Project aims at technical skill transfer for making guidance. Technical Working Group of Weather Guidance would be able to develop various element guidance which meet the PAGASA's operational requirements after the initial technical transfer ended.

5) Output-2a and 3 (Warning Criteria)

The Team proposed an installation of "South Luzon Rain Gauge Network" for developing Quantitative Precipitation Estimation and warning criteria activity. PAGASA and the Team agreed with the plan. However, JICA noted when Japanese visit Masbate a security briefing by the Japanese Embassy should be a requirement.

6) Output-4 (Meteorological Information)

PAGASA suggested that the mobile phone application and information should be developed not only for National Capital Region and South Luzon PRSD but also for other areas. The other contents such as weather information for tourists should be developed in the future.

7) Output-5 (Awareness Rising Activities)

The Department of Education (DepEd) pointed out that the material should be shared to 17 regions and 331 divisions' coordinators through coordinator trainings. PAGASA agreed to send staff members to the coordinator trainings based on the official request from the DepEd.

2. Miscellaneous

JICA informed that there is one trainee seat for JICA training course 'Meteorology' in 2016 Autumn.

PAGASA executives will be visiting JMA and its facilities from 1st to 5th of February 2016 to study JMA weather services.

(End of meeting)

Appendixes:

1. Agenda of 4th JCC meeting



4th Joint Coordination Committee (JCC) Meeting for J-POW PROJECT



(JICA Project for Enhancing Capacity on Weather Observation, Forecasting and Warning)

SEAMEO Innotech, Regional Headquarter, Commonwealth Avenue, Diliman Quezon City

28th January 2016; 8:30 AM to 12:00 PM

Agenda

I. Call to Order

Dr. Vicente B. Malano

Acting Administrator, PAGASA
Project Director, J-POW Project

II. Statement

Mr. Takahiro Morita

Senior Representative, JICA Philippines Office

III. Highlights and Business Arising from previous JCC

Dr. Esperanza O. Cayanan

Chief, Weather Division, PAGASA
Project Manager, J-POW Project

IV. Project Progress Reports

- a) Radar Maintenance (Output-1a)
- b) Meteorological Data Analysis (Output-2a)
- c) Meteorological Information (Output-4)
- d) Weather Observation (Output-1b)
- e) Weather Guidance (Output-2b)
- f) Warning Criteria (Output-3)
- g) Awareness Raising Activities (Output-5)
- h) J-POW Project current achievements and expected outcome

Mr. Michihiko Tonouchi

Team Leader, J-POW Project

Mr. Koji Matsubara

Expert, J-POW Project

Mr. Ferdinand Barcenas *

OIC, IRDU, PAGASA

Mr. Ryusuke Tiara

Expert, J-POW Project

Mr. Raymond Ordinario *

Weather Specialist I, WD, PAGASA

Mr. Nobuo Sato

Chief Advisor, J-POW Project

Dr. Masao Mikami

Deputy Team Leader, J-POW project

V. Other activities: Training held in Japan

Dr. Esperanza O. Cayanan

VI. Other matters

VII. Concluding remarks and adjournment

Dr. Vicente B. Malano

* Presenter

**MINUTES OF MEETING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL
AND ASTRONOMICAL SERVICES ADMINISTRATION,
DEPARTMENT OF SCIENCE AND TECHNOLOGY
ON
PROJECT FOR ENHANCING THE CAPACITY ON WEATHER OBSERVATION,
FORECASTING AND WARNING**

Japan International Cooperation Agency (hereinafter referred to as "JICA"), the Philippine Atmospheric, Geophysical and Astronomical Services Administration, The Department of Science and Technology (hereinafter referred to as "PAGASA") and other Philippine authorities concerned have discussed several major issues during the Fifth Joint Coordination Committee (hereinafter referred to as "JCC") Meeting for the Project for Enhancing the Capacity on Weather Observation, Forecasting and Warning (hereinafter referred to as "J-POW Project") on 7th June 2016 at SEAMEO Innotech in Quezon city.

Both Philippine and Japanese sides exchanged views with respect to the desirable measures to be taken by the PAGASA and the Project Team (hereinafter referred to as "the Team") for the successful implementation of the Project.

As a result of the discussions, the PAGASA and the Team have agreed on the matters referred in the document attached herewith.

Quezon City, 7th June 2016




Mr. Nobuo Sato
Chief Advisor and Expert on Weather
Forecasting/Administration
J-POW Project



Dr. Vicente B. Malano
Acting Administrator,
Philippine Atmospheric, Geophysical and
Astronomical Services Administration,
Department of Science and Technology



Witness by



Mr. Takahiro Morita
Senior Representative
JICA Philippines Office

Highlights and Discussions of the Meeting

The Team and PAGASA Counterparts made the presentations on “J-POW Project Progress Report” for each output. The “Highlights and Businesses Arising from Previous JCC meeting” and “Training held in Southern Luzon and Central office” (Appendix I: Agenda of 5th JCC meeting) were also introduced. The main issues presented, discussed and terms agreed are as follows:

1, Highlights

1) Output-1a (Radar Maintenance)

Regular fundamental maintenance and performance check is being implemented by PAGASA at Aparri. However, reports for trouble shooting or repair are not enough.

In order to step up to higher-level maintenance, the senior radar engineer training is scheduled at Virac from 15th February to 11th March 2016.

PPI elevation should be discussed for quantitative observation nearby RADAR site considering PAGASA RADAR observation concepts with RADAR staff, product research team, users and administrators.

2) Output-1b (Weather Observation)

In 2015, based on the results of baseline inspection (issues on resolution of calibration equipment, traceability not secured, and instrumental error), Working Group (WG) members visited more than 18 sites and made verification on the precision/accuracy of the indicated values of operational barometers used in the station. Proper observation procedures and accuracy of the weather report were secured through training, practice and lectures by J-POW project. Also standard barometer sets were hand over for use in calibration and intercomparison of barograph at stations.

3) Output-2a (Meteorological Data Analysis)

PAGASA already uses satellite data and SATAID, however, satellite analysis is not enough due to the emergence of the new ‘HIMAWARI8/9 products’, , The satellite analysis training on ‘SATAID usage for new satellite’ and ‘Dvorac method’ is scheduled from 15th to 19th February 2016.

Radar product team is trying to make calibrated radar data with rain gauges data, however, enough data for the analysis is not collected. The team plans to gather additional rain gauge data and continuously collect radar and rain gauge data for Southern Luzon Rain Gauge Network

4) Output-2b (Weather Guidance)

The activities of Technical Working Group of Weather guidance were reported. The results of their experiments on the temperature forecast showed the good potential of weather guidance for the improvement of the accuracy of operational forecast of PAGASA.

The plan of operational use of the guidance in the forecast work was also reported.

5) Output-3 (Warning Criteria)

In order to build a warning criteria at the provincial level, review on severe weather bulletin, tropical cyclone warning system, and activities in the target provinces was done. Based on this inspection, training and lectures on precipitation forecast system in JMA and discussion on the importance of calibration of radar images by rain gauge network data were carried out. Finally, discussion and consulting on warning criteria in SLPRSD and examination of usage of rain gauge data for warning criteria were also carried out.

6) Output-4 (Meteorological Information)

In order to improve the content of meteorological information to be more user-friendly and find ways of information dissemination to the concerned agencies particularly DRRMC, the following activities have been done; J-POW project team surveyed the requirements and challenges of users, designed apps for mobile device, built Website for mobile device, and provided Google Analytics training to WG members.

7) Output-5 (Awareness Raising Activities)

A set of educational materials that helps pupils to learn weather-related disasters as well as radio clips for the general public have been developed. In August 2015, two pre-test awareness seminars were held at elementary schools located in capitals of pilot provinces. In November 2015, the 1st series of awareness seminars were held at four elementary schools located in the pilot provinces. Radio clips on "Bagyo" and storm surge were broadcasted in the target areas for a week around the time of the 1st awareness seminars.

8) J-POW Project current achievements and expected outcome

J-POW final goal is to enhance the capacity on weather observation, forecasting and warning in the Philippines. For this purpose, J-POW project has started since May 2014 with 7 sub-teams from Output-1a to Output 5, which aim the activities on Radar Maintenance (O-1a), Surface Observation (O-1b), SATAID (O2-a), Guidance (O-2b), Warning Criteria (O-3), Weather Information (O-4), and Awareness Raising (O-5), respectively. From the end of June 2015, each WGs step up their activities from Inspection Phase to Practice Phase. Until the end of 2015, J-POW has carried out various activities for improving traceability of instrument and for better operation and observation quality of Radars. Trainings for weather guidance for automated production system and (QC) quality control function also practiced intensively for developing operational temperature forecast. For enhancing warning criteria a 9 Automated Rain Gauge Network will be installed in Southern Luzon for radar data calibration. For meteorological information, mobile apps were developed and are ready for public use. And for raising awareness preparation for logistics materials for the next awareness and preparedness seminar. For enhancing capacity on weather observation, forecasting and warning, the working group focus on the following: (O-1a) Radar senior engineer training, follow up training and review of training, (O-1b) 3 short term experts implement exchange knowledge and intercomparison for traceability of instruments, 3 short term experts implement lectures and exercised training on HIMAWARI9, (O-2a) SATAID and Dvorak Method, (O-2b) develop operational temperature forecast production system of weather guidance, Building a rain-gauge network to link with radar data for reliable rainfall distribution for warning, (O-4) develop a mobile app for meteorological information and warning for a public, and prepare new materials at SLPRSD joint school exercise and media extend this package to another PRSD.

9) Training held in Southern Luzon and Central Office

- a) Radar Operation and Maintenance, held in Virac Feb. 15 – March 11; Hold the same training in the 3 radar sites namely Virac, Aparri and Guiuan on May 23 to June 9.
- b) Meteorological Equipment Calibration Traceability and Calibration conducted by RIC Tsukuba, March 10-12.
- c) SATAID Training conducted by 3 JMA Expert held Feb. 15-19.

2. Discussions

The team made the presentations on "Current Status of J-POW project" with subsequent supplementary explanation and suggestions by PAGASA and JICA participants. The main points of each output are as follows:

- a) **Output 1a:** Radar maintenance - PAGASA recognizes the difficulty to address problem on commercial power and the poor load at the station; and PAGASA will seek advice with JRC to fully optimize the use of radar low power input and the threshold of poor regulator.
- b) **Output 2a:** Radar software and training - the team reported that the OJT at 3 radar sites namely Virac, Aparri and Guiuan were conducted and on-going, and also noted that the comparison between radar and AWS data, and radar calibration software would be completely developed by the end of June. The PAGASA reported that JRC replied to the queries about defects of Virac radar except the clutter observed at the monitoring system.
Satellite analysis and training - The team reported effectiveness of training on HIMAWARI-8/9, SATAID and Dvorak technique conducted by 3 experts from JMA based on the results of examinations conducted before and after the training.
- c) **Output 1b:** Weather observation - the team stressed importance of instrument traceability related to calibration and maintenance with examples of well-maintained and contrary stations, and reported that development of the manuals/guidelines would be completed before long. Furthermore the use of field note (book) at Legaspi station on a trial basis was introduced. It is expected to improve the methods of observation.
- d) **Output-2b:** Weather Guidance - PAGASA is keen to make the weather guidance output be included in the daily forecast operation. In this context, the Working Group should include appropriate forecaster(s) during the internal test of an automated production system towards temporary operation. Dr. Malano will follow-up on the application of Weather Guidance implementation.
- e) **Output 3:** Criteria of warnings and QPE – The team reported that the Automatic Rain Gauge (ARG) network in Southern Luzon and Northern Samar would be implemented by the end of July. In addition to existing 5 ARGs in SL PRSD, the new 9 ARGs will be used for radar data calibration. Furthermore the team stressed the necessity to access rainfall observation data on a real-time basis and accordingly suggested to purchase a modem and a PC to archive and visualize the new 9 ARGs for improving warning operation. JICA replied that the purchase of such a modem and a PC should address to JICA HQ and then the team will see if the JICA Philippines office can facilitate this request.
- f) **Output 4:** Content and accessibility of meteorological information - The team realized the need for mobile phone accessibility of weather information through the survey of existing PAGASA website and developed a mobile application and website for mobile access. JCC participants were informed that the mobile application under Android on beta version had already been available through Google play store and that the mobile website had been accessible through <http://m.pagasa.dost.gov.ph/weather>. In addition to the initial content mainly on weather it is expected to include other PAGASA information such as climate, flood and so on. Flyers to introduce these services will be distributed to public users.
- g) **Output 5:** Awareness Raising Activity – The 1st Awareness Raising Seminar had been carried out in Nov. 2015 with participation of 200 pupils and 159 observers at four schools in Northern Samar and Sorsogon Provinces. Furthermore the team noted the effective

dissemination of weather information as a radio clip and educational materials such as presentation slides, small posters and experiment equipment of “cloud formation”.

