3-4 Sharing risk information of natural disaster by using satellite image

The Sentinel Asia(SA) initiative is collaboration between space agencies and disaster management agencies, applying remote sensing and Web-GIS technologies to assist disaster management in the Asia-Pacific region. The SA is a voluntary and best-efforts-basis initiative led by the Asia-Pacific Regional Space Agency Forum (APRSAF) to share disaster information in near-real-time across the Asia-Pacific region, using primarily the Digital Asia (Web-GIS) platform.

3-4-1. Basic Research on Hazard Map for Glacial Lake Outburst Flood in Bhutan

The SA's architecture is designed to operate initially as an internet-based, node-distributed information distribution backbone, eventually distributing relevant satellite and in spatial information on multiple hazards in the Asia-Pacific region.A step-by-step approach for implementation of this dissemination system was adopted as follows:

Step 1: Implementation of the backbone Sentinel Asia data dissemination system as a pilot project, to showcase the value and impact of the technology using standard internet dissemination systems (2006-2007)

Step 2: Expansion of the dissemination backbone with new satellite communication systems, and enhancement of activities based on experiences in Step 1 and new requirements (2008-2012)

Step 3: Establishment of a comprehensive disaster management support system (2013 onwards)

SA Step1 has achieved its overall goals. The Sentinel Asia website has operated since October 2006. It has served as a good demonstrator project, to share disaster-related information obtained by several Earth observation satellites such as Advanced Land Observing Satellite (ALOS). It has also demonstrated recent advances in web-mapping technologies.

And Glacial Lake Outburst Flood resulted from climate change was focused on SA Step2. Therefore, new working group, GLOF working, was established on step2. ADRC joined in this working group as one of project organization since 2009.

3-4-1-1. background

Bhutan is well known for one of affected countries due to their request. The main objectives are to develop a hazard map, and to conduct workshops for capacity building at local level. For considering the plan, the ADRC dispatched staff to Bhutan and discussed about this matter with

government staff.

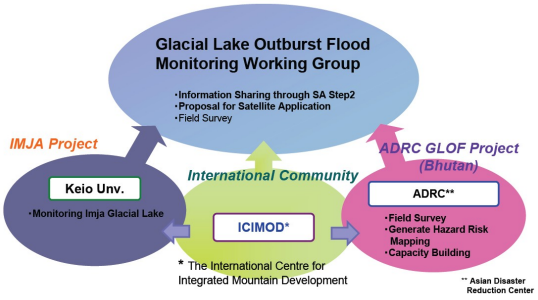

Fig. 3-4-1-1 Framework of GLOF working

3-4-1-2. Survey

(1) Preliminary Meeting

The international conference, Joint Project Meeting for Sentinel Asia, is held to share the latest activities every year. In 2009 meeting was conducted in Indonesia from 15th to 17th July. During this confrtrnce the ADRC had a meeting with participants of Bhutan to discuss a working plan.

(2) Kick off meeting

A Kick off meeting was held on 5th October 2009 in Bhutan. In this meeting, participants discussed the target area and specific plan of this project.

1) Target area

The Mo Chhu river basin was decided as target area which is shown Fig. 3-4-1-2(No1-5).

2) Objectives

-To gather materials concerning GLOF for developing Hazard Map

-To build a capacity for government officer

-To consider early warning system

(3) Survey

1) Interview

Some of participants including ADRC staff went to target area, the Mo Chhu river basin, and have a discussion with DDM staff. It was suggested that it is possible to cause flood resulted from GLOF in the suburbs of Punaka city.

2) Other

Before the survey, one earthquake occurred at the east of Bhutan. Therefore local government staffs of DMM are interested in disaster mitigation activity.

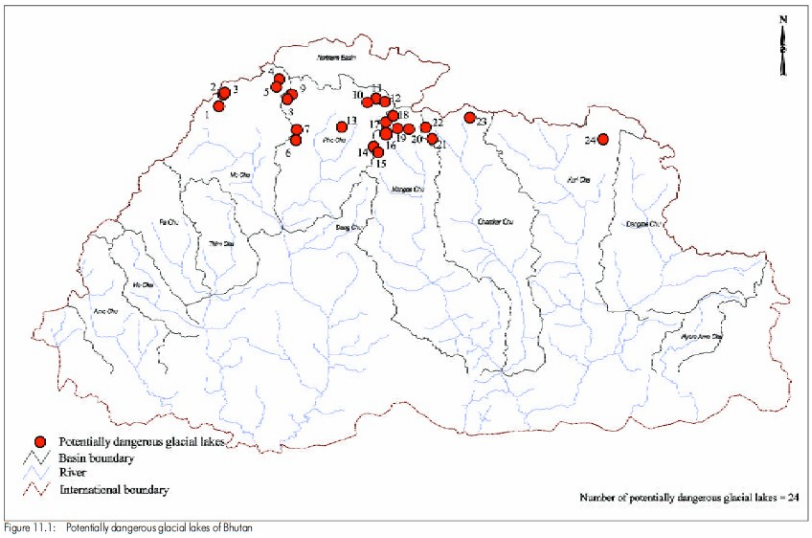

Fig. 3-4-1-2 Map of Bhutan(ICIMOD)

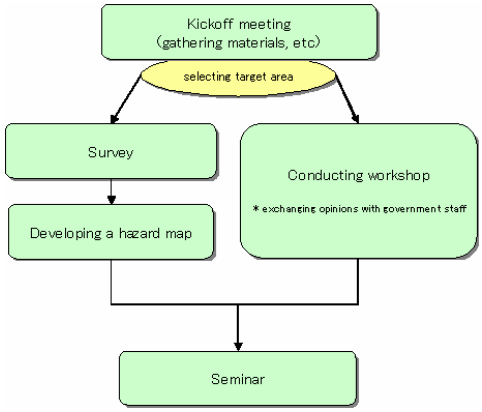

Fig.3-1-1-3 Flowchart of GLOF activity

Fig. 3-4-1-4 the Punaka city

（left:1994 right(ICIMOD): At present）

3-4-2. Transmitting Images of Disaster-Stricken Area and Providing Lessons in Image Analysis Techniques

(1) Emergency observation

From April 2009 to March 2010, 16 emergency observation requests were received and 20 emergency observations were performed. Table 3-4-2-1 provides details of the emergency observations performed during this period. When emergency requests are received, ADRC's emergency request administrator decides whether the request is appropriate and whether the observation will be performed.

Table 3-4-2-1 Emergency observation

	Country	Region	Type	Date
1	Vietnam	Bac Kan	Flood	2009/7/7
2	Philippines	Mt. Pinatubo	Typhoon	2009/8/8
3	Nepal	Sunsari District	Flood	2009/8/18
4	Indonesia	Cianjur, West Java state	Earthquake	2009/9/2
5	Philippines	Manila ctiy, Quezon ctiy	Flood	2009/9/26
6	Vietnam	Quang tri, Da Nang	Flood	2009/9/28
7	Indonesia	Western Sumatera	Earthquake	2009/9/30
8	Philippines	Northern Luzon	Flood	2009/10/9
9	Nepal	Western Nepal	Flood	2009/10/12
10	Vietnam	Binh Dinh, Phu Yen, Khanh Hoa	Flood	2009/11/3
11	Sli Lanka	Eastern Province	Flood	2009/12/15
12	Philippines	Mayon volcano	Volcanic Eruption	2009/12/25
13	Indonesia	Bandung district	Land slide	2010/2/23
14	Bhutan	Trashigang,Mongar	Forest Fire	2010/3/9
15	Kazakhstan	Kyzyl-Agash	Flood	2010/3/13
16	Indonesia	Karawang, West Java	Flood	2010/3/21

Figure 3-4-2-1 flow of the emergency observation request

(2) Follow-up Survey

Starting this year, follow-up surveys are being conducted in countries that have requested emergency observations. Surveys this year were conducted in Philippine and Vietnam and the results show that the requesting agencies, especially local offices, lack the necessary skills for processing satellite image data for disaster reduction. We must provide examples of how satellite image data can be used, and teach relevant agencies how to process those images for disaster reduction purposes. We also learned that the staff of local government agencies is less adept than national government officials at utilizing satellite image data. It is therefore very important to implement capacity-building measures for local government officials.

fig3-4-2-2 Survey in Manila, Philippine

(3) Seminar and International Conference on Sentinel Asia

This year, ADRC dispatched staff to Sri-Lanka (from 27 Sep to 1 Oct 2009) and Kyrgyz (from 19 to 25 Dec 2009) to conduct seminars on the operation of Sentinel Asia. During those seminars, participants learned about the activities of ADRC and received training in the issuance of Emergency Observation Request.

ADRC also sent a representative to attend a conference organized by the Asia-Pacific Regional Space Agency Forum (APRSAF) in Bangkok, Thailand in January 2010. At this conference, ADRC presented on the situation and trends of natural disasters worldwide, progresses made in implementing the Hyogo Framework for Action 2005-2015 - a global blueprint for disaster risk reduction efforts -, and the application of space technologies to disaster management with Sentinel Asia and UNSPIDER as an example.

3-4-3. Capacity Building Project for Local Government Officials

3-4-3-1. Objectives

Local government officials play pivotal roles in every stage of the disaster management cycle, including preparedness, emergency response, rescue & recovery, and disaster mitigation. However, they have limited opportunities to receive relevant training. This project aims to provide local government officials with opportunities to learn about disasters, disaster management, and technologies for strengthening their capacity to cope with disasters, as well as to develop bases for conducting ongoing disaster risk reduction training in the ASEAN countries in the future.

3-4-3-2. Outline

This project consists of three components: (1) development of an ongoing training system for local government officials, (2) development of training materials and modules based on the disaster characteristics and training needs of each country, (3) the organization of workshops for local government officials.

The Asian Disaster Reduction Center (ADRC) and disaster risk reduction (DRR) organizations in each country work together on selecting training topics, choosing experts to conduct training sessions, and developing training materials based on the disaster background and training experiences of each country. Then the "training of trainers" (TOT) sessions are conducted using the materials developed. After undergoing this training, the TOT participants will then lead workshops for local government officials. If three workshops are held in each country, and these are attended by a total of 90 local government officials, this program could end up training as many as 900 total officials.

The project will last three years, with 20 months of activity scheduled in each country. The following schedule has been agreed upon by each country:

FY 2008: Cambodia, Lao PDR, Vietnam

FY 2009: Brunei Darussalam, Malaysia, the Philippines, Thailand

FY 2010: Indonesia, Myanmar, Singapore

3-4-3-3. Progress

In fiscal 2008, kickoff meetings were held in Lao PDR (National Disaster Management Office) and Cambodia (National Committee for Disaster Management) in October, and in Vietnam (Disaster Management Center) in November. The meetings lasted a couple of days in each location. ADRC and officials in these three countries discussed the training needs of local

government officials, and selected topics for training based on those needs, given their countries' respective disaster backgrounds and disaster management systems.

At present, ADRC is working with each country on selecting experts to give lectures and on developing training materials both in English and the local language. The "training of trainers" sessions are scheduled for June 2009 in these three countries, and these will be followed by workshops for local government officials later in the year.

For the countries scheduled to implement the program in the second and third years, the start dates are May 2009 and February 2010, respectively. Since the project period is 20 months in each country, there is some overlap between them.

Fig. 3-4-3-1 Kickoff Meeting (Lao PDR)

Fig. 3-4-3-2 Kickoff Meeting (Cambodia)

Fig. 3-4-3-3 Kickoff Meeting (Vietnam)