JAXA/AIT COLLABORATION FOR CAPACITY BUILDING IN ASIA-PACIFIC

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ABSTRACT:

Use of remote sensing, GIS and GPS becoming operationalize in most parts of the world including Asia-Pacific. One of the main reasons for this increase is ongoing international cooperation in various development projects. Also, with the availability of high-resolution satellite data, most of Asian countries show their enthusiasm in using these technologies for their mapping and resource monitoring activities. With the increase of satellite data usage and use of GIS technology, it is important to develop local knowledge and technical know-how of local expertise use of remote sensing, GIS and GPS in practical applications. Also, it is identified that awareness need to increase not only among technicians, political leaders need to be educated in these technologies to receive their blessing in adopting these technologies in day to day activities in possible fields of applications. JAXA is generous in providing technical assistance to the region with the collaboration of Geoinformatics Centre of Asian Institute of Technology since 1995 to increase the awareness and to develop individual capacities in remote sensing, GIS and GPS technologies. More than 800 were trained from the region either at AIT or locally, depend on the program they participated. This is a remarkable achievement and the support would have certainly helped to increase the knowledge as well as awareness in the region. This paper summarizes various training programs conducted by GIC with JAXA support and present status of JAXA sponsored capacity building activities in Asia-Pacific.

1. INTRODUCTION

Japan Aerospace Exploration Agency (JAXA) previously known as National Space Development Agency (NASDA) of Japan has been contributing to capacity building in remote sensing and related space technologies in Asian region with the cooperation of Geoinformatics Center (GIC) previously named as GIS Application Centre (GAC) of Asian Institute of Technology since 1995. The first training course under JAXA sponsorship was launched in 1995 inviting twenty participants from Asia to GIC. The title of the course was PC based GIS Information System, which was appropriate at that time due to very limited awareness of these new technologies. Further, it is important to say that GIC was established in the same year with the financial collaboration of United Nation Environment Program – Environment Assessment of Asia and Pacific. With the success of the first course conducted with the collaboration of GIC, JAXA continued to support the region with more training courses covering remote sensing, GIS, GPS and application of these technologies.

JAXA supported capacity building and information sharing in the region was carried out in number of initiatives since 1995 as given below;

a. Structured training programs
b. Caravan training programs
c. Mini-Projects
d. Workshops

Structured training programs were carried out at GIC inviting participants from the region who are working in national agencies. Structured courses were conducted for two weeks at GIC with full sponsorship of JAXA. The sponsorship included airfare to AIT in Bangkok, accommodation and living expenses in Bangkok, and tuition fee at GIC. This activity was continued until year 2003 satisfactorily training more than 400 people. During training at AIT, participants were benefited with access to the library of the institute and opportunities to meet faculty members of AIT to further exchange information and develop future collaborative opportunities.

Another type of training program that is conducting by GIC for JAXA sponsorship is referred to as Caravan Training. These programs are being conducted locally with the collaboration of local agencies. It is expected that this program could offer opportunities to a larger audience to increase awareness in remote sensing, GIS and GPS by conducting locally. Generally, the duration is five days targeting a topic that is relevant to the country concerned. Since 1997, after two years of first structured training program, Caravan type training programs were started and the first training program was conducted in Philippines. Since then seventeen Caravan training programs were conducted in ten countries.

One of the other information sharing and capacity building activity that was supported by JAXA was Eco-Seminar conducted since 1992. This was a 2-3 day workshop gathering experts from the region to discuss the sustainable natural resource management and the potential of remote sensing, GIS and GPS technologies in supporting this endeavour. This program started from Thailand in 1992 and conducted in Malaysia, Indonesia, Philippines, Fiji, Vietnam, Bangladesh, Myanmar and concluded the program conducting the last of the series in Thailand in 2000.

2. SUMMARY OF ACHIVEMENTS

2.1 Structured 2 Weeks Training Courses

This programmed was the start of JAXA contribution in Asia-Pacific through AIT. Due to relatively high cost involved in sponsoring participants, these courses were limited for two

weeks though these provided most effective method to provide latest development of geospatial technology to selected participants. Since the inauguration, more than twenty training programs were designed by GIS of AIT and conducted with the sponsorship of JAXA. This allowed to provide technical assistance to more than 400 persons belonged to various agencies in Asian countries. Table 1 shows the distribution of participants under these training programs until 2003. Most number of participants has come from Bangladesh, Indonesia, Nepal, Philippines, Sri Lanka and Thailand. These countries could consider as active countries in application of remote sensing, GIS and GPS as well as integrated these technologies in to their national educational programs. Stronger economies like Brunei, Malaysia and Singapore were not given sponsorship describing the smaller number of participants from these countries. Some countries such as Bhutan, Iran, Mongolia, and Fiji represented less due to high cost of transportation involved. Further few countries such as China, Myanmar, and Cambodia are under represented due to difficulties in securing suitable participants as a reason of poor communication and delays in local administration. Thailand has enjoyed most number of participants due to low sponsoring cost and positive participation of national agencies.

Table 1 Distribution of structured training program participant

Country	No of Participants	No of Participants	
Bangladesh	38	Malaysia	07
Bhutan	01	Mongolia	12
Brunei	03	Myanmar	10
Cambodia	14	Nepal	30
China	03	Pakistan	17
Fiji	05	Philippines	26
India	18	Singapore	02
Indonesia	39	Sri Lanka	49
Iran	01	Thailand	67
Lao PDR	17	Vietnam	40

In selecting themes for structured training programs, participants' needs, and appropriate topics for their respective countries were considered. Training programs were prepared based on real-world applications. Also, it was always targeted to provide application oriented training program where participants were given from end to end knowledge of application of remote sensing and GIS in real-world applications. Generally, 70% of the time was spent for hands-on training. Table 2 shows themes used for structured training programs since 1995 with number of participants for each course. At the end of each training program, participants were provided training datasets with training manuals to share among their colleagues once they return back to respective agencies.

Table 2 Themes of structured training program conducted

Year	Theme	No
1995	Introduction to PC Based GIS	20
1996	Forest & Natural Resources Management	20
1997	GIS and Remote Sensing for Watershed Management	20
	Microwave Remote Sensing	20
	GIS in Land Use Planning	20
1998	GIS and Remote Sensing for Watershed Management	15
	GIS and Remote Sensing for Flood Mitigation	15
	SAR Data Potential & Applications	16
1999	Remote Sensing and GIS for Coastal Zone Monitