July 6, 2017

Emergency support for flood management in Sri Lanka
— Expectations for provision of real-time information for effective water-related disaster management by maximizing Japan's advanced science and technology —

A devastating flood disaster occurred in Sri Lanka in late May 2017, leaving over 300 people dead and missing. Upon the request of the government of the Democratic Socialist Republic of Sri Lanka, the government of Japan dispatched the Japan Disaster Relief (JDR) Expert Team to Sri Lanka to assist flood recovery efforts. The Public Works Research Institute (PWRI) assisted by sending a senior researcher as its expert.

Since further flood damage is anticipated in Sri Lanka, disaster-related information provided by using Japan's advanced science and technology will be crucial for effective flood management. Under such circumstance, EDITORIA[*1], which has developed DIAS[*2], and ICHARM[*3], which specializes in research on flood observation and forecasting, have decided to provide real-time flood forecasts and other information experimentally and to offer training and capacity development programs for proper utilization of these information.

1. Outline of the flood disaster in Sri Lanka

Intensive rainfall started on May 24, 2017, and continued intermittently, resulting in a record daily maximum rainfall of over 550 mm in some parts of Sri Lanka. This heavy rainfall caused severe floods and landslides nationwide, especially in the Kalu River basin located in the south-western part of the country. More than 300 people were reported to be dead and missing, and more than 18,000 houses were reported to be damaged (as of June 3, 2017, by the Government of Sri Lanka).

In response to this flood disaster, upon the request of the government of the Democratic Socialist Republic of Sri Lanka, the government of Japan dispatched the Japan Disaster Relief (JDR) Expert Team to Sri Lanka to assist flood recovery efforts from June 2 to June 11, 2017. The Public Works Research Institute (PWRI) assisted by sending a senior researcher as its expert.

Since Sri Lanka is in the middle of the rainy season, more flood disasters are anticipated, that may possibly cause further damages to lives and property in the country. The situation is still critical, requiring latest information by maximizing Japan's advanced science and technology for preventing recurring disasters and assisting the country in emergency response and post-disaster restoration.

2. Outline of support for Sri Lanka

In response to this disaster in Sri Lanka, EDITORIA and ICHARM cooperate to provide the following information for effective flood management by coupling outputs of meteorological and hydrological models developed by ICHARM with DIAS developed by EDITORIA.

- DIAS has already integrated ground and satellite precipitation data, rainfall forecasting data, results of flood inundation analysis and forecasting, and satellite observation data on cloud development, as well as ongoing floods and inundations. This information has been provided in real time for the related organizations of the Sri Lankan government since the dispatch of the JDR Expert Team, and will be provided continually.

- Hands-on-training and capacity development programs will be implemented for Sri Lankan experts to utilize these data and information provided through DIAS properly and practically.

3. Expected outcomes

Through this support, Sri Lanka will be provided with various types of flood-related information based on the latest research findings achieved by EDITORIA and ICHARM. This information will enable the government organizations of Sri Lanka to disseminate effective flood forecasts and early evacuation alerts, which will lead to human damage reduction and efficient emergency response.

(*1)   EDITORIA, "Earth Observation Data Integration and Fusion Research Initiative", was established in April 2006 as a research institute for studying an integrated use of earth observation data by mutually collaborating with organizations in different fields, such as earth observation, information science and technology, and public policy concerning disasters and agriculture, in the University of Tokyo. With support from the Ministry of Education, Culture, Sports, Science and Technology (MEXT), EDITORIA has developed the Data Integration and Analysis System (DIAS), which is capable of processing various types of massive earth observation data from heterogeneous information sources. EDITORIA has been creating information which contributes to deepening understanding of the global environment, to increasing prediction capabilities, and to assisting well-informed policy making on risk management, resources management, and other critical issues.

(*2)   DIAS, "Data Integration and Analysis System", started in 2006 as a MEXT-led project to develop and utilize data infrastructure, can collect and store a massive volume of diverse data. DIAS can combine different types of data including socio-economic data, and convert data into information useful for risk management with respect to global-scale environmental issues, natural disasters, and other threats, and provide this information in real time for users in Japan and overseas. In 2010, the prototype of DIAS was developed, and in 2015, DIAS underwent further advancement and expansion to improve its practicality as social and public infrastructure. Since 2016, more researches have been

underway to place DIAS into practical use.

