3-3. Applying Space-Based Technology and Information and Communication Technology to Strengthen Disaster Resilience

3-3-1. Sentinel Asia

(1) Objective

ADRC continues to participate in the Sentinel Asia project. The project was launched in 2006 with an objective of establishing a disaster risk management system by making the use of satellite images in Asia. ADRC serves as the focal point to receive emergency observation requests from DRR organizations in the framework of the Sentinel Asia. ADRC then examine whether the request is appropriate or not and whether the emergency observation should be implemented mainly for the assessment of damages and casualties or not, and forward the requests to five space agencies, namely, the ISRO (India), the JAXA (Japan), the GISTDA (Thailand), the KARI (Korea), NARL (Taiwan), CRISP (Singapore) participating in the Sentinel Asia Project.

In accordance with the Cooperation Agreement between the United Nations Office for Outer Space Affairs (UNOOSA) and ADRC signed on 4 June 2009 on the establishment of ADRC UN-SPIDER Regional Support Office, ADRC UN-SPIDER Regional Support Office has been established within ADRC premises and operated by ADRC staff members as coordinators of ADRC UN-SPIDER RSO.

ADRC, as a UN-SPIDER RSO, should thus work toward ensuring the successful completion of the UN-SPIDER Work Plan thereby facilitating countries in Asia to have access to and develop the capacity to use space-based information to support the full disaster management cycle.

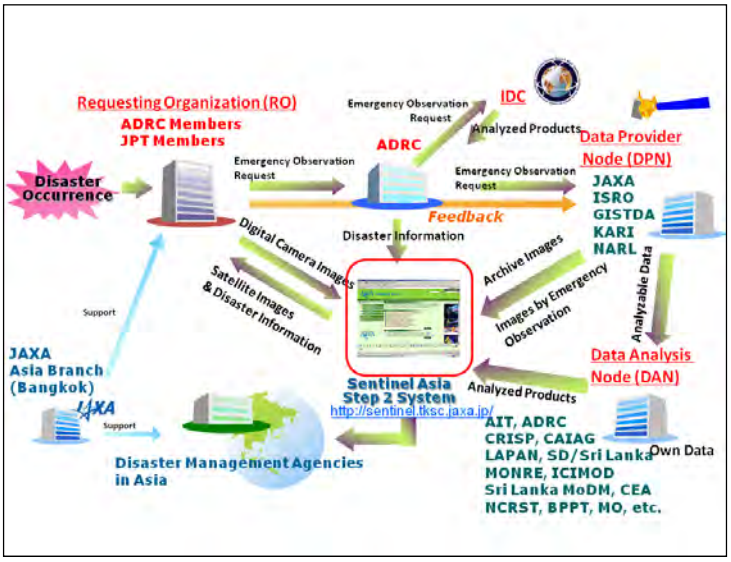

Fig. 3-3-1 Flow of emergency observation

(2) Implementation of Sentinel Asia Step3

A step-by-step approach for the implementation of Sentinel Asia was adopted as follows:

Step1: Implementation of the backbone Sentinel Asia data dissemination system

Step2: Expansion of the dissemination backbone with new satellite communication systems

Step3: Establishment of a comprehensive disaster management support system

At APRSAF-19 (Asia-Pacific Regional Space Agency Forum, APRSAF) held in Kuala Lumpur in December 2012, successful completion of Sentinel Asia Step2 was declared. Sentinel Asia Step3 has the following concept, based on experiences in Step2 and user requirements.

- A basic continuation of Step2 activities
- Expansion from response (in Step1 and Step2) to cover the mitigation/preparedness and recovery phases in the disaster management cycle (Fig. 3-3-1)
- Participation of various satellites: earth observation satellites, communication satellites, and navigation satellites
- Further collaboration for operation
- Further utilization of human networking through capacity building and outreach

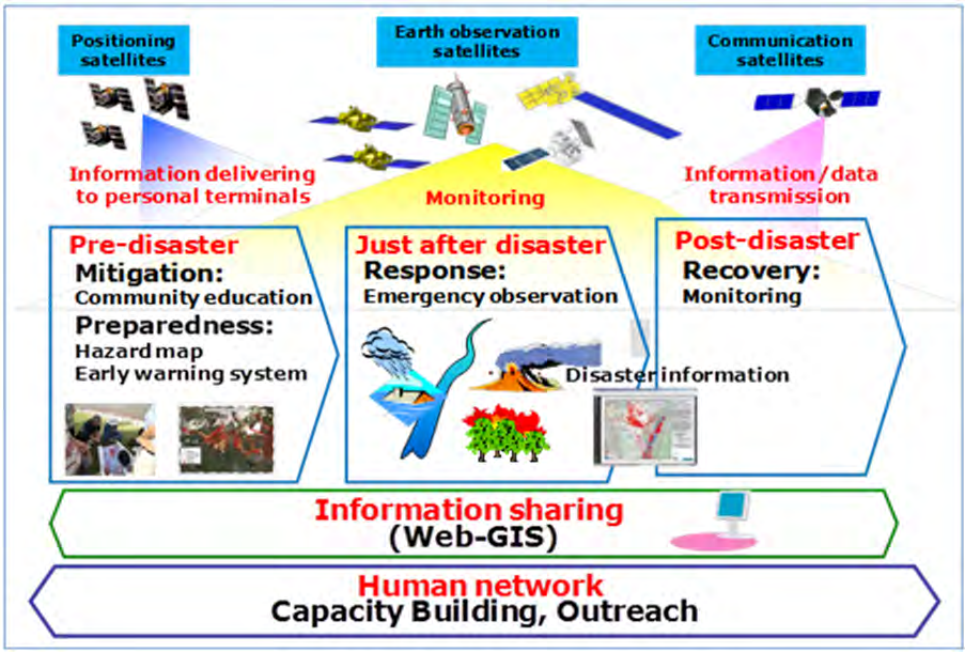

Fig. 3-3-2 Concept of Sentinel Asia Step3

(3) Emergency Observation Activities for this year

Despite the year to year changes in the number of requests, the ratio of activated numbers remains stable at around 80%. After a peak of 2010-2011, however, the number of requests reduced after ALOS, a laser sensor had stopped in May 2011, which might had affected the number of requests. From January to December 2015, twenty-five emergency observations were requested, twenty-four of which were undertaken, after the operation of ALOS-2, the succeeding satellite of ALOS had started from November, 2014.

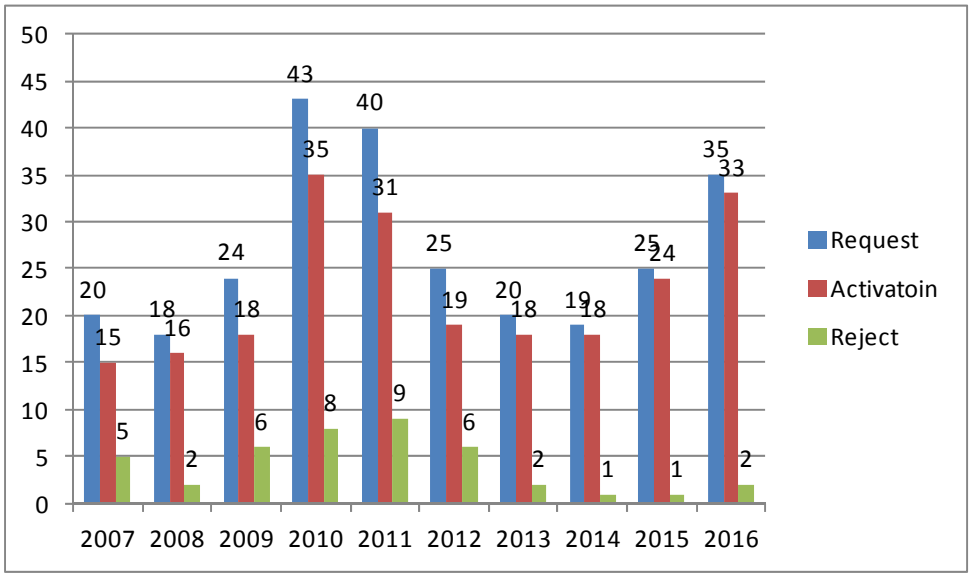

Fig. 3-3-3 Changes in the number of emergency observation 2007-2016

Looking at the breakdown of type of disaster in 2016, the ratio of flood occupies for more than one third of the total (Fig. 3-3-).

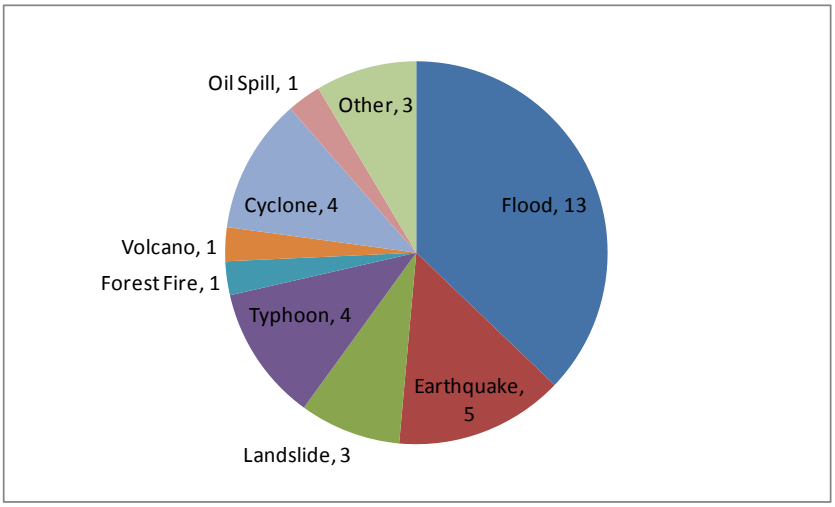

Fig. 3-3-4 Breakdown by type of disaster (2016)

3-3-2. Sentinel Asia activities for DRR

(1) Sentinel Asia Step 3 and ADRC

Sentinel Asia STEP 3 has started since 2013 based on expanding human networks and joint operation coordinated by Joint Project Team of SA, and been employing a wide variety of satellites including earth observation satellites, communication satellites and navigation satellites. The activities have covered all phases of disaster management cycle including not just emergency response but pre-disaster prevention and preparedness phases as well as post-disaster recovery and reconstruction phases.

ADRC has got support from JAXA and carried out the following tasks to lead SA STEP3 evolution, supporting of establishment and management of steering committee and working groups, emphasizing utilization of satellite images for the disaster management organizations participating in SA.

(2) Contents

Major activities performed by ADRC for Sentinel Asia STEP3 include:

1. Collaboration for establishing the Steering Committee for work as the secretariat for SC together with JAXA
   - 1.1 Preparatory coordination for establishing SC
   - 1.2 Support for day to day organization of SC as the secretariat
   - 1.3 Document and report preparation for the meetings
2. Collaboration for promotion of SA step 3
   - 2.1 Coordination for intensifying cooperation with the disaster management organization
   - 2.2 Support for WG organization of such as disaster classification WG
3. Report in the meetings

(3) Progress

ADRC has supported steering committee and WG meetings for SA, mainly hosted by JAXA. About supporting promotion of SA STEP3, ADRC undertook a questionnaire survey and hearing survey targeting disaster management organizations on the following issue.

- ✓ Organizational structure of disaster management organizations in the governments of member countries
- ✓ Department/division requiring satellite images including contact details
- ✓ Working Groups of their interest
- ✓ Contact points in case of disasters, including those of local offices, if any

The outcome of this survey has been made accessible on the web of JAXA.

3-3-3. Applying Space-Based Technology and Information and Communication Technology to Strengthen Disaster Resilience

(1) Background and Objectives

Asian Development Bank (ADB) has initiated a regional capacity development technical assistance on Application of Satellite Based Technology (SBT) and Internet and Communication Technology (ICT) at local government and community levels in a more cost-effective manner. This project aims to support Armenia, Bangladesh, Fiji and the Philippines by improving local capacity to collect reliable and timely disaster-related data facilitating post-disaster response, recovery and reconstruction efforts, leading to strengthening disaster resilience of the target country/region. ADRC has joined this project as CBDRM Specialist.