JCC participants were informed of the next activity plan by the 3rd quarter of this year with a team “Floods” and the educational materials would be shared to DepEd and PAGASA.

DepEd requested for a copy of the presentation used in Awareness Raising Activity. Dr. Cayanan confirmed that the presentation would be shared to them.

NEDA inquired if the Awareness Raising Activity would be intended only for Grade 5 & 6 students and would conduct only at schools. The team showed its plan to conduct in other institutions.

3. Miscellaneous

I. Revision of Counterpart List

Dr. Cayanan presented the updated Counterpart List (Annex to this MM).

Dr. Dalida and Dr. Cayanan stressed the necessity of reducing disaster risks and damages, especially tropical cyclone damages. In this context PAGASA inquired the possibility of having an expert to conduct training on analysis of tropical cyclone and wind pressure estimation. The team replied that they should try to contact JMA HQ for the possibility of this inquiry, because there must be opportunities such as participation in workshops and training with extended stay.

II. Terminal Evaluation

Mr. Nakamura, Project Formulation Advisor of JICA Philippines Office, explained an outline of Terminal evaluation tentatively scheduled from Sept. 29 to Oct. 18. Evaluators will be a consultant appointed by JICA HQ, a JICA official and a JICA advisor from Japanese side, an officials of NEDA and DOST and a PAGASA officer who are not directly involved in the project.

III. Concluding remarks and adjournment

Dr. Dalida expressed his gratitude for participation and cooperation to all attendees of the 5th JCC meeting, especially from the government agencies from NEDA, DepEd and CAAP.

(End of Meeting)

Appendixes:

1. Agenda of 5th JCC meeting
2. Revised Counterpart List



5th Joint Coordination Committee (JCC) Meeting for J-POW PROJECT



(JICA Project for Enhancing Capacity on Weather Observation, Forecasting and Warning)

SEAMEO Innotech, Regional Headquarter, Commonwealth Avenue, Diliman Quezon City

7th June 2016; 8:30 AM to 12:00 PM

Agenda

I. Call to Order

Dr. Vicente B. Malano
Acting Administrator, PAGASA
Project Director, J-POW Project

II. Statement

Mr. Takahiro Morita
Senior Representative,
JICA Philippines Office

III. Highlights and Business Arising from previous JCC

Dr. Esperanza O. Cayanan
Chief, Weather Division, PAGASA
Project Manager, J-POW Project

IV. Project Progress Reports

- a) Radar Maintenance (Output-1a)
- b) Meteorological Data Analysis (Output-2a)

Mr. Michihiko Tonouchi*
Team Leader, J-POW Project
Mr. Fulgencio A. Austria, Jr.
Weather Facilities Specialist II, ETSD, PAGASA

- c) Weather Observation (Output-1b)

Mr. Koji Matsubara
Expert, J-POW Project

- d) Weather Guidance (Output-2b)

Mr. Ryusuke Tiara
Expert, J-POW Project
Mr. Raymond Ordinario*
Weather Specialist I, WD, PAGASA

- e) Rain Gauge Network in Southern Luzon

Dr. Masao Mikami
Deputy Team Leader, J-POW Project

- f) Warning Criteria (Output-3)

Mr. Nobuo Sato
Chief Advisor, J-POW Project

- g) Meteorological Information (Output-4)

Mr. Koji Mitsuhashi*
Expert, J-POW Project
Ms. Samantha Christine V. Monfero
Senior Weather Specialist, WD, PAGASA

- h) Awareness Raising Activities (Output-5)

Dr. Masao Mikami
Ms. Venus Valdemoro*
Administrative Officer V, RDTD, PAGASA

V. Revision of Counterpart List

Dr. Esperanza O. Cayanan

VI. Terminal Evaluation

Mr. Hayato Nakamura
Project Formulation Advisor
JICA Philippines Office

VII. Concluding remarks and adjournment

Dr. Landrico U. Dalida
Acting Deputy Administrator for O&S, PAGASA



J-POW Project Overview **jica**

(JICA Project for Enhancing Capacity on Weather Observation, Forecasting and Warning)

Project Purpose

Capacity of PAGASA Central Office and Southern Luzon PAGASA Regional Services Division (PRSD) is enhanced in terms of weather observation, forecasting and warning.

Project Outputs

- 1, Capacity on weather observation is improved.
- 2, Capacity on meteorological data analysis and forecasting is improved.
- 3, Criteria of warnings are elaborated at Southern Luzon PRSD.
- 4, Content and accessibility of meteorological information are improved.
- 5, Activities of awareness-raising on meteorological information are improved at Southern Luzon PRSD.

Project Term

May 2014 - May 2017 (3 years)

Target Area

Main Target: **NCR (National Capital Region)** and **Southern Luzon PRSD**

Sub Target: Whole Nation



Main Activities

- Instrument calibration and maintenance training
- Radar maintenance training (Virac, Aparri and Guianan)
- Radar data quality control training
- Training on radar data calibration against rain gauge data
- Satellite image analysis training
- Weather guidance training
- Production of training manuals & guidelines on the above field
- Establishing criteria of warnings
- DRR collaboration meetings
- Development of web site for mobile device
- Development of mobile application for weather information
- Public awareness activities in Southern Luzon
- Production of awareness materials (class room lectures, experimental kits and posters)
- Holding Annual seminars on weather related topics
- Holding JCC meetings
- (Production of project PR materials)



List of Counterpart

- (a) **Project Director**
Dr. Vicente B. Malano, Acting Administrator, DOST-PAGASA
- (b) **Project Manager**
Dr. Esperanza O. Cayanan, Chief of NCR PRSD
- (c) **Assistant Project Manager**
- (d) Dr. Landrico U. Dalida, OIC, Office of the Deputy Administrator for Operations and Services
Mr. Roberto S. Sawi, AWSC, Weather Division
- (e) **Project Coordinator**
Mr. Raymond C. Ordinario, Weather Specialist I, Weather Division
Ms. Angelina S. Galang, Weather Specialist I, Administrator's Office
- (f) **Counterpart Personnel**
C/P personnel are expected to work closely with the JICA Experts.
- Weather Division
Mr. Renito B. Paciente
Mr. Vicente P. Falcon
Ms. Samantha Christine V. Monfero
 - Engineering and Technical Services Division
Mr. Edwin Manresa
Mr. Fulgencio A. Austria
Mr. Harry V. Alcantara
 - Research and Development and Training Division
Dr. Cynthia P. Celebre
Ms. Edna Seachon
Mr. Ferdinand Y. Barcenas
Ms. Marichu Charito J. Zarate
 - Southern Luzon PRSD
Mr. Eufronio H. Garcia
Ms. Lilian N. Guillermo
Mr. Allan T. Almojuela
Mr. Melvin C. Almojuela
Mr. Michael D. Francisco
Ms. Josie J. Mendoza
Ms. Ma. Cyd A. Sena
Mr. Ariel R. Zamudio
Mr. Felion Corona
Mr. Fernando Pantoja
 - NCR PRSD
Ms. Julie M. Nimes
Mr. Arman R. Griarte
 - Administrator's Office
Ms. Elena V. Tan
Ms. Nancy T. Lance
Ms. Fe V. Marquez
- (g) **Technical Working Group Counterpart Personnel**
- Meteorological Instruments Group
Mr. Ferdinand Y. Barcenas ETSD
Ms. Michelle M. Familaren ETSD

- | | | |
|---|----------|--------|
| Ms. Marilyn V. Medina, | NCR PRSD | |
| Mr. Arman R. Griante | NCR PRSD | |
| - <u>Radar Maintenance Group</u> | | |
| Mr. Edwin Manresa | ETSD | |
| Mr. Fulgencio A. Austria | ETSD | |
| Mr. Johny C. Zabala | | SLPRSD |
| Mr. Marianito Macasa | SLPRSD | |
| Mr. Eufronio H. Garcia | SLPRSD | |
| Mr. Rogelio T. Bagadiong | ETSD | |
| - <u>SATAID/ Radar data correction Group</u> | | |
| Mr. Robert Sawi | WD | |
| Mr. Vicente Manalo III | WD | |
| Ms. Maria Ana Glaiza Escullar | WD | |
| Mr. Charlie Rapadas | WD | |
| Mr. Vicente P. Palcon Jr. | WD | |
| - <u>Weather Guidance Group</u> | | |
| Ms. Samantha Christine Monfero | WD | |
| Mr. Raymond C. Ordinario | | WD |
| Mr. Resly George Amador | WD | |
| Ms. Shirley J. David | | RDTD |
| Mr. Larry Ger B. Aragon | RDTD | |
| - <u>Web site Improvement Group</u> | | |
| Mr. Roberto S. Sawi | | WD |
| MS. Samantha Christine V. Monfero | | WD |
| Mr. Raymond C. Ordinario | | WD |
| Mr. Rene Gumapal | | ETSD |
| - <u>Public Awareness Group</u> | | |
| Ms. Edna T. Seachon | RDTD | |
| Ms. Venus Valdemoro | RDTD | |
| Mr. Ferdinand Castillo | RDTD | |
| Ms. Melanie Aquino | RDTD | |
| Ms. Sharon Juliet Arruejo | | RDTD |
| - <u>Quantitative Precipitation Estimates Group</u> | | |
| Michael Bala | RDTD | |
| Ramjun Sajulga | RDTD | |
| Evan James Carlos | | RDTD |
| Resly George Amador | WD | |

MINUTES OF MEETING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL
AND ASTRONOMICAL SERVICES ADMINISTRATION,
DEPARTMENT OF SCIENCE AND TECHNOLOGY
ON
PROJECT FOR ENHANCING THE CAPACITY ON WEATHER OBSERVATION,
FORECASTING AND WARNING


Japan International Cooperation Agency (hereinafter referred to as "JICA"), the Philippine Atmospheric, Geophysical and Astronomical Services Administration, The Department of Science and Technology (hereinafter referred to as "PAGASA") and other Philippine authorities concerned have discussed several major issues during the Sixth Joint Coordination Committee (hereinafter referred to as "JCC") Meeting for the Project for Enhancing the Capacity on Weather Observation, Forecasting and Warning (hereinafter referred to as "J-POW Project") on the 18th of October 2016 at Amihan Conference Room, PAGASA Science Garden Complex, Agham Road, Diliman, Quezon city.

Both Philippine and Japanese sides exchanged views with respect to the desirable measures to be taken by the PAGASA and the Project Team (hereinafter referred to as "the Team") for the successful implementation of the Project.

As a result of the discussions, the PAGASA and the Team have agreed on the matters referred in the document attached herewith.

Quezon City, 18th October 2016


Mr. Nobuo Sato
 Chief Advisor and Expert on Weather
 Forecasting/Administration
 and
 J-POW Project


Dr. Vicente B. Malano
 Administrator
 Philippine Atmospheric, Geophysical
 Astronomical Services Administration
 Department of Science and Technology

Witness by:


Mr. Takahiro Morita
 Senior Representative
 JICA Philippines Office

Highlights and Discussions of the Meeting

Evaluators from Japan and Philippines conducted the Joint Terminal Evaluation on J-POW project from September 29th to October 17th 2016 right before the 6th JCC meeting. Accordingly, the summary of "Terminal Evaluation Report" was presented to discuss about solutions and next actions to obtain further improvement in another six months efficiently. This became the main agenda in the 6th JCC meeting. Minutes of Meeting for the discussion of the terminal evaluation on the project was separately created and signed.

As the regular contents, "Highlights and Businesses Arising from Previous JCC meeting" was introduced by PAGASA, and The Expert Team also made the presentations on "J-POW Comprehensive Report of Project Progress" for each output, and Discussion for "Future Plan of Project" followed by Q&A.

The subjects presented, discussed, and matters agreed for the project are as follows:

1. Highlights

a) Achievement of Output-1 (Radar Maintenance and Meteorological Observation)

Evaluation rating: Moderately achieved.

Remaining tasks are:

- (i) Improvement of traceability to the provincial level
- (ii) Utilization of the newly installed calibrated equipment
- (iii) Follow up the submission of monthly reports by the local observatories to the central office regarding radar and surface observation

b) Achievement of Output-2 (SATAID, Southern Luzon rain gauge installation and guidance)

Evaluation rating: Moderately achieved.

Remaining tasks are:

- (i) Further data collection for Quantitative Precipitation Estimate (QPE) during heavy rain events
- (ii) Discussion for scan angles by radars for QPE
- (iii) Operational temperature guidance with Forecasters Work Support System (FxWSS) development

c) Achievement of Output-3 (Warning Criteria)

Evaluation rating: Partly achieved.

Remaining tasks are:

- (i) Archiving disaster records and automatic rain gauge (ARG) data
- (ii) Validation/Improvement of Warning Criteria developed by Southern Luzon PRSD using new /latest data.

d) Achievement of Output-4 (Mobile website and application)

Evaluation rating: Mostly achieved.

Remaining task is promotion for utilization of the mobile website and application at provincial level.

e) Achievement of Output-5 (Awareness Raising Activities)

Evaluation rating: Mostly achieved.

Seminars were implemented at 7 junior schools for 5th/6th grade pupils.

Remaining task is enhancement of activities to include local Disaster Risk Reduction Management Officers (DRRMOs) in the future.

f) Achievement in Project Purpose

Evaluation rating: Achievement for the Indicators on the Project Design Matrix (PDM) is

relatively high.

Remaining tasks are:

- (i) Follow up on confirming operational ratio of 3 radars
- (ii) Development of FxWSS for temperature guidance operation
- (iii) Conduct a follow-up survey on the effectiveness of the awareness raising activities in the pilot area affected by typhoon (scheduled in December).

g) Contributing Factors

- (i) Continuous involvement and effort by TWGs (Technical Working Group) from the beginning to the end.
- (ii) PAGASA Modernization Act in 2015.

h) Inhibiting Factors

- (i) Absence of data: disaster records.
- (ii) Web administrative order for governmental website, and risks in sustainability at two TWGs (QPE and guidance: activities on top of their regular tasks).

2. Discussions

The expert team made the presentations on "Comprehensive progress report, and facilitated Q& A Discussion for "Future Plan of Project" The main points of each Output are as follows:

a) Risks in sustainability at two TWGs for QPE and guidance (Output 3: Warning Criteria)

Dr. Cayanan explained to JICA that PAGASA intends to issue a Memorandum for the operational use of temperature guidance. To limit the sustainability risks for two TWGs of QPE and Guidance, PAGASA will issue a Special Order for the current members of the respective TWG to continue the activities of QPE and guidance as aside from their regular tasks. The team will continue to do verification of guidance and challenge for the rain and wind guidance related to development of 'rainfall warning system'.

Mr. Sato, JICA expert reminded PAGASA that JMA ensemble forecasts can provide information on possibility of heavy rain. Also, he mentioned that QPE and ARG/AWS for monitoring of heavy rain are useful in precipitation forecast.

b) Application development for iphone in Output 4 (Meteorological Information)

The position of the development of mobile phone APP and application for Android is done in Output 4. As the answer for a question about possibility of another application development for iphone, the Consultant Team pointed out that PAGASA is the one who need to take initiative for carrying out further modification and development including ones for the other OSs.

c) Possibility of expansion of the sharing knowledge in Output 5 (Awareness Raising Activities)

With regards to the possibility of expanding project area to nationwide and add more pilot schools in the project for Output 5, the Consultant Team explained that there have been some communications with DepEd for additional plans in Region-V.

The team also explained their future prospect that the teachers and educational staff who joined and learned at the seminars in the seven pilot schools would share their



knowledge to the other schools. Those educational materials have been already shared to DepEd.

Ms. Valdemoro, the project member for Output 5 informed that DepEd was asking permission for the pilot schools to share the educational materials with other schools. PAGASA will officially issue the "go signal" to provide them after final assessment of the awareness materials.

Dr. Cayanan shared an experience of PAGASA regarding development of educational books by USAID done few years ago. Those books have been shared with DepEd, however, it shows difficulties to get introduced to the local levels due to the issues of sharing structure, way of knowledge sharing, and so on. PAGASA would negotiate effective ways to share educational materials with DepEd and Region V agencies.

d) Daily monitoring and modification on the project for Output 2b (Weather Guidance)

Mr. Akatsu, JICA senior advisor pointed that weather guidance expected on PDM was MOS (Model Output Statistics) however the result of this project greatly exceeded the original goal. He admired the achievement of the project for Output 2b that "Operational Guidance and Kalman Filter Guidance" is the first successful case in the many projects relate to weather and disaster prevention implemented by JICA ever, therefore JICA expects PAGASA to develop and continue operational guidance as the good sample for the other related projects.

Mr. Akatsu also provided an advice that PAGASA should continue daily monitoring and modification to keep good conditions, though there would be some obstacles for the success in operational guidance.

Dr. Cayanan responded for the advice as she shared PAGASA's plan about assignment of a technical application team for the monitoring task. She also provided her opinion that the improvement of human resources in collaboration of technical development and adoption of new techniques will be meaningful, not just introducing it as black box.

3. Miscellaneous

Concluding remarks and adjournment

Engr. Catalino L. Davis, Deputy Administrator for Administration and Engineering Services provided closing remarks that some issues remained has been mostly solved Since the last JCC, and results of terminal evaluation are very satisfactory. He expressed his expectation that remaining matters reported that day will be settled by the next JCC next year. He also mentioned about the past US project "Educational textbook for typhoon warning" for 5/6 grades pupils in junior schools as a succeeded case, and explained PAGASA's intent to collaborate with the other agencies to maximize the output of the project.

(End of Meeting)

Appendixes:

1. Agenda of 6th JCC meeting





6th Joint Coordination Committee (JCC) Meeting for J-POW PROJECT



(JICA Project for Enhancing Capacity on Weather Observation, Forecasting and Warning)
Amihan Conference Room, PAGASA Science Garden, Agham Road, Quezon City
18th October 2016; 1:00 PM to 4:00 PM

I. Call to Order

Dr. Vicente B. Malano

Administrator, PAGASA
Project Director, J-POW Project

II. Statement

Mr. Takahiro Morita

Senior Representative,
JICA Philippines Office

III. Highlights and Business Arising from previous JCC

Dr. Esperanza O. Cayanan

Chief, Weather Division, PAGASA
Project Manager, J-POW Project

IV. Result of Joint Terminal Evaluation

- a) Presentation
- b) Q & A

Ms. Yuko Tanaka

Consultant, Tekizaitekisho LLC

V. Project Progress Reports & Discussion for Future Plan of Project

- a) Warning Criteria (Output-3)
- b) Comprehensive Report
 - Radar Maintenance (Output-1a)
 - Weather Observation (Output-1b)
 - Weather Guidance (Output-2b)
 - Meteorological Data Analysis (Output-2a)
 - Rain Gauge Network in Southern Luzon
 - Meteorological Information (Output-4)
 - Awareness Raising Activities (Output-5)
- c) Q& A Discussion for Future Plan of Project

Mr. Nobuo Sato

Chief Advisor, J-POW Project

Mr. Michihiko Tonouchi

Team Leader, J-POW Project

Dr. Masao Mikami

Sub Team Leader, J-POW Project

VI. Concluding remarks

Engr. Catalino L. Davis

Deputy Administrator,
Administrative and Engineer Services

VII. Adjournment

Engr. Catalino L. Davis

Deputy Administrator,
Administrative and Engineer Services

*Moderator: Ms. Angelina S. Galang,
Weather Specialist I, Administrator's Office PAGASA
Project Coordinator, J-POW Project*

MINUTES OF MEETING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL
AND ASTRONOMICAL SERVICES ADMINISTRATION,
DEPARTMENT OF SCIENCE AND TECHNOLOGY
ON
PROJECT FOR ENHANCING THE CAPACITY ON WEATHER OBSERVATION,
FORECASTING AND WARNING

Japan International Cooperation Agency (hereinafter referred to as "JICA"), the Philippine Atmospheric, Geophysical and Astronomical Services Administration, The Department of Science and Technology (hereinafter referred to as "PAGASA") and other Philippine authorities concerned have discussed several major issues during the Seventh Joint Coordination Committee (hereinafter referred to as "JCC") Meeting for the Project for Enhancing the Capacity on Weather Observation, Forecasting and Warning (hereinafter referred to as "J-POW Project") on the 21st of April 2017 at SEAMEO Innotech in Quezon city.

Both Philippine and Japanese sides exchanged views with respect to the progress of the J-POW Project Output and discussed about the realization of the planned targets and achievement of the project objectives.

As a result of the discussions, the PAGASA and the Project Team have agreed on the matters referred in the document attached herewith.

Quezon City, 21st April 2017



Mr. Nobuo Sato
 Chief Advisor and Expert on Weather
 Forecasting/Administration
 J-POW Project



Dr. Vicente B. Malano
 Administrator,
 Philippine Atmospheric, Geophysical and
 Astronomical Services Administration,
 Department of Science and Technology

Witness by



Ms. Ayumu Ohshima
 Senior Representative
 JICA Philippines Office

Highlights and Discussions of the Meeting

The summary of the "Joint Terminal Evaluation Report" prepared by the Japanese and Filipino evaluators was presented in the highlights and business arising from previous JCC meeting. Since this is the final JCC meeting, the discussion focused on the accomplishments of the project after the Terminal Evaluation and on the achievement of the target indicators and overall project objectives indicated in the Project Design Matrix (PDM).

After the "Highlights and Businesses Arising from Previous JCC meeting" was introduced by PAGASA, the J-POW Project Team Member made the presentations on "Project Purpose, Goal, and Structure", "Summary of the J-POW Project Accomplishments" for each output, and Discussion for "Future Plan of Project". After the summary reports from each output team and discussions, the ceremony of "Hand-over of Deliverables" was performed.

The subjects presented, discussed, and matters agreed for the project are as follows:

I. Highlights and Business Arising from previous JCC

1) Review of the Terminal Evaluation

The following evaluation ratings were reviewed for each Output team.

- (i) Output 1a and 1b are moderately achieved.
- (ii) Outputs 2a and 2b are moderately achieved.
- (iii) Output 3 is partly achieved.
- (iv) Output 4 is mostly achieved.
- (v) Output 5 is mostly achieved.

The achievement of the project purpose was evaluated to be relatively high.

2) Highlights

From previous JCC, the Japanese experts and PAGASA counterparts have discussed the implementation plan for remaining activities per output. And the following activities have been done;

- (i) Efforts towards sustainable outcome targets of two TWGs for QPE and guidance.
- (ii) Public information publicity activities for Mobile Application for android and discussion for the development for iPhone Application in Output 4.
- (iii) Activities to collect feedback information of awareness seminar by questionnaire.
- (iv) Monitoring and continued modification of weather guidance.

II. Project Purpose, Goal, and Structure

A review of project purpose and goal was presented by the lead Japanese Expert based on the final PDM (Project Design Matrix). The structure and the strategy of the project were also reviewed briefly.

III. Project Accomplishment Reports

1) Accomplishment of Output-1 (Radar Maintenance and Meteorological Observation)

Achievements are:

- (i) Radar maintenance trainings were conducted in Nov. 2015 at Aparri and Virac.
- (ii) Maintenance manuals and guidance were developed.
- (iii) Intensive training and follow-up training were also conducted at Virac radar from Feb. to June 2016.
- (iv) As a result, The team confirmed 'Project Purpose Indicator 1: Average operation rate (i.e. data are provided to PAGASA from radars) of three radars becomes more than 80% in the third year' was achieved based on 'PAGASA 2016 Doppler RADAR Whole Year Performance Report' as 94.7 to 100.0 percent at Aparri, Virac

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- and Guiuan.
- (v) Establishment of new standard barometer (3-sensors Digital Barometer with Calibration System)
- (vi) To ensure the traceability of the instruments, continuous survey and the seminar at local observation sites and distribution of the field note were conducted.
- (vii) For improving the traceability of instruments, Meteorological Instruments Maintenance Guideline and Reference Guides were developed.

Remaining issues are:

- (i) Regular maintenance reports must be reported regularly.
- (ii) Stable power supply is a key factor for stable operation.

2) Accomplishment of Output-2 (Meteorological Data Analysis)

Achievements are:

- (i) Improvement of satellite analysis skill through training. For this purpose, the team implemented trainings for SATAID, HIMAWARI8 and Dvorak methods and for radar data products.
- (ii) For preliminary QPE experiment, the team established a Rain Gauge Network in Southern Luzon PRSD to get 10 minutes interval precipitation data, stored rain gauge and radar data from 2016, obtained data during 2 typhoon events in October and developed preliminary QPE (Quantitative Precipitation Estimation) scripts/software.
- (iii) Preliminary trial of QPE at target region, Southern Luzon PRSD
- (iv) Weather guidance for temperature forecast based on Kalman filter technique was successfully developed.
- (v) The guidance was integrated into FAST (Forecast Assist Tool) and has started to be used in the forecast operation of PAGASA.
- (vi) As a result, "Project Purpose Indicator 2: Quantitative forecasting is issued by using weather guidance" was accomplished.

Remaining issues are:

- (i) ARG observation should be continued even after the project.
- (ii) ARG and Radar data should be archived continuously for practicing QPE experiment.
- (iii) Further development of various weather guidance should be continued after the end of the project.
- (iv) There are more requirements of various product based on NWP forecast improvement of the forecast operation of PAGASA.
- (v) There is a need for more staff to develop weather guidance product.

3) Accomplishment of Output-3 (Warning Criteria)

Achievements are:

- (i) Conducted a workshop in SLPRSD to review the existing Rainfall Warning Criteria to verify a criteria in the case of Typhoon Nona (2015) and Nina (2016).
- (ii) Revision of the SLPRSD Rainfall Warning Criteria

4) Accomplishment of Output-4 (Mobile website and application)

Achievements are:

- (i) Meteorological information in the PAGASA website such as Glossary, Warning, and Bulletin was analyzed and improved.
- (ii) Mobile Web site was developed (m.pagasa.dost.gov.ph/weather).
- (iii) Mobile APPs for Android was developed. It is distributed through Google play.

Remaining issues are:

- (i) Development of mobile apps for other platforms (iOS, Windows) to meet the demand for broader users
- (ii) Monitor the User feedback on Mobile apps and continuous modification of the mobile apps based on user needs

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5) Accomplishment of Output-5 (Awareness Rising Activities)

Achievements are:

- (i) Awareness raising seminars at pilot region were successfully carried out and totally more than a thousand of participants that include pupils, parents, teachers, and local government DRR officials,.
- (ii) Questionnaires were collected after the seminar and the results of the evaluation indicated that contents of the seminar was useful and the presentation was easy to understand.
- (iii) In addition, the evaluation at post 1st seminar after Typhoon NONA occurrence indicated that the content of the seminar was very useful for disaster prevention at the time of typhoon NONA occurrence.

Remaining issues are:

- (i) It is desirable that continued awareness raising activities for weather disaster prevention even after the project is over. At that time, cooperation with the region's DepEd is effective.
- (ii) PAGASA will continue with other initiatives in other provinces from pilot region so that the disaster prevention base for natural hazards in all provinces in the Philippines will be strengthened.

6) Summary of Achievement

Dr. Cayanan, head of Weather Division and Project Manager PAGASA summarized the achievements of J-POW Project and concluded that achievement for the Indicators on the PDM is relatively high.

IV. Discussions

The expert team made the presentations on "Comprehensive progress report, and facilitated Q& A Discussion for "Future Plan of Project" The main points of each Output are as follows:

Q: Regarding guidelines and manuals on observation and calibration created in collaboration with PAGASA in this project, does it conforms to ISO?

A: Mr. Barcenas replied that it will be improved further to then apply for ISO certification. In addition, he reported that good performance was obtained when PAGASA's anemometer was calibrated in a wind tunnel in Japan.

Q: Can the manual and guidelines we submitted be used for the purpose of application for ISO as a requirement?

A: Mr. Barcenas answered it is not yet done but it can still be improved for the purpose.

Comment: Dr. Dalida informed that PAGASA will acquire additional wind tunnels, one for the Visayas (Cebu) and the other in Mindanao.

Mr. Barcenas made an additional comment on this that their present wind tunnel 75 m/s will be transferred to Mindanao and the new 100 m/s will be installed in central office and the other 100m/s to Cebu. It will be in the process of bidding this year.

Comment: PAGASA pointed that the team should store additional rain gauge and radar data during heavy rain events for future QPE development.

Output 2-a presenter agreed the importance of data storage especially during heavy rain events, and confirmed to continue data storage.

Q: There was a question from Dr. Dalida concerning the MOS guidance equation developed in this project.

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A: The presenter of Output 2-b explained that the forecast equation of temperature guidance with Kalman filter technique was not fixed one but was updated everyday in order to realize the best accuracy.

Q: Dr. Dalida ask if the project includes the established rainfall threshold by Albay PDRRMO.

A: The presenter of Output 3 replied that the project focuses on flooding first but we will improve the Rainfall Warning Criteria and will use the threshold established by Albay PDRRMO.

Q: The question from DOST is on the inclusion of expected landslide on the red warning level and if PAGASA is the one responsible for this type of warning.

A: Dr. Malano replied that there is an initiative of the Philippine government to harmonized different warning thru a multi hazard warning system of different government agencies.

Q: The question from OCD regarding on who will be responsible in issuing localized rainfall warning since we discussed that the rainfall threshold is highly localized.

A: The presenter of Output 3 replied that the warning should be issued by the PRSD.

Q: The question from OCD regarding on who will be responsible in issuing localized rainfall warning since we discussed that the rainfall threshold is highly localized.

A: The presenter of Output 3 replied that the warning should be issued by the PRSD.

Comment: In addition to DepEd DRR section, we should involve the Philippine Information Agency (PIA) in the production of information materials and as partner in the raising awareness seminar.

A: The presenter of Output 5 replied that it is worth for consideration. We would like to involve the Philippine Information Agency (PIA) in the future, however in the Output 5 conduct of Raising Awareness and in the development of information materials like poster and power point presentations we involved the School DRR Focal Person in the Pilot areas, the science teachers and the school principal. While the production of radio plugs the PIA, PDRRMO and Broadcasters were involved. It is worth mentioning that even if the radio plug is in Filipino, the local broadcaster translated the material into local dialects (Bicolnon and Waray). The presenter also informed the body that the information produced by Output 5 were first presented with Technical Personnel of PAGASA and JPOW Staff for comments before we conducted the pre-test in identified schools in Sorsogon and Northern Samar.

Q. Why limit the number of students in the awareness seminar?

A. The 50 students per session was targeted as participants since it is the ideal number per class and of course in addition to the students, we invited more that 50 parents and teachers as observers per area. However, to address the issue of more people should be informed and updated on the focused topic for 1st awareness like tropical cyclone and storm surge and for 2nd awareness raising which was focused on FLOOD the strategy is the developed and aired radio plugs in local radio stations.

Additional Remarks from the Presenter

It is worth mentioning that in the Consultation meeting with Regional DEPED, it was attended by no less than the Regional Director, Assistant Regional Director and Schools Division Superintendent and Schools DRR Focal Persons. In fact, they were appreciative of the project and requesting for the educational /information materials for replication in their respective areas.

Further, the presenter announced that this coming July 2017 in the celebration of the National Science and Technology Week, one of the activities is a Disaster Summit for 500 School children as participants and will be using the materials produced by the J-POW Project.

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V, Miscellaneous

Concluding remarks and final comments from JICA Senior Advisor

Dr. Dalida, Deputy Administrator for Operations & Services, PAGASA, expressed his deep thanks for Output team members for their efforts to achieve outcome goals. He also expressed his gratitude for the project's great achievements.

Mr. Akatsu, Senior Advisor (professional engineer), JICA, as a concerned coordinator who has been involved from the beginning of this project, expressed his great pleasure to find the project finalized with fruitful results. He also mentioned that JICA would support activities of PAGASA and related agencies from DRR (Disaster Risk Reduction).

(End of Meeting)

Appendixes:

1. Agenda of 7thJCC meeting

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7th Joint Coordination Committee (JCC) Meeting JPOW PROJECT



(JICA Project for Enhancing Capacity on Weather Observation, Forecasting and Warning)

L.B. Soriano Hall, SEAMEO Innotech, Commonwealth Ave., Diliman, Quezon City

21st April 2017; 9:00 AM to 12:00 NN (Registration : 8:30 AM)

I. Call to Order and Opening Statement

Dr. Vicente B. Malano

Administrator, PAGASA
Project Director, JPOW Project

II. Highlights and Business Arising from previous JCC

Dr. Esperanza O. Cayanan

Chief, Weather Division, PAGASA
Project Manager, JPOW Project

III. Project Purpose, Goal, and Structure

Mr. Michihiko Tonouchi

Project Manager, J-POW Project

IV. Project Accomplishment Reports

a) Radar Maintenance (Output-1a)

Mr. Fulgencio A. Austria, Jr.

Weather Facilities Specialist II, ETSD, PAGASA

b) Meteorological Data Analysis (Output-2a)

Mr. Ramjun Sajulga

Weather Facilities Specialist I, RDTD, PAGASA

c) Weather Observation (Output-1b)

Mr. Ferdinand Y. Barcenas

Weather Specialist II, IRDU, PAGASA

d) Weather Guidance (Output-2b)

Mr. Koji Matsubara

Expert, J-POW Project

e) Warning Criteria (Output-3)

Mr. Raymond Ordinario

Weather Specialist I, WD, PAGASA

f) Meteorological Information (Output-4)

Mr. Ryusuke Taira

Expert, J-POW Project

g) Awareness Raising Activities (Output-5)

Mr. Eufronio Garcia

Officer-in-Charge, SLPRSD PAGASA

h) Summary of Achievements

Mr. Nobuo Sato

Chief Advisor, J-POW Project

V. Hand-over of Deliverables

Ms. Samantha Christine V. Monfero

Senior Weather Specialist, WD, PAGASA

VI. Concluding Remarks

Ms. Venus Valdemoro

Administrative Officer V, RDTD, PAGASA

VII. Adjournment

Dr. Esperanza O. Cayanan

Dr. Masao Mikami

Sub Project Manager, JPOW Project

Dr. Landrico U. Dalida

Deputy Administrator for O&S, PAGASA

Dr. Vicente B. Malano

Administrator, PAGASA

Project Director, JPOW Project

Emcee: *Mr. Raymond C. Ordinario,*
Weather Specialist I, Weather Division, PAGASA

MINUTES OF MEETINGS
BETWEEN
THE JAPANESE TERMINAL EVALUATION TEAM AND THE AUTHORITIES CONCERNED OF THE
GOVERNMENT OF THE PHILIPPINE
ON
THE JAPANESE TECHNICAL COOPERATION
FOR
PROJECT FOR ENHANCING CAPACITY ON WEATHER OBSERVATION, FORECASTING AND
WARNING

The Japanese Terminal Evaluation Team (hereinafter referred to as "the Team"), organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Yoichi Inoue, Acting Director of Disaster Risk Reduction Team 1, Global Environment Department, visited the Republic of the Philippines from September 28 to October 19, 2016 for the purpose of conducting the terminal evaluation on the Japanese technical cooperation for project for enhancing capacity on weather observation, forecasting and warning (hereinafter referred to as "the Project").

During its stay, both the Team and the Philippine side formulated the Joint Evaluation Team, exchanged the views and had a series of discussions on the Project with the Philippine authorities related and concerned. As a result of the discussions, the Team submitted the report as attached (Annex-1) and both Philippine and Japanese sides (hereinafter referred to as "Both sides") agreed upon the descriptions of the report and the attached document.

Quezon City, October 18, 2016

YOICHI INOUE

Team Leader

Terminal Evaluation Team

Japan International Cooperation Agency (JICA)

VICENTE B. MALANO, PhD, MNSA

Administrator

Philippine Atmospheric, Geophysical, and
Astronomical Services Administration (PAGASA)

ATTACHED DOCUMENT

1. Joint Terminal Evaluation:

Both sides agreed the result of the Joint Terminal Evaluation as Annex 1.

2. Recommendations and lesson learned:

A series of recommendations and lessons learned are written in the Report. Below points are to be highlighted by the Team because of its importance.

Recommendations to be considered during the Project period (until May 2017)

1. For traceability of meteorological instruments (indicator 1-1 of Output 1), the Project mainly focused on improvement of atmospheric pressure. The Project also compared existing reference standard for thermometer with JMA's travelling standard. In order to operationalize traceability at the local level, it is advised for RDTD to coordinate with ETSD to assure that the calibrated instrument is utilized at the local level after installation. At the same time, it is important to educate staff members at local Synop/AWS stations for the importance of utilizing newly installed instruments. It is also recommended to discuss importance of Quality Control (QC) to assure (traceability) accuracy of meteorological instruments.
2. To follow up if the monthly maintenance reports including equipment status report at radar sites are regularly reported to ETSD. At the same time, it is advised to assure if equipment status reports of other meteorological instruments are regularly reported to ETSD as is instructed in MASSO.
3. For early development of QPE system and setting up criteria for warning, it is necessary to archive precipitation data from radar stations and ARG/AWS. A workshop on the assessment of warning criteria and development of new threshold values is recommended when more data has been collected.
4. For future development of precipitation guidance, it is necessary to assure archive of precipitation data (ARG/AWS).
5. The Project is advised to steadily complete the "Automation Production System of Weather Guidance" and to launch the operation of "Forecast work support system (FxWSS)".
6. For warning criteria in SL-PRSD, it is advised to i) operationalize the warning criteria set in Legaspi and evaluate, ii) to assess whether the provisional warning criteria is also applicable to ARG sites, by comparing precipitation data and disaster data (such as flood).
7. Regarding the elevation angle of radars, it is suggested to JICA expert in charge of QPE to write a letter to WD to propose modification of the elevation angle of three JRC radars. It is important for observation of not only typhoons but also rain clouds.
8. It is recommended to promote mobile application and mobile website not only to NCR but also provinces. It is recommended that local DRRMOs be involved in IEC activities as member of TWG to complement resources of the Project.

ANNEX:

ANNEX 1: Joint Terminal Evaluation Report



**Terminal Evaluation Report
on Japanese Technical Cooperation
for
the Project for Enhancing Capacity on Weather Observation,
Forecasting and Warning
in the Republic of the Philippines**

**Japan International Cooperation Agency
and
Philippine Atmospheric, Geophysical and Astronomical Services Administration
(PAGASA)**

October 2016

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ANNEX LIST

Annex 1	Schedule of the Terminal Evaluation
Annex 2	List of Persons Interviewed
Annex 3	PDM version 1
Annex 4	Lists of Inputs

LIST OF ABBREVIATIONS

ARG	Automatic Rain Gauge
AWLG	Automatic Water Level Gauge
AWS	Automatic Weather Station
C/P	Counterpart
DRRM	Disaster Risk Reduction and Management
DOST	Department of Science and Technology
EFCOS	Effective Flood Control Operation System
ETSD	Engineering and Technical Services Division, PAGASA
FFWS	Flood Forecasting and Warning System
GIS	Geographic Information System
HMD	Hydrometeorology Division
JCC	Joint Coordinating Committee
JICA	Japan International Cooperation Agency
JMA	Japan Meteorological Agency
JOCV	Japan Overseas Cooperation Volunteer
JPY	Japanese Yen
M&E	Monitoring and Evaluation
MM	Man-Month
NCR	National Capital Region
NCRPRSD	National Capital Region PRSD
NEDA	National Economic and Development Authority
NDRRMC	National Disaster Risk Reduction and Management Council
NLPRSD	Northern Luzon PRSD
NWP	Numerical Weather Prediction
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PDM	Project Design Matrix
PO	Plan of Operations
PRSD	PAGASA Regional Services Division
QPE	Quantitative Precipitation Estimation
R/D	Record of Discussions
RDTD	Research and Development Training Division, PAGASA
SATAID	Satellite Animation and Interactive Diagnosis
SL-PRSD	Southern Luzon PRSD
SYNOP	Surface Synoptic Observation
WD	Weather Division, PAGASA

1. OUTLINE OF THE TERMINAL EVALUATION STUDY

1.1 Background of the Terminal Evaluation

The Philippine archipelago, located near the western edge of the Pacific Ocean with a population of 94 million people (based on the 2010 Census), is in the direct path of seasonal typhoons and monsoon rains which bring floods, storm surges, and their attendant landslides and other forms of devastating natural disasters. According to the Office of Civil Defense (OCD), 12 tropical storms and typhoons in 2011 alone had caused 1,557 deaths and adversely affected more than 3.5 million people. Every year, the Philippines experiences huge economic losses coupled with serious human anguish and sufferings caused by destructive tropical cyclones that cross the country. Tropical cyclones repeatedly caused significant damage to agriculture which is a vital industry in the Philippines, thereby inflicting widespread poverty on its people. Extensive damages from tropical cyclones have caused significant set-backs of the national economy and adversely affected the people's standard of living in the Philippines. In this context, the establishment of effective weather forecasting and warning system is considered by the Government of the Philippines (GOP) one of the top development agenda.

The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) is the sole national meteorological service provider in the Philippines operating under the administrative supervision of the Department of Science and Technology (DOST). Its main responsibility as a National Meteorological Service is to record meteorological observations round the clock and to provide weather information, forecasts, advisories and warnings necessary to mitigate and prevent widespread damages from natural disasters and therefore contribute to the improvement of socio-economic conditions.

In order to effectively protect lives and properties from tropical cyclones, it is important to establish a reliable and timely dissemination of public storm warning signals and tropical cyclone information to the public and disaster management agencies [e.g. OCD, The Philippine Coast Guard (PCG) and the local government units (LGUs), among others]. Under this circumstance, the Government of the Philippines (GOP) requested the Government of Japan (GOJ) for a grant assistance to improve the meteorological radar system in the Philippines. In response, the GOJ through JICA assisted PAGASA in implementing the "Project for Improvement of the Meteorological Radar System" between 2009 and 2013 under Japan's Grant Aid program. The project established three Doppler radars in Virac (Catanduanes Island), Aparri (Luzon Island) and Guiuan (Samar Island) and included the procurement and installation of required equipment, construction of appropriate radar tower buildings, as well as provision of relevant systems and facilities.

The full utilization of procured equipment and installed systems is crucial to achieve effective forecasting and dissemination of meteorological and disaster-related information to the public and disaster management agencies. In order to strengthen the capacity of PAGASA staff in utilizing the system and disseminating warning information, the GOP again requested GOJ this time for a technical assistance. In response, the GOJ through JICA assisted PAGASA in implementing the "Project for Enhancing Capacity on Weather Observation, Forecasting and Warning" under JICA's Technical Cooperation Program (TCP) from April 2014 to May 2017.

In order to review the progress of implementation and project achievements as well as identify measures to ensure successful project completion in May 2017, JICA conducts the Terminal Evaluation for the project and dispatched the Terminal Evaluation Team to the Philippines during the last days of September 2016

until the third week of October 2016.

1.2 Objectives of the Terminal Evaluation

The Objectives of the Terminal Evaluation are as follows;

- (1) To verify the level of achievement of the Outputs and the Project Purpose as indicated in the Project Design Matrix (PDM);
- (2) To identify factors that promoted or inhibited the performance of the Project;
- (3) To analyze the JICA’s technical cooperation and overall project intervention from the point of views of the five evaluation criteria; and
- (4) To identify recommendations and extract lessons for planning and implementing similar technical cooperation projects in the future.

1.3 Members of the Terminal Evaluation Team

The Terminal Evaluation was conducted jointly by representatives of both Japanese and Philippine Governments. The Terminal Evaluation Team is composed of the following members:

1.3.1 Japanese Side:

	Name	Designation	Position, Organization
1	Mr. Yoichi Inoue	Team Leader	Acting Director, Disaster Risk Reduction Team I, Global Environment Dept., Japan International Cooperation Agency (JICA), Tokyo, Japan
2	Mr. Kunio Akatsu	International Meteorology	Senior Advisor, Japan International Cooperation Agency (JICA), Tokyo, Japan
3	Ms. Yuko Tanaka	Evaluation Analysis	Consultant, Tekizaitekisho LLC, Tokyo, Japan
4	Mr. Rey Gerona	Evaluation Analysis 2	In-house consultant for Project Formulation, M&E and Capacity Building for Partner Organizations, JICA Philippines Office

1.3.2 Philippine Side:

	Name	Position, Organisation
1	Mr. Ryan Christopher P. Viado	Senior Science Research Specialist of the Energy and Utilities Systems Technology Development Division (EUSTDD), DOST
2	Ms. Thelma A. Cinco	Section Chief, Impact Assessment Application Division, CAD, PAGASA
3	Engr. Roy A. Badilla	OIC, Hydro-meteorological Division, PAGASA

1.4 Schedule of the Terminal Evaluation

The evaluation was conducted from September 29, 2016 to October 19, 2016. The detailed schedule of the Terminal Evaluation is attached as **Annex 1**.

1.5 Stakeholders Consulted/Interviewed

The stakeholders who were consulted or interviewed for the Terminal Evaluation consisted mainly of the following:

- Japanese experts assigned to the Project

- Counterparts (C/Ps) from PAGASA
- Related stakeholders in Sorsogon, Legazpi, and Virac

The detailed list of the persons consulted is attached as **Annex 2**.

1.6 Methodology of the Terminal Evaluation

1.6.1 Procedure

The PDM version 1 (see **Annex 3**) is adopted as a framework of the Terminal Evaluation. The Terminal Evaluation Team (hereinafter referred to as “the Team”) conducted surveys by questionnaires and interviewed the counterparts (hereinafter referred to as “C/P”) and the Japanese experts (also referred hereinafter as “JICA experts”) as well as those officials concerned with the Project. Both quantitative and qualitative data were gathered and utilized for analysis. Data collection methods used for the evaluation were as follows:

- Literature/Documentation Review;
- Questionnaires;
- Individual and/or group interviews;
- Direct Observations

1.6.2 Items of the Terminal Evaluation

(1) Achievement of the Project

Achievement of the Project is measured in terms of the progress of the provision of Inputs, extent of the production of Outputs, and the extent of achieving the Project Purpose, with reference to the Objectively Verifiable Indicators identified in the PDM version 1.

(2) Implementation Process

In order to identify promoting and inhibiting factors affecting performance of the project, implementation process is reviewed from various viewpoints, including communication among stakeholders, monitoring and project management, among others.

(3) Analysis based on the Five Evaluation Criteria

Based on the observations made under the previous two items, the Project is assessed from the viewpoints of the Five Evaluation Criteria defined by JICA and originally espoused-by the DAC (OECD)¹ shown in Table 1-1 below.

¹ DAC website on Criteria for Evaluating Development Assistance (accessed on 29 August, 2015)
<http://www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.htm>

Table 1-1 Summary Definition of the Five Evaluation Criteria

Five Evaluation Criteria		Definitions as per JICA Evaluation Guidelines
1.	Relevance	Relevance of the Project is reviewed by examining the validity of the Project Purpose and Overall Goal in connection with the Philippine Government's development policy and the needs of the target groups and/or ultimate beneficiaries.
2.	Effectiveness	Effectiveness is assessed by examining the extent to which the Project has achieved its Project Purpose, clarifying the relationship between the Project Purpose and Outputs.
3.	Efficiency	Efficiency of the Project implementation is analysed with emphasis on the relationship between Outputs and Inputs in terms of timing, quality and quantity.
4.	Impact	Impact of the Project is assessed in terms of positive/negative, intended/unintended influence caused by the Project.
5.	Sustainability	Sustainability of the Project is assessed in terms of institutional, financial and technical aspects by examining the extent to which the achievements of the Project will be sustained after the Project cooperation is completed.

Source: JICA Project Evaluation Guidelines (June 2010), JICA

2. OUTLINE OF THE PROJECT

The outline of the Project summarized in the PDM (version 1) is as follows. The Project Purpose indicators down to the Inputs are expected to be achieved during the cooperation period or until May 2017; while the Overall Goal indicators are expected to be achieved within three to five years after the completion of the Project².

2.1 Overall Goal

Capacity of all PRSDs is enhanced in terms of weather observation, forecasting and warning.

2.2 Project Purpose

Capacity of PAGASA Central Office and Southern Luzon PRSD is enhanced in terms of weather observation, forecasting and warning.

2.3 Outputs

There are five Outputs in this Project, namely:

1. Capacity on weather observation is improved.
2. Capacity on meteorological data analysis and forecasting is improved.
3. Criteria of warnings are elaborated at Southern Luzon PRSD.
4. Content and accessibility of meteorological information are improved.
5. Activities of awareness-raising on meteorological information are improved at Southern Luzon PRSD.

² According to JICA Project Evaluation Guidelines (June 2010)

3. ACHIEVEMENT AND IMPLEMENTATION PROCESS

3.1 Inputs

Inputs to the Project as of October 2016 since its inception are as follows:

3.1.1 Japanese Side

a) Dispatch of the JICA experts

Long-term Experts: A total of two long-term experts were assigned and dispatched to the Project since its commencement. The areas of expertise as well as contract period of long-term experts are shown in the following table.

Table 3-1 Summary of Long-term Experts

Areas of Expertise	Contract Period
Chief Advisor/ Meteorological Administration	May 2014 – May 2016
Project Coordinator / Specialist (Training Program/Public Relation)	June 2014 – June 2016

Source: Data provided by the Project

Short-term Experts (Japan): A total of 40.43 man-months³ (MM) were allocated for the assignment of 11 short-term experts from Japan. The following table shows the allocation of MM for each area of expertise.

Table 3-2 Summary of Short-term Experts (Japan)

Areas of Expertise / Terms of Reference (TOR)	Total Man-months (MM)
Chief Advisor/ Meteorological Administration	6.23
Previous Project Manager/ Awareness-raising activities	4.20
Sub Project Manager/ Awareness-raising activities	3.53
Project Manager/ SATAID	3.50
Observation	7.63
Radar maintenance and operation	1.37
Radar maintenance and operation hard ware	2.77
Radar maintenance and operation soft ware	0.26
Guidance	4.93
Weather information and communication	7.97
Awareness-raising activities	4.27
Total	40.43

Source: Data provided by the Project

The detailed lists of the experts are attached as **Annex 4**.

b) Training in Japan

³ Includes provisional assignment will March 2017.

As of October 2016, a total of four (4) counterparts from PAGASA were sent to Japan for training. The overview of the mentioned training/workshop is shown below.

Table 3-3 Summary of the Training in Japan

Name of the Training	Number of Participants	Duration
Weather Forecasting	4	Oct 12 – Oct 24, 2015 (13 days)

Source: Data provided by the Project

c) Local Expenses

A total of **JPY6,147,764** were provided by Japanese side as a local cost. The local cost includes car rentals, consumables, domestic travel costs including air fare, accommodation and per-diem, telecommunications and teaching materials. The summary of the local expenses is shown in the following Table.

Table 3-4 Summary of Local Expenses

Items	Amount (JPY)
Rental cars	4,252,592
Consumables	30,648
Domestic travel cost	1,250,746
Telecommunications	77,825
Teaching materials	280,199
Other expenses	255,753
Total	6,147,763

Source: Data provided by the Project

d) Equipment

A total of **PHP7,894,000** worth of equipment was provided by Japanese side. Equipment provided by the Project includes OA equipment such as office PCs, photo copy, printers, projectors, as well as calibration equipment and equipment for ARG network. Additional PHP482,045 was spent for the transportation of equipment. The detailed list of equipment is attached as **Annex 4**.

3.1.2 Philippine Side

a) Assignment of Counterparts

As of October 2016, a total of 36 personnel from PAGASA are assigned as counterparts (C/Ps) to the Project. They are three administrative officers from DOST-PAGASA, thirteen (13) from Weather Division (WD), nine (9) from Engineering and Technical Services Division (ETSD) and eleven (11) from Research and Development Training Division (RDTD). In addition, staff members from the PAGASA Southern Luzon Regional Services Division (SL-PRSD) are assigned as the Project C/Ps. List of counterparts and related stakeholders are attached as **Annex 4**.

b) Provision of Facilities for Project Operations

The Philippine side secured office space within PAGASA central office for JICA experts as well as lots for rain-gauge instruments.

3.2 Achievement of the Project

3.2.1 Activities

Most of the Project's activities, as specified in the PDM (version 1) and the Project's Plan of Operation (PO) were mostly implemented as planned.

3.2.2 Outputs

Output 1: Capacity on weather observation is improved.

Output 1 is composed of two elements namely; a) Operation and maintenance of radars; b) meteorological observation. The table below shows the level of achievements of Output1 with reference to indicators specified in PDM (version 1).

Table 3-5 Level of achievement with reference to Indicators (Output 1)

Indicators as per PDM (version 1)	Major achievements	Remarks
1-1 Traceability of Instrument is improved through development of reference guides regarding maintenance and calibration.	<ul style="list-style-type: none"> ● Traceability of barometer was improved as the Project developed the RIC Philippine reference standard for atmospheric pressure, utilizing digital barometers. ● Reference standard for thermometer already existed in PAGASA before the Project. The existing reference standard for thermometer was compared with JMA standard during the visit of short-term expert. ● For more improvement of rain gauge calibration, the Project is conducting OJT on calibration procedure of rain gauge on a trial basis. 	<ul style="list-style-type: none"> ● Reference standard is improved for barometer, however still needs improvement in terms of operations at the provincial level
1-2 Capability of more than 80% of staff engaged in the maintenance and calibration of SYNOP/ AWS stations and RADAR stations is enhanced.	<ul style="list-style-type: none"> ● Short-term experts were dispatched to provide intensive training for operation and maintenance targeting at least two principal radar operators each from three Radar stations. ● Training was conducted on the maintenance and calibration of Synop/AWS, of which 175 (including 38 from Southern Luzon region) participated. 91% of the participants responded that the contents of the training was useful for their regular work, though limited information was available about the level of capacity building. ● For meteorological instruments, site visits are conducted in Synop/AWS stations to provide necessary advice and trainings. 	<ul style="list-style-type: none"> ● Educate staff at local Synop/AWS for the importance of utilizing newly installed instruments.
1-3 Maintenance reports on respective equipment (i.e. radars, synop stations and AWS) are regularly prepared and reported to the PAGASA Central Office.	<ul style="list-style-type: none"> ● Maintenance reports are regularly prepared at Radar sites by resident technicians, however it was reported that not all the maintenance reports are regularly reported to ETSD. ● The existing "Manual of surface synoptic observation (MASSO)" regulates reporting system from local to central levels. However, limited information is available whether all equipment status reports on AWS/Synop stations are regularly prepared and reported to the PAGASA central office in compliance with MASSO. 	<ul style="list-style-type: none"> ● Follow-up necessary to see if maintenance reports, including equipment status reports are regularly reported from Radar stations, AWS/Synop.

Source: Interview and Progress Report 3

Output 1 is moderately achieved. Two technical working groups (TWG) were formed under this output, namely i) TWG on Radar maintenance and ii) TWG on Meteorological Instruments and weather observation.

As for the traceability of instruments, reference standards for thermometer and barometer already existed in PAGASA even before the Project. The existing reference standard for thermometer and barometer were compared with JMA standards during the visit of short-term experts. The comparison results were within the achievable measurement uncertainty. Traceability of barometer was improved as the Project developed the RIC Philippine reference standard for atmospheric pressure, utilizing digital barometer as it is just timely that the standard barometer of PAGASA had to be recalibrated and a more precise digital barometer and pressure pump was granted from the project. It is reported however that some Synop stations still utilize old instruments even after the installation of new instruments calibrated by RDTD. The reason behind was assumed that there was not enough time to provide sufficient instructions by ETSD after installation of new instruments and staff at the local stations are more familiar with utilizing old instruments. Therefore, the indicator 1-1 is mostly achieved for barometers, but it still needs improvement in terms of operations at the provincial level.

As for the operation and maintenance of radar sites, short-term experts were dispatched to provide intensive training for operation and maintenance targeting radar operators from three Radar stations established by Japan's Grant Aid program. During the interview with radar operators in Weather Radar Station in Virac, it was reported that radar operators trained by the project have become confident enough to conduct necessary operation and maintenance (Indicator 1-2). Maintenance reports are regularly prepared and logged at radar sites however it was reported that not all the maintenance reports are regularly reported to PAGASA central office (Indicator 1-3).

Remaining task for Output 1 is to ensure the full utilization of calibrated instruments installed newly so that the RIC Philippine reference standards for air pressure, as well as existing reference standards for temperature are to be fully utilized. For this purpose, the Project is expected to provide further guidance and instructions to Synop/AWS stations as well as officers-in charge from engineering department of PAGASA central office.

Output 2: Capacity on meteorological data analysis and forecasting is improved.

Output 2 is composed of two elements namely; a) SATAID/Radar analysis; b) meteorological guidance. The level of achievements of Output 2 with reference to indicators identified in PDM is shown in the table below.

Table 3-6 Level of achievement with reference to Indicators (Output 2)

Indicators as per PDM (version 1)	Major achievements	Remarks
2-1 Capability of 80% of the operational staff on the use of SATAID is improved.	<ul style="list-style-type: none"> ● Project conducted various trainings such as SATAID, Dvorak method, Himawari 8. The short-term experts reported that there had been improvement of staff's capacity. ● 22 staff participated in the above-mentioned training, and it is reported that more than 80% of them enhanced knowledge on the use of SATAID after the training. 	<ul style="list-style-type: none"> ● Staff are already utilizing SATAID, the Project only provided additional knowledge through trainings and mentoring.
2-2 Software for RADAR data	<ul style="list-style-type: none"> ● Software for Radar data calibration with rain gage data is developed. 	<ul style="list-style-type: none"> ● The software still awaits for more events (heavy rains) to be able to

calibration with raingauge data is developed.	<ul style="list-style-type: none"> ● Continuous archiving of available radar and raingauge data since Dec 2015. ● Installation of additional 9 ARGs around Virac radar. 	<p>feed into the system.</p> <ul style="list-style-type: none"> ● In order to develop QPE system, it is necessary to i) archive Radar and AWS/ARG data; ii) assure quality control of Radar data through capacity-building of numerical modeling staff; iii) calibrate radar data with ARG data. ● The observation angle mode of three JRC radars is another issue of concern for development of QPE system.
2-3 Weather guidance is developed.	<ul style="list-style-type: none"> ● Technical working group on weather guidance began its activity from Nov. 2014 and has developed temperature guidance by utilizing Kalman filtering method. ● “Automated production system of weather guidance” is being constructed and shall be launched by the end of 2016. 	<ul style="list-style-type: none"> ● It is important to steadily complete the “Automated production system of weather guidance” and FxWSS based on the implementation plan agreed between JICA expert and PAGASA counterparts.

Source: Interview and Progress Report 3

Output 2 is moderately achieved. Two technical working groups (TWG) were formed under this output, namely: i) TWG on Quantitative Precipitation Estimation (QPE) and ii) TWG on weather guidance.

Short-term experts were dispatched to provide trainings on the use of SATAID and it is reported by the short-term experts that there had been improvement of staff’s capacity on the use of SATAID (indicator 2-1). For the calibration of radar data, Radar data from Aparri, Virac and Guiuan are transmitted to PAGASA central office and the ARG data is transmitted to both PAGASA central office and SL-PRSD. Rainfall data from Radar and AWS/ARG are reported to have been archived from July 2014. However, Japanese expert team notes that rainfall data are still missing even after the mentioned date of July 2014. Indicator 2-2 is partly achieved in light of development of QPE, since it requires to i) archive Radar and AWS/ARG data; ii) assure quality control of Radar data; and iii) calibrate radar data with ARG data.

Remaining task of Output 2 is the development of QPE. This will heavily rely on the availability of rainfall data (therefore will depend on the occurrences of natural “events”). It is also necessary for the Project to assure if the data from all 9 ARGs are appropriately transmitted and archived at PAGASA central office. For the development of QPE, archive of ground rainfall data is essential as mentioned, and radars data can be utilized as equivalent data to ground raingauge. In this regard, re-arrangement of observation angle mode of three JRC radars should be considered so that radars can detect rain clouds more widely nearby 2km height from the ground with less radar false echo.

As for the weather guidance, the TWG focused first in providing an automated forecast work support system for some of the contents of PAGASA’s issuance of daily weather forecasts. In particular, the TWG arrived at formulating a temperature guidance for 15 key cities included in the extended weather outlook. Operation and maintenance of the automation system will become an important issue once “Automated production system of temperature guidance” is fully launched. For this end, enhancement of technical support team for the automation system is necessary in order to sustain the automation production system of temperature guidance.

Output 3: Criteria of warnings are elaborated at Southern Luzon PRSD.

The level of achievements of Output 3 with reference to indicators identified in PDM is shown in the Table below.

Table 3-7 Level of achievement with reference to Indicators (Output 3)

Indicators as per PDM (version 1)	Major achievements	Remarks
3-1 Criteria of warnings are made at the provincial level.	<ul style="list-style-type: none"> Warning criteria is provisionally set for some of the municipalities including Legazpi City in Albay Province. 	<ul style="list-style-type: none"> The SL-PRSD has not yet developed criteria for warnings at the provincial level. Need to operationalize the warning criteria set in Legazpi and evaluate Need to assess whether the provisional warning criteria is also applicable to ARG sites

Source: Interview and Progress Report 3

Output 3 is partly achieved. The Project actively involves SL-PRSD as the main counterpart for setting up provincial level criteria for rainfall warning. The 9 ARGs were installed in three provinces within SL-PRSD coverage in July 2016 in order to enhance the achievement of the Project. Warning criteria is provisionally set by the SL-PRSD for some of the municipalities in Albay Province in June 2015, but this is just on experimental basis that needs to be reviewed/assessed and adjusted when more rain events are gathered. This is the reason why SL-PRSD has not yet announced rainfall warning even during the event of typhoon Nona in December 2015 because the rainfall data did not reach to the assigned threshold for warning.

Remaining task for Output 3 is to strengthen data collection and archive structures of both rainfall data (through ARG and radar) and natural disaster data induced by rainfall. As for the archive of natural disaster data induced by rainfall, coordination with PDRRMO within southern Luzon region shall be strengthened. Through this project, the expert can assist in the review/assessment of the provisional criteria by way of a workshop when more data is collected on provincial level before the project ends in May 2017.

Output 4: Content and accessibility of meteorological information are improved.

The level of achievements of Output 4 with reference to indicators identified in PDM is shown in the Table below.

Table 3-8 Level of achievement with reference to Indicators (Output 4)

Indicators as per PDM (version 1)	Major achievements	Remarks
4-1 Laymanized and professional information are differentiated at PAGASA's website.	<ul style="list-style-type: none"> The Project created a mobile website to provide laymanized information. The mobile website is provisionally launched and shall be fully launched before the end of the Project. 	<ul style="list-style-type: none"> To promote utilization of mobile application and mobile web to provincial level as well.
4-2 Meteorological information is	<ul style="list-style-type: none"> In order to reduce concentration of access to PAGASA's website, the Project provided alternative website by 	<ul style="list-style-type: none"> No other remarks for this indicator.

timely transmitted by PAGASA Central Office to concerned agencies particularly DRRMC	<ul style="list-style-type: none"> ● creating above mobile website and mobile application. ● Meteorological information is also transmitted to DRRMC through mobile application mentioned above. 	
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Source: Interview and Progress Report 3

Output 4 is mostly achieved. In addition to the existing PAGASA website, the Project created a mobile website and mobile application in order to provide laymanized information. Both mobile website and mobile application are launched (though mobile website provisionally launched). One constraint for the Project to modify existing website was that there was an Administrative Order (AO) issued in July 2013 mandating government agencies including PAGASA to migrate to the government web hosting service⁴. By creating alternative websites, the Project intends to reduce the concentration of access by all users into PAGASA’s homepage.

Remaining task for Output 4 would be to further promote the utilization of mobile website and mobile application to the public in general.

Output 5: Activities of awareness-raising on meteorological information are improved at Southern Luzon PRSD.

The level of achievements of Output 5 with reference to indicators identified in PDM is shown in the table below.

Table 3-9 Level of achievement with reference to Indicators (Output 5)

Indicators as per PDM (version 1)	Major achievements	Remarks
5-1 Program of awareness-raising is enhanced.	<ul style="list-style-type: none"> ● Awareness raising activities were conducted in 8 elementary schools in the Provinces of Northern Samar, Sorsogon and Southern Luzon. ● Educational materials on typhoon and storm surge for pupils (grades 5/6) was produced in English and was utilized in awareness raising activities in local elementary schools mentioned above. ● Radio Clips (30 sec.) on Bagyo (Tropical Cyclone) and Storm Surge was produced in two local languages: Waray (for Northern Samar Province) and Bikolnon (for Sorsogon Province) 	<ul style="list-style-type: none"> ● Indicator 5-1 is achieved, therefore no further remarks for this indicator.
5-2 Result of the implementation of the program is reported.	<ul style="list-style-type: none"> ● The outcomes of the activities are reported to related stakeholders such as Department of Education and the general public in target provinces through local radio stations by airing the radio clips. ● The result of program implementation was also reported to stakeholders at the national level through JCC meetings. 	<ul style="list-style-type: none"> ● This indicator does not specify “to whom” the result shall be reported. ● Participation of local DRRMOs on IEC activities has not been sufficient yet.

Source: Interview and Progress Report 3

Output 5 is mostly achieved. Since its first trial awareness-raising seminar in August 2015, the Project

⁴ Administrative Order No.30 Mandating Government Agencies to Migrate to the Government Web Hosting Service (GWHS) of the Department of Science and Technology - Information and Communications Technology Office (DOST – ICTO)

conducted two awareness raising seminars in eight (8) elementary schools within the target provinces⁵. The number of attendants was ranging 45-65 elementary school children with 23-50 teachers also participated as observers. The educational materials and video clips mentioned in Table 3-9 are produced by the Project. The digital data of IEC materials will be shared with the Department of Education in target provinces. The radio clips were already made available at local radio stations in Sorsogon and Northern Samar provinces.

3.2.3 Project Purpose

Project Purpose: Capacity of PAGASA Central Office and Southern Luzon PRSD is enhanced in terms of weather observation, forecasting and warning.

The level of achievements of Project Purpose with reference to indicators identified in PDM is shown in the table below.

Table 3-10 Level of achievement with reference to Indicators (Project Purpose)

Indicators as per PDM (version 1)	Major achievement	Remarks
1. Average operation rate (i.e. data are provided to PAGASA from radars) of three radars becomes more than 80% in the third year.	<ul style="list-style-type: none"> ● Average operation rate of Virac Radar is more than 82% during 2015-2016. ● Limited data available for other two sites (Aparri and Guiuan). 	<ul style="list-style-type: none"> ● To follow-up average operation rate of other two JRC Radars (in Aparri and Guiuan provinces)
2. Quantitative forecasting is issued by using weather guidance.	<ul style="list-style-type: none"> ● “Automated Production System of temperature guidance” is almost constructed. ● In addition, PAGASA develops the “Forecast work support system” in order to operationalize temperature guidance into its quantitative forecasting based on their plan. 	<ul style="list-style-type: none"> ● It is important to steadily complete the “Automated production system of weather guidance” and FxWSS based on the implementation plan agreed between JICA expert and PAGASA counterparts so that PAGASA could enhance quantitative forecasting.
3. More than 80% of concerned actors (i.e. OCD; PCG; LGUs in pilot PRSD) agree that laymanized meteorological information is timely delivered to them in the third year.	<ul style="list-style-type: none"> ● The project aims to deliver laymanized information by developing a mobile application and mobile website. They are just launched in June 2016 and are not sufficiently promoted in provincial level stakeholders. ● Awareness raising teaching materials (such as posters) are produced targeting school children to raise awareness of disaster preparedness and early evacuation. 	<ul style="list-style-type: none"> ● The Project will conduct a survey once it is promoted at provincial level to find out the results for indicator 3.

Source: Interview and Progress Report 3

Based on the assessment of level of achievement of indicators, **the possibility of achieving the Project Purpose by the end of the Project is considered to be relatively high.**

According to the interview with staff from Virac Radar Station, average operation rate already exceeds 80%, while there is no data yet made available for radar stations in Aparri and Guiuan (indicator 1). Radar data are transmitted to PAGASA central office on a real-time basis and the information is also available through

⁵ Details of awareness raising seminars can be found in Progress Report 3 produced by the Project.

website. With the advancement of QPE system (Output 2a), the radar data shall be utilized to further improve forecasting and warning.

As for weather guidance, the temperature guidance is developed and it is being incorporated into “automated production system of temperature guidance” (indicator 2). In order to operationalize weather guidance, PAGASA also developed the “Forecast work support system” incorporating temperature guidance. The two systems are expected to be finalized by the end of 2016 and expected to be launched from the beginning of 2017.

It is expected for PAGASA to further develop guidance for other parameters such as rainfall and wind after the end of the Project.

As for indicator 3, the Project launched mobile website and mobile application in order to provide laymanized information. The mobile application was launched in June 2016. The Project is expected to further promote utilization of mobile website and mobile application at the provincial level. It is reported by the Japanese expert that the Project intends to conduct a survey to find out the results for indicator 3 (as per mentioned in Table3-10 above) six months after the launch of mobile application, i.e. in December 2016.

3.3 Implementation Process

3.3.1 Specific arrangements regarding Implementation Process

The following are some issues of importance regarding the implementation process of the Project:

- **Coordination with grant aid project:** The Project is implemented in coordination with JICA’s grant aid project, namely “the Project for Improvement of the Meteorological Rader System (2009-2014)”. Through this grant aid project, meteorological radar systems were installed in three provinces in Virac, Aparri and Guiuan Provinces.
- **Implementation structure:** Japanese experts were dispatched based on two different kinds of contract. Chief advisor and project coordinator were dispatched under direct administration of JICA, while short-term experts team were dispatched from a Japanese consultancy company on a contract basis.
- **Formation of technical working groups (TWG):** Seven TWGs were formed under 5 Outputs of the Project, namely: i) Radar maintenance (Output1a), ii) Meteorological Instruments and weather observation (Output1b), iii) Quantitative Precipitation Estimation (QPE)(Output 2a), iv) Weather guidance (Output 2b), v) ARG (Output 3), vi) mobile application/website (Output 4), and vii) awareness raising (Output 5).

3.3.2 Promoting Factors for the Realization of the Project’s Effects

The following are factors promoting the realization of the Project effects:

- **Commitment of TWG and counterpart members:** Most of the TWG members interviewed during the evaluation study are involved from the beginning until at the time of the terminal evaluation without being affected by rotation of human resources in PAGASA. The continuous cooperation and commitment of TWG members and counterpart members are promoting factors during the Project implementation that

facilitate the achievements of activities and outputs identified and expected of the project, respectively.

- **Modernization Act of PAGASA:** “The PAGASA Modernization Act” which took effect in 2015 to improve PAGASA’s technological operation capacity. Objectives stated in the Modernization Act include providing useful, timely, accurate and reliable weather, forecasting and localized warning, which are consistent with the objectives of the Project. It is expected that the outcomes of the Project will be further reinforced with effective implementation of the Modernization Act.

3.3.3 Inhibiting Factors for the Realization of the Project’s Effects

The following are inhibiting factors for the realization of the Project effects:

- **Absence of data to set up QPE and criteria for warning:** Utilization of rainfall data from AWS/ARG is indispensable for development of QPE system and also for setting up criteria for warning. In order to reinforce data collection, the Project installed 9 ARGs in July 2016. However the amount of rainfall data so far is not sufficient to complete Output 2a (QPE) and Output 3 (Warning criteria) within the Project implementation time.
- **Insufficient archive of disaster record at the provincial and local level:** Rainfall-related disaster record is also necessary to set up criteria for warning (Output 3). Archive of disaster record is managed by NDRRMC and summarized data are also made available through OCD website. However, archive of detailed natural disaster data induced by rainfall at the local level is also necessary in order to set up criteria for warning at the local level⁶.
- **Provision of laymanized information through website:** The Project did not modify existing PAGASA website due to a limitation set by an Administrative Order in July 2013 mandating all government agencies to migrate to the government web hosting service. The Project instead developed mobile application and mobile website in order to provide laymanized information. Since the launch of mobile application in 2016, mobile application and mobile website are not yet widely promoted throughout the country, therefore their contribution for reducing access to existing PAGASA website is not yet clear.
- **Risk factor for sustained activities of QPE and Weather Guidance:** It is discussed during the focus group interviews with TWG members that some of the tasks implemented by the Project are conducted as additional activities on top of their regular tasks as PAGASA employees. These tasks include: QPE and Weather guidance. The evaluation team notes that there are certain risk factors for the continuation of these activities after the end of the Project.
- The interaction time between Japanese experts and PAGASA C/Ps for technology transfer is limited. Based on the project design, Japanese experts are dispatched on short-term basis only. On the other hand, PAGASA C/Ps could only devote 30-50% of their time for the Project activities because of other tasks assigned to them as PAGASA employees.

⁶ According to the interview with JICA experts, it is reported that in Albay province natural disaster data is only archived only during two to three years.

4. EVALUATION RESULTS BY FIVE EVALUATION CRITERIA

4.1 Relevance

The relevance of the Project is high for the following reasons:

- The Project design is in line with national policies of the Philippines namely, the “Philippine Development Plan (2011-2016)” which states the strategy to enhance monitoring, forecast, early warning and risk assessment and risk management system. The Philippine’s Disaster Risk Reduction and Management Act was established in 2010, whose objectives include “early warning” and “awareness raising”.
- The Project is consistent with priority areas for Japan’s Assistance Strategy to The Philippines. The Project is conducted under the development issue of “Disaster Risk Mitigation and Management” of the priority area “Overcoming Vulnerability and Stabilizing Bases for Human Life and Production Activity” of the Japanese Government’s Country Assistance Strategy for the Philippines (2012).
- Southern Luzon region, as the target area of the Project, is one of the typhoon-prone areas. It also hosts one meteorological radar stations installed by Japan’s grant aid project. This Project aims to reinforce operation and maintenance side of the Radar stations as part of its five components.

4.2 Effectiveness

The effectiveness of the Project is considered to be relatively high for the following reasons:

- The possibility of achieving the Project Purpose by the end of the Project is considered to be relatively high.
- The Project expects to issue quantitative forecasting (Indicator 2 of Project Purpose) by utilizing temperature guidance before the end of the Project. For further enhancement of the quantitative forecasting, it is expected for PAGASA to continue development of weather guidance for other parameters such as rainfall and wind after the end of the Project.
- The Project aims to provide timely laymanized meteorological information (Indicator 3 of Project Purpose) to all stakeholders (including OCD; PCG; LGUs in pilot PRSD) by developing a new mobile application and mobile website. They are launched in June 2016, although they are not widely recognized yet among stakeholders especially at the Provincial level.
- The effectiveness of the Project could be enhanced if indicator 2 and 3 mentioned above are achieved before the end of the Project.

4.3 Efficiency

Overall, the level of efficiency of the Project is considered to be moderately high for the following reasons:

- The Project is designed to efficiently utilize meteorological radar stations installed by Japan’s grant aid project. Just after the completion of the grant aid project in 2014, the Project initiates in 2014 to reinforce operation and maintenance of radars as well as to effectively utilize radar data for improvement of weather observation, forecasting and warning.
- Consistent involvement of TWG members and PAGASA counterparts throughout the Project cooperation period is expected to enhance the efficient implementation of the Project.

4.4 Impact

Impact is a viewpoint that asks “whether expected or unexpected long-term effects are brought about as a result of the Project”. Overall Goal, which is expected to be achieved within three to five years after the Project completion, is one of the expected impacts of the Project.

As for the achievement of Overall Goal “Capacity of all PRSDs is enhanced in terms of weather observation, forecasting and warning”, the Evaluation Team considers that the probability of achieving the mentioned Overall Goal within three to five years is moderate. The main target of the Project is PAGASA central office and SL-PRSD, and there are more steps necessary for substantial capacity enhancement in other PRSDs. PAGASA as main counterpart of the Project is expected to play an important role to disseminate knowledge and experiences gained throughout the Project to all PRSDs in terms of observation, forecasting and warning.

The laymanized meteorological information (indicator 1 of Overall Goal) is practically available for all PRSDs through mobile application and mobile website, as well as existing PAGASA website. Level of achievement of Overall Goal could be further enhanced if PAGASA promotes the utilization of mobile application and mobile website not only within NCR and South Luzon, but also in all other non-pilot PRSDs.

No negative impacts have been identified so far.

4.5 Sustainability

The sustainability of the Project is considered to be moderately high for the following reasons:

- Policy aspect: National level policy such as “PAGASA Modernization Act in 2015” and “Philippine Disaster Risk Reduction and Management Act in 2010” shows that the Project’s objectives are also part of the priority area.
- Institutional and financial aspect: Five (5) out of seven (7) TWGs implement their task as part of regular work as PAGASA (i.e. TWG on Output 1a, 1b, 3, 4, 5), therefore institutional and financial sustainability is relatively high for these activities. The remaining two (2) TWGs, i.e. TWG on Output 2a (QPE) and Output 2b (weather guidance) implement their project tasks on top of their regular work as PAGASA employees, so some framework would be necessary for these TWGs to continue achieving further project outcomes.
- Technical aspects: Different aspects of technical transfer have been carried out for the enhancement of weather observation, forecasting and warning for staff members of PAGASA, SL-PRSD and Synop/AWS in the region, as well as in radar stations in three provinces. Knowledge and experiences are shared to enhance operation and maintenance of radar and meteorological instruments, development or utilization of various software, research and development such as QPE and weather guidance, to name a few.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The Project is making good progress. Regarding level of achievements, both Outputs 1&2 are considered to be moderately achieved, Output 3 is partly achieved and Output 4 & 5 are mostly achieved. The possibility of achieving the Project Purpose by the end of the Project (May 2017) is considered to be relatively high. In light of indicators for the Project Purpose, the achievement of the Project Purpose is subject to the development of i) Quantitative forecasting issued by using weather guidance (indicator 2) and ii) laymanized meteorological information being delivered timely to concerned actors including SL-PRSD and LGUs (indicator 3). The remaining tasks before the end of the Project is indicated in “Remarks” of above summary Tables (Tables 3-5 to table 3-10).

In terms of five evaluation criteria, relevance is considered to be high. Effectiveness, efficiency and sustainability of the Project are considered to be moderately high. The impact, which is a viewpoint to assess the possibility of achieving the Overall Goal is considered to be moderate. However the impact of the Project could be enhanced if PAGASA continues to disseminate knowledge and experiences gained throughout the Project in terms of observation, forecasting and warning to all PRSDs after the end of the Project.

5.2 Recommendations

On the basis of the results of the study summarized above, the Terminal Evaluation Team has made the following recommendations to the Project.

5.2.1 Recommendations to be considered during the Project period (until May 2017)

1. For traceability of meteorological instruments (indicator 1-1 of Output 1), the Project mainly focused on improvement of atmospheric pressure. The Project also compared existing reference standard for thermometer with JMA’s travelling standard. In order to operationalize traceability at the local level, it is advised for RDTD to coordinate with ETSD to assure that the calibrated instrument is utilized at the local level after installation. At the same time, it is important to educate staff members at local Synop/AWS stations for the importance of utilizing newly installed instruments. It is also recommended to discuss importance of Quality Control (QC) to assure (traceability) accuracy of meteorological instruments.
2. To follow up if the monthly maintenance reports including equipment status report at radar sites are regularly reported to ETSD. At the same time, it is advised to assure if equipment status reports of other meteorological instruments are regularly reported to ETSD as is instructed in MASSO.
3. For early development of QPE system and setting up criteria for warning, it is necessary to archive precipitation data from radar stations and ARG/AWS. A workshop on the assessment of warning criteria and development of new threshold values is recommended when more data has been collected.
4. For future development of precipitation guidance, it is necessary to assure archive of precipitation data (ARG/AWS).
5. The Project is advised to steadily complete the “Automation Production System of Weather Guidance” and to launch the operation of “Forecast work support system (FxWSS)”.
6. For warning criteria in SL-PRSD, it is advised to i) operationalize the warning criteria set in Legaspi and evaluate, ii) to assess whether the provisional warning criteria is also applicable to ARG sites, by comparing precipitation data and disaster data (such as flood).
7. Regarding the elevation angle of radars, it is suggested to JICA expert in charge of QPE to write a letter to WD to propose modification of the elevation angle of three JRC radars. It is important for observation

of not only typhoons but also rain clouds.

8. It is recommended to promote mobile application and mobile website not only to NCR but also provinces. It is recommended that local DRRMOs be involved in IEC activities as member of TWG to complement resources of the Project.

5.2.2 Recommendations to be considered after the completion of the Project

1. For improvement of traceability, it is necessary to assure traceability for rain gauge and anemometer as well.
2. For a continuous development, operation and improvement of weather guidance, it is fundamental to allocate technical staff who are exclusively in charge of development and operation of automated production system of weather guidance.
3. For development of QPE system and warning criteria, it is necessary to archive all precipitation data and radar data. Towards this end, it is advised to establish a data management structure within PAGASA to follow up when the radar data and/or precipitation data is not appropriately transmitted.
4. Based on the proposal letter to be submitted by JICA expert, it is recommended to PAGASA to further examine re-arrangement of observation angle mode of three JRC radars (in Virac, Aparri and Guiuan Provinces), as well as to establish a quality control (QC) systems of Radar data. Necessary actions shall be taken accordingly.
5. For establishment of warning criteria at the provincial level, it is necessary to archive natural disaster data induced by rainfall at the local level. For this purpose, it is recommended to strengthen coordination with local level entities such as PDRRMOs to efficiently utilise and reflect local level natural disaster data induced by rainfall into warning criteria.

5.3 Lessons Learned

In the process of implementation of the Project, good practices and lessons learnt were identified as follows:

- Baseline study conducted at the earlier stage of the Project is an important chance to modify indicators of PDM by clarifying goals and targets of the Project.
- Automation of system, once it is established, requires technical support structure in order to continuously operate, review, and update the system
- When the Project implement new activities that are not part of the regular tasks within the counterpart agency, it is important for the Project to discuss and clarify the continuity of these activities after the Project within the Project cooperation period.

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（以下のファイルデータは CD-R へ格納）

- 1-1 Guideline of Radar Maintenance and Operation for Senior Engineer
- 1-2 Glossary of Weather Radar
- 1-3 Weather Radar System
- 2 Manual for Maintenance of Weather Radar
- 3&4 Meteorological Instruments Maintenance Guideline and Manual
- 5-1 1st Seminar Slides Part1 (25 slides)
- 5-2 1st Seminar Slides Part2 (48 slides)
- 5-3 2nd Seminar Slides Part1 (28 slides)
- 5-4 2nd Seminar Slides Part2 (28 slides)

- 6-1 Output 2a_Training_Materials
- 6-2 Output 2b_Weather Guidance Reference
- 6-3 Output 2b_Weather Guidance Operations Guide
- 6-4 Output 3_Quick Report on JMA's Response to Natural Disasters
- 6-5 Output 4_Meteorological Information APPENDIX 1 to 14
- 6-6 Output 5_Questionnaire of the First and the Second Seminars
- 6-7 Output 5_Radio Clip