(*3)   ICHARM, "International Centre for Water Hazard and Risk Management", was established in March 2006, as an international center under the auspices of UNESCO and a research center of the Public Works Research Institute of Japan. Building on technologies and experience accumulated in hydrological and other related fields in Japan, ICHARM specializes in research on forecasting and analysis of rainfall, flood discharge, and river basin inundation as well as on inundation area mapping using satellite data. The center also provides training and educational programs covering issues on water-related disasters in Japan and around the world.

Present situation: Test operation for rainy season

→ **Mid-term framework**

Implemented by EDITORIA and ICHARM on DIAS

ALOS © JAXA (2016)

In-situ rain gauge data (6 numbers)

Satellite precipitation data（GSMaP）

4 hr latency data （NRT）

Real time data (NOW)

Calibration

Ensemble forecasting rainfall for the next 16 days (max)

Himawari-8 cloud images

Inundation map by satellite data (ALOS-2)

Flood Forecasting for Sri Lanka

DIAS Data Integration & Analysis System
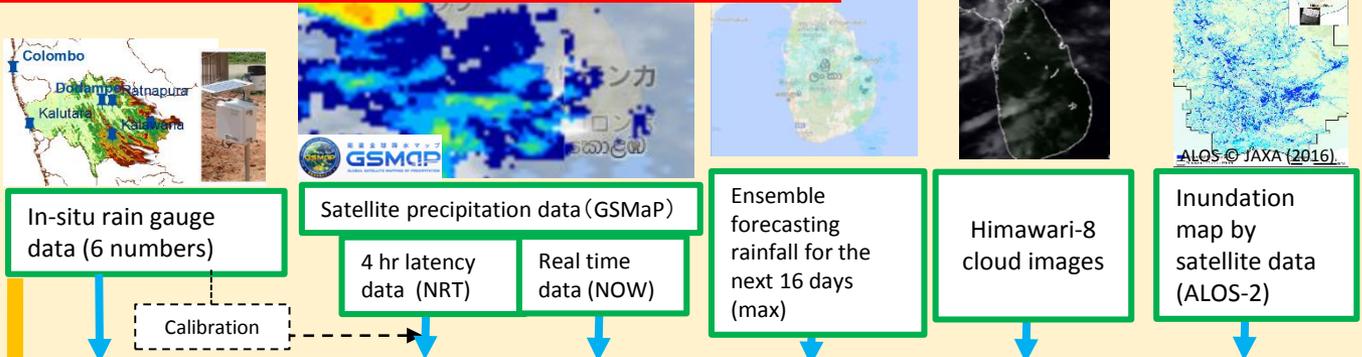
Inundation analysis by using RRI in DIAS

入力項目
降雨
標高
土地利用
河川断面

中間流＋表面流

河道部1次元拡散波近似

出力項目
河川流量
河川水位
浸水深

斜面部2次元拡散波近似

鉛直浸透流

RRI model

Concept of RRI model

Simulation and forecasting of river discharge, water level, inundation extent

Inundation analysis results

On-line Information provision on DIAS : In-situ rainfall, satellite rainfall, calibrated and forecast rainfall, inundation simulations

Flood Forecasting for Sri Lanka DIAS

Realtime Rain Monitor (ALL Rain Gauge, 30 Days)

Summary at 2017/06/22 12:05 (UTC+5:30)

Marker	Station Name	Latest 1hr	24 hrs	3 Days	30 Days
A	Kalutara	0mm	0mm	102.8mm	173.2mm
B	Kalawana	0mm	1.4mm	11.5mm	857.2mm
C	Rahepra	0mm	1.6mm	5.4mm	767.2mm
D	Kahawatte	0mm	3.0mm	12.8mm	519.0mm
E	Dompe	0mm	0mm	6.6mm	584.2mm
F	Dolomba	0mm	0mm	0mm	106.8mm

Collaboration

Email alert messages

Information provision

Sri Lanka disaster management platform

Government of Sri Lanka (Irrigation Department)

Damage reduction by pre-disaster measures

Government of Sri Lanka (Disaster Management Center)

Evacuation advisory by early warning

INTERNATIONAL FLOOD INITIATIVE

Collaboration with member organizations of disaster management platform

Member organizations of national platform

- Meteorology Department
- Irrigation Department
- Disaster Management Center
- Universities

and others

Capacity building for operation

- Promotion of research
- Damage reduction through implementation