Internal Ex-Post Evaluation for Technical Cooperation Project (SATREPS)[1]

conducted by Indonesia Office: December, 2020

Country Name	**Project for Climate Variability Study and Societal Application through Indonesia-Japan "Maritime Continent COE"- Radar-Buoy Network Optimization for Rainfall Prediction**
Republic of Indonesia	

I. Project Outline

Background	Indonesia was the world 3rd largest emitter of the Greenhouse Gas (GHG) following China and the United States with the emission of 3,143 million CO2 tons, including the CO2 emission from peatlands (the Wetlands International Annual Report). On the other hand, in December 2007, the government of Indonesia announced "the National Action Plan for Climate Change" for implementation of comprehensive mitigation and countermeasures against climate change at the United Nations Framework Convention on Climate Change (UNFCCC) 13th session of the Conference of the Parties (COP13) in Bali. Under such situation, the government of Indonesia has promoted integrated management of observation data on climate change (Nusantara Earth Observation Network: NEONET). Also, Indonesia has complied research performance on global earth observation based on weather radar and ocean observation buoy as a member country of the Global Earth Observation System of Systems (GEOSS). However, development of optimum observation network for short term climate change was still limited in Indonesia.		
Objectives of the Project	Through preparation of institutional framework for the Maritime Continent Center of Excellence (MCCOE), establishment of technologies for observation and prediction of short-term climate variations, buoy construction and operation as well as observation and development of technologies for quality control of observation data, and publishing research papers, the project aimed at promotion of research and development for improving predictability of extreme weather/climate variation and utilization of observation data compiled, thereby contributing to preparation of strategies to mitigate rainfall disasters. 1. Expected Overall Goal: None 2. Project Purpose: By optimizing atmospheric and oceanic observation networks and utilizing observational data, research and development for improving predictability of extreme weather/climate variations and drawing up strategy to mitigate rainfall disasters are promoted, and the outcomes are published internationally.		
Activities of the Project	1. Project site: Padang, Serpong, Pontianak, Manado, and offshores of north western Papua and southwestern Java 2. Main activities: 1) Preparation of institutional frameworks for MCCOE, 2) Establishment of technologies for observation and prediction of short-term climate and rainfall variations through optimized radar-profiler network, 3) development of technologies for buoy planning, construction, operation and observation, 4) development of technologies for quality control, archiving and analysis of observation data, 5) development of research paper and other research outputs including hazard maps 3. Inputs (to carry out above activities) Japanese Side 1) Experts: 18 persons 2) Trainees received: 30 persons 3) Trainees in the third country: 4 persons (in Germany) 4) Equipment: Buoy system and equipment, Mobile Parameter Radar (MPR), Trailer, Acoustic Releaser, etc. 5) Local cost: travel cost, fee and honorarium for non-staff members, etc. Indonesian Side 1) Staff allocated: 99 persons 2) Land and Facilities: Project offices in the Agency for Assessment and Application of Technology (BPPT) in Jakarta and Serpong 3) Local cost: cost for cruise for Ina-TRITON Buoy (No.1,2 and 3), maintenance cost for X-Band Doppler Radar (XDR) and C-Band Doppler Radar (CDR), etc.		
Project Period	April 2010 – March 2014	Project Cost	(ex-ante) 390 million yen, (actual) 415 million yen
Implementing Agency	Agency for Assessment and Application of Technology (BPPT) Agency for Meteorology Climatology and Geophysics (BMKG) National Institute of Aeronautics and Space (LAPAN)		
Cooperation Agency in Japan	Japan Agency for Marine-Earth Science and Technology (JAMSTEC)		

II. Result of the Evaluation

< Special Perspectives Considered in the Ex-Post Evaluation >

[Assessment of achievement level of the Expected Overall Goals]

For this SATREPS project, no Overall Goal was set forth in the Record of Discussion (R/D). "Utilization of the research outcomes by the project for mitigation and adaptation to climate change" can be an "expected Overall Goal" since the project activities addressed utilization of the research outcomes and distribution of information related climate change. In this ex-post evaluation, the following issues were verified to assess achievement level of the expected Overall Goal as one of the expected positive impacts.

- Practical use of technologies developed by the project, including "SIJAMPANG" (the radar real time rainfall observation system), InaTRITON (climate observation) buoy, and Buoy data real time quality control system
- Utilization of research outcomes for the society, including utilization of the observation data for international joint research such as GEOSS and WCRP (the World Climate Research Plan) as well as for the world weather maps and climate observation by transmitting to the Global Telecommunication System (GTS), data distribution to the public through SIJAMPANG.

[1] SATREPS: Science and Technology Research Partnership for Sustainable Development

1 Relevance

<Consistency with the Development Policy of Indonesia at the Time of Ex-Ante Evaluation and Project Completion>

The project was consistent with the Indonesia's development policies to cope with climate change, including the "National Action Plan for Climate Change" (2006-2009), "National Midterm Development Plan (RPJMN)" (2010-2014) and the "National Action Plan: Indonesia Responses to Climate Change" issued in 2007 from Ministry of Environment (KLH), in order to implement comprehensive measures for mitigation and countermeasures against climate change.

<Consistency with the Development Needs of Indonesia at the Time of Ex-Ante Evaluation and Project Completion >

The project was consistent with the Indonesia's development needs for research activities on climate change because climatic and meteorological phenomena which cause abnormal weather adversely affected the country surrounding oceans.

<Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation>

The project consistent with the Japan's ODA policy for Indonesia prioritizing support for development of democratic and fair society, including environmental protection, which was set in "the Country Assistance Program for Indonesia" (2004).

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

<Status of Achievement of the Project Purpose at the time of Project Completion>

The Project Purpose was partially achieved by the time of project completion. Establishment of an organizational mechanism of MCCOE was commenced but not completed within the project period (Indicator 1). The buoy ocean observation data collected by the project were used for global climate variation and the radar observation data collected by the project were used for local rainfall observation, in particular at the time of the extreme flood in Jakarta in January 2013 (Indicator 2).

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have been continued by the time of ex-post evaluation. MCCOE was established on 13th November 2013 with 8 personnel and has been functioning for the research activities on climate/weather technologies and disaster alert. The observation data collected by the observation system which had been installed by the project have been utilized by BMKG for climate/weather mitigation and intensive monitoring in the Greater Jakarta Area since 2015. Also, the data collected by the buoy ocean observation system has been utilized. The buoy number 1 deployed in the Papua waters had stopped transmitting the signal in January 2013 . Although it had been transmitting its location for a while, no vessel could collect it because it went too far then finally the battery died and it could not be found. Therefore, the actual reason was not able to be identified. It can be assumed that an unexpected accident may have occurred and it may have drifted to the Pacific Ocean The major research outputs of the project, such as the climate database at 200 points, the extreme event maps, the forecasting of potential rainfall and hazard maps associated with development phase of ENSO (El Niño-Southern Oscillation) and IOD (Indian Ocean Diploe mode), have been continuously developed and updated by BPPT, BMKG, and JAMSTEC though the Quantitative Precipitation Forecast (QPF) has not. In addition, BPPT and BMKG have collaborated to deploy the Indonesia Tsunami Early Warning System (Ina-TEWS) a mandate program from the President of Indonesia for the period between 2019 and 2020 utilizing buoy number 1 applying the improved technology based on the training in Japan under the SATREPS project. The Ina-TEWS, which has been funded by the national budget of Indonesia, has been taken place in Sunda Strait (for Krakatau eruption causing Tsunami in Banten Province) and Palu shore (for Tsunami in Palu).

Also, the major research equipment, such as the Climate Observation Buoy (Ina TRITON), X-Band Doppler Radar and Mobile Parameter Radar (MPR) have been continuously utilized by BPPT. There was an incident damaging the important part of X-Band Doppler Radar and make it out of order for two years though the other parts of MPR equipment have been well preserved. BPPT has purchased new spare parts costly as much as 200million Indonesian Ruphia to replace the broken part, but it has been still waiting for a German technician to repair and install the spare parts.

<Status of Achievement for Expected Overall Goal at the time of Ex-post Evaluation>

Since the Expected Overall Goal was not set forth for this SATREPS project, this ex-post evaluation verified "utilization of the research outcomes by the project". The utilization of the research outcomes by the SATREPS project has been progressed through utilization by the implementing agencies as well as the other government authority. After the project completion, the major technologies developed by the project have been utilized the BPPT and BMKG as well as the National Agency for Disaster Management (BNPB). SIJAMPANG has been a base for development of the Early Warning System by BNPB. Ina TRITON has been used by BPPT and BMKG for their research activities. Also, the buoy data real time quality control system has been utilized by BPPT for research on further development of Ina-TEWS. Furthermore, the seasonal prediction system using SINTEX-F[2] has been applied for agriculture by the Ministry of Agriculture and BMKG.

<Other Impacts at the time of Ex-post Evaluation>

There are some positive impacts of the project confirmed at the time of ex-post evaluation. BPPT and BMKG have improved their ability of data quality control, observation, radar operation, and data analysis. In addition, BPPT is now able to detect not only rainfall but also other parameters, such as smoke by using MPR. Also, BPPT enables to produce a buoy for Ina TRITON. BMKG has installed weather radar nationwide because of the increased radar operation capacity and analytical capacity of radar data.

No negative impact by the SATREPS project has been observed.

<Evaluation Result>

Therefore, the effectiveness/impact of the project is high.

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results
(Project Purpose) By optimizing atmospheric and oceanic	(Indicator 1) Institutional organizational mechanism of MCCOE is functioned.	Status of the Achievement: Not achieved (Achieved) (Project Completion) ● The newly constructed building of MCCOE was opened in November

[2] A supercomputer model for seasonal prediction developed under the joint cooperation between Europe and Japan.

observation networks and utilizing observational data, research and development for improving predictability of extreme weather/climate variations and drawing up strategy to mitigate rainfall disasters are promoted, and the outcomes are published internationally.		2013. ● The organizational mechanism of MCCOE was not functioned since the establishment was just commenced but not completed by the project completion (Ex-post Evaluation) ● MCCOE has been functioning for the research activities on climate/weather technologies and disaster alert.
	(Indicator 2) Societal Application of research and development on climate variations is newly introduced in Indonesia.	Status of the Achievement: Achieved. (Continued) (Project Completion) ● The buoy ocean observation data were used for global climate variations. ● The radar observation data were used for local rainfall observation, in particular at the time of the extreme flood in Jakarta in January 2013. (Ex-post Evaluation) ● The observation data collected by the observation system which had been installed by the project has been utilized by BMKG for climate/weather mitigation and intensive monitoring in the Greater Jakarta area since 2015.

Source：Terminal Evaluation Report, Data and information provided by BMKG and BPPT

3 Efficiency

Although the project period was within the plan (the ratio against plan: 92%), the project cost slightly exceeded the plan (the ratio against plan: 106%). The project outputs were produced as planned. Therefore, the efficiency of the project is fair.

4 Sustainability

<Policy Aspect>

"The Ministerial Regulation No. 40 Year 2018 on National Research Priorities of 2017-2019" focuses disaster management as one of the priorities by the Ministry of Research and Technology (RISTEK). Also, BNPB, BMKG and BPPT issued "Tsunami Mitigation" (2012-2015) for implementation of roadmap of tsunami mitigation. These policies and regulation have promoted utilization of research outcomes, such as the observation system installed by the project.

<Institutional Aspect>

BPPT has sustained the organizational setting to continue observation data collection. Under BPPT, the Center for Technology on regional Resources Development (PTPSW) has 10 researchers/staff to be engaged in research and technology on weather and climate in order to support awareness raising and cautions toward natural disaster of the people and the Grand Center for Weather Modification Technology (BTMC) has more than 70 staff to be engaged in the central government programs related to weather modification technologies. The personnel of PTPSW and BBTMC has been sufficient for collecting observation data collection. MCCOE, which was established by the project, has been responsible for research on weather and climate technology and awareness raising on disaster warning. PTPSW of MCCOE has 7 researchers and 3 administration staff for the research activities. No information about BMKG and LAPAN is available.

For maintenance of the research equipment installed by the project, BPPT has been responsible for maintenance of Ina TORITON, X-ban Doppler Rader, C-band Doppler Rater and Multi parameter Rater (MPR).

<Technical Aspect>

The most of skills and knowledge on the rainfall observations and forecasts, including rainfall observation and buoy data collection with less errors, have been sustained by the research staff of BPPT, BMKG and MOCCOE. In particular, the researchers have skills for operation of the observation equipment. In addition, the researchers involved in the SATREPS project have continuously improved their research capacity through the higher academic education, international research cooperation, training in foreign countries. For example, some researchers have continued their academic course of Ph.D. Other researchers have made international collaborative researches with JAMSTEC and other foreign researchers.

<Financial Aspect>

For the maintenance of research equipment, BPPT has secured the budget for operational cost for MPR and XDR amounting around 2 million Indonesian Rupiah (IDR) per month to cover costs of electricity and internet, and also purchasing new spare parts for the broken X-Band Doppler Radar. BMKG and LAPAN have continuously allocated the budget for the Wind Profiler Rader (WPR) since the project completion in 2014. For the Buoy observation system has not required budget so far since the Ina TORITON, which upgrades the Ina TEW, has not been launched yet. MOCCOE submitted a research proposal of 300 million Indonesian Rupiah to the Ministry of Research Technology and Higher Education in 2017 and 2019 for the research topics of "Coastal Tomography Acoustic to Detect Sub-marine Vessel" (2017) and "Development of Jakarta Flood Monitoring System based on Weather Radar Technology and River Tomography Acoustic" (2019).

<Evaluation Result>

In the light above, there were only few of information collected from BMKG and LAPAN regarding its institutional aspect during the ex-post evaluation period. Therefore, the sustainability of the effects through the project is fair.

5 Summary of the Evaluation

The project was achieved the Project Purpose after the project completion and the utilization of the project outcomes through the further research and development activities for the Tsunami warning system based on the observation data collected by the SATREPS project. As for sustainability, there have been unclearness of resource allocations for the maintenance of the research equipment by the implementing agencies. As for efficiency, the project cost slightly exceeded the plan.

Considering all of the above points, this project is evaluated to be satisfactory.

III. Recommendations & Lessons Learned

Recommendation to Implementing Agency:

In this SATREPS project, the oceanographic observation buoy was installed in the adjacent waters of the northwest of Papua Island but the buoy was lost as it was drifted away to Pacific Ocean due to accident. Since the research equipment is essential for the project activities under the SATREPS project, it can affect the research activities. In order to avoid such accident in other similar activities, the project has to take appropriate measures with responsibility and authority under such occasion when deploying equipment in the ocean.

"Magnetron" is a new purchased spare part for the X-Band Doppler Radar that attached to the Mobile Parameter Radar"