

# Internal Ex-Post Evaluation for Grant Aid Project

conducted by Sri Lanka Office: December, 2013

|              |                                                                                |
|--------------|--------------------------------------------------------------------------------|
| Country Name | The Project for Improvement of Meteorological and Disaster Information Network |
| Sri Lanka    |                                                                                |

## I. Project Outline

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |               |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------|
| Background                | In Sri Lanka, it was an urgent task to mitigate damage of properties and prevent human lives against floods and landslides caused by rainfalls. The Department of Meteorology (DoM), Ministry of Disaster Management and Human Rights (Ministry of Disaster Management at present),, was regularly collecting observed data from 22 meteorological stations located nationwide. However, because of the long interval between the observations, the limited number of stations, and the visual check on the observation by meteorological observers, the precision and reliability of obtained weather data was insufficient. Also, it took time for DoM headquarters to collect and manually edit the data; thus it was not possible to issue weather forecasts and warnings precisely and promptly.                                                                                                                                                                                                                  |                 |               |
| Objectives of the Project | To improve meteorological observation accuracy by procuring and installing equipment for a meteorological information network system, thereby contributing to improvement of weather forecasting accuracy, early transmission of warnings, and mitigation of damages caused by natural disasters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |               |
| Outputs of the Project    | <ol style="list-style-type: none"> <li>1. Project Site: Whole country (DoM headquarters and 19 meteorological stations and 18 collaborative stations located nationwide)</li> <li>2. Japanese side <ol style="list-style-type: none"> <li>1) Construction of the following facility(s): None</li> <li>2) Procurement and installation of the following equipment: Automatic weather observation (AWS) systems, satellite communication (VSAT: Very Small Aperture Terminal) systems, and a central operating system</li> <li>3) Technical assistance (soft component) in operation of the installed systems</li> </ol> </li> <li>3. Sri Lanka side: <p>Satellite communication contracts with a satellite operator, to obtain a necessary communication frequency band, to erect fences at 2 collaborator stations to avoid effects on observed data by entry of any third party, and to install the equipment at the 7 stations in the Northern and Eastern provinces after completion of the Project</p> </li> </ol> |                 |               |
| E/N Date                  | August 27, 2007                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Completion Date | July 13, 2009 |
| Project Cost              | E/N Grant Limit: : 807 million yen, Contract Amount: 630 million yen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |               |
| Implementing Agency       | Department of Meteorology (DoM), Ministry of Disaster Management and Human Rights(Ministry of Disaster Management at present)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |               |
| Contracted Agencies       | Oriental Consultants Co., Ltd., Marubeni Corporation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |               |
| Related Studies           | Basic Design Study: October 2006 – June 2007                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |               |
| Related Projects (if any) | <p>Japan's Cooperation:</p> <ul style="list-style-type: none"> <li>• Comprehensive Study on Disaster Management (Technical Cooperation (Development Study), 2006 - 2009)</li> <li>• Disaster Management Capacity Enhancement Project Adaptable to Climate Change (DiMCEP) (Technical Cooperation, 2009 – 2012)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |               |

## II. Result of the Evaluation

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 Relevance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p>This project has been highly consistent with Sri Lanka's development policy, such as establishing the multi-hazard early warning system as set out in "The Road Map for Disaster Risk Management (2005)", and development needs to improve the lead time to issue extreme rainfall warnings for reducing flood damages, as well as Japan's ODA policy for reducing vulnerability specified under the Country Assistance Programs, at the time of both ex-ante and ex-post evaluation. Therefore, relevance of this project is high.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2 Effectiveness/Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>The project has largely achieved its objective, "to improve meteorological observation accuracy," as most of the targets, i.e. reduction of time required for collection of meteorological data (Indicator 1), narrowing of interval for collection of meteorological observation data at normal times (Indicator 3) and at severe weather (Indicator4), have been attained by using AWS and VSAT installed at meteorological stations. The number of meteorological stations that can provide data (Indicator 2) increased, but has not reached the target as the installation process at one station (that was planned after project completion) was delayed due to the land property issue raised after end of civil war. The installation process is scheduled to be completed in the middle of 2014. Precision of the observed data was enhanced by more frequent collection from larger number of stations. Accuracy of meteorological observation and collection is supposed to be ensured: because manual observation is done in parallel at the station, DoM can every time compare both AWS and manual data and calibrate AWS if each data set shows difference. The data processing has been improved, too, with use of the central operating system and partly thanks to the technical assistance (soft component) under this project.</p> <p>While the equipments are generally used at the time of ex-post evaluation, some equipment, especially the communication (VSAT) system, are not in proper order, and therefore the DoM headquarters cannot monitor 11 stations as of Aug 30<sup>th</sup>, 2013.</p> |

The identification of the reasons of malfunctioning and the necessary countermeasures are still under examinations at the time of ex-post evaluation.

As for the impacts, warnings have become transmitted to the related organizations in more timely manner than before the project. Together with awareness programmes to the public, such improvement is expected to mitigate damage by natural disaster, but no evidence is confirmed at the time of ex-post evaluation. Accuracy of forecasting is to be improved by introducing an objective forecast method of which now DoM is trying to strengthen the capacity through a JICA's Technical cooperation project that is currently being formulated.

Therefore, effectiveness/impact of this project is high.

#### Quantitative Effects

| Indicator                                                                                          | 2006<br>(before the project)<br>Actual value | 2011<br>(target year)<br>Target value                                     | 2011<br>(target year)<br>Actual value                        | 2013<br>(ex-post evaluation<br>year)<br>Actual value         |
|----------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|
| Indicator 1:<br>Time required for collection<br>of meteorological data                             | Approximately<br>50 minutes <sup>1</sup>     | Within 10 minutes                                                         | Within 10 minutes                                            | Within 10 minutes                                            |
| Indicator 2:<br>Number of stations as<br>sources of meteorological<br>observation data             | 20 synoptic stations of<br>DoM <sup>2</sup>  | 38 (20 DoM stations<br>and 18 collaborator<br>stations)                   | 36 (18 DoM stations<br>and 18 collaborators'<br>stations)    | 37 (19 DoM stations<br>and 18 collaborators'<br>stations)    |
| Indicator 3:<br>Interval for collection of<br>meteorological observation<br>data at normal times   | 3 hours                                      | 1 hour                                                                    | 1 hour                                                       | 1 hour                                                       |
| Indicator 4:<br>Interval for collection of<br>meteorological observation<br>data at severe weather | 1 hour<br>(Applicable stations<br>only)      | 10 minutes<br>(Applicable stations<br>only)                               | 10 minutes<br>(Applicable stations<br>only)                  | 10 minutes<br>(Applicable stations<br>only)                  |
| Indicator 5: (supplementary)<br>Items observed and collected                                       |                                              | DoM stations: 7 items<br>Collaborators' stations:<br>5 items <sup>3</sup> | DoM stations: 7 items<br>Collaborators' stations:<br>5 items | DoM stations: 7 items<br>Collaborators' stations:<br>5 items |

Sources: DoM (answer to the questionnaire), DiMCEP reports.

Notes: (1) Before the project, it took 10 minutes for observation (visual check), 10 minutes for preparation of data in a specific format (by manual work), and 30 minutes for collecting data (headquarters collects data from observation stations by phone).

(2) Before the project, 18 collaborators' stations had existed besides these 20 DoM stations, but data was collected from 7 collaborators' stations once per day by telephone. From the other 11 collaborators' stations, data was collected once per month by mail.

(3) DoM stations are supposed to collect data for 7 items (Wind direction, Wind speed, Temperature, Humidity, Barometric pressure, Rainfall, Solar radiation) and collaborators' stations are supposed to collect data for 5 items (Wind direction, Wind speed, Temperature, Rainfall, Solar radiation).

#### 3 Efficiency

Although the project cost was within the plan (ratio against the plan: 78%), project period exceeded the plan (ratio against the plan: 131%) because the deterioration of security caused the delay of custom clearance for VSAT. The outputs of the project were produced mostly as planned. Therefore, efficiency of this project is fair.

#### 4 Sustainability

The operation and maintenance of the equipment procured by the project have been carried out by DoM, the implementing agency. The implementation structure has sustained what it was considered desirable at the time of ex-ante evaluation. The number of staff is somehow sufficient to achieve their management and regular operation in the DoM headquarters and each AWS station. In addition, DOM is recruiting more than 100 officers based on their plan in near future, which shows DOM's strong intention on institutional strengthening. As for the technical aspect, there are institutional efforts such as preparation of manuals (e.g. Maintenance Manuals and "Cleaning Procedures" both in English and Sinhala are prepared by Electronics Engineering Division of DOM) and DoM's capacity to operate and maintain the equipment fulfills minimum requirement, but is not sufficient enough. Even though the Technical Officer (Electronics Engineering Division) usually identifies the main cause of the AWS fault, it takes some time to get it repaired due to the spare parts and transportation problems. In the financial aspect, certain budget is allocated for operation and maintenance of the equipment but not adequate enough to purchase all the necessary spare parts in timely manner.

Therefore, there are some problems in the technical and financial aspects of the implementing agency as well as the current status of operation and maintenance, and sustainability of this project effect is fair.

#### 5 Summary of the Evaluation

This project has largely achieved its objective, "to improve meteorological observation accuracy" as the time required for collection of meteorological data as well as the interval for collection of data have been reduced as expected by using the AWS and VSAT systems installed under this project. Accuracy of weather forecasting and warning are expected to be improved with such data and a new JICA technical cooperation project that is under formulation. As for sustainability, there are some problems observed in terms of the technical and financial aspects of the implementing agency and the current status of operation and maintenance due to limitations of technical and financial capacity of DoM to repair breakdown and purchase spare parts in a

timely manner. As for efficiency, the project period exceeded the plan.  
In light of the above, this project is evaluated to be satisfactory.

### III. Recommendations & Lessons Learned

Recommendations to implementing agency:

- To examine more about the communication system since the communication system (VSAT) procured by the project is not in proper order.
- To maintain the accuracy of AWS data which is going to be essential part of the objective forecasting method. More investment for the maintenance work of AWS is recommended.
- To consider the linkage between this project and upcoming Technical Cooperation Project to be started from FY2014 for improving capacity of weather forecasting and warning in terms of improving accuracy of forecasting by introducing an objective forecast method.

Lessons learned for JICA:

- It is important to examine more cautiously about the feasibility of maintenance of equipment, especially feasibility of repair work in a case of technical troubles.



AWS data shown in DoM headquarters



AWS data logger



VSAT system