(2) Overall methodology

Community based hazard map on paper provides diverse local information, which can be easily shared by digitalization. Electric map facilitates also sharing micro-regional information rapidly in case of disaster. In addition, by overlaying the satellite imagery, disaster history in the area and overall disaster images can be easily shared with, facilitating rapid and effective disaster response.

The overall approach and methodology (See Figure 3-3-5) includes:

i) community-based OSM base map development;

ii) community based hazard/risk and evacuation routes mapping;

iii) crisis mapping;

iv) utilization of satellite -based damage assessment;

v) data management using GIS at local governments; and

vi) utilization of data at the community level for disaster risk reduction, response and recovery.

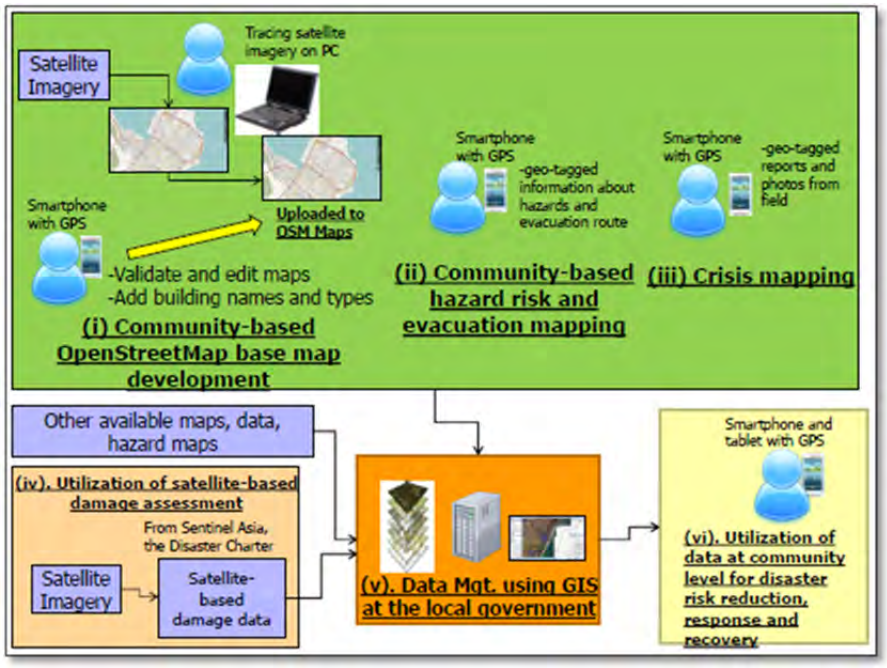

Fig. 3-3-5. Overall methodology

(3) Project period

The project period is from October 2015 to July 2017.

In December 2015,the regional kick-off meeting with the governmental officials of four pilot project countries (Armenia, Bangladesh, Fiji, and Philippines) was held at AIT, Thailand. Throughout 2016, map data and other relevant data were prepared and town-watching training were organized in each country. The software that was developed also during 2016, has been used for the town-watching and drill from the beginning of 2017. The applications will be completed by the end of May 2017, and made available for the relevant local authorities so that they will be able to get prepared to face future disasters.

(4) Activities at regional and in four pilot project countries

1) Regional kick off meetings

The regional kick off meeting in AIT stated with a side event, the OSM (Open Street Map) workshop to inform the participants the OSM concept, how to use the application, and good practices. International and national consultants participated in it.

Delegates from pilot project countries also participated in the regional kick-off meeting. After the briefing of the project by ADB, collaborators contributing the project including AIT, ADRC, RESTEC, PASCO, GeoThings reported the status of each pilot project countries as well as the project targets.

2) Kick-off Meeting and other activities in the pilot project countries

Each pilot project country conducted the kick-off meeting, OSM mapping workshop, Town-Watching workshop, Evacuation drill, Policy making meeting, and the Final meeting.

Additional workshops are scheduled during April to July 2017 in each pilot project country.

(5) Further Contribution to member countries

The application developed as an outcome of this project could be applied to other member countries in the future and expected to contribute to strengthen DRR at the community level in each member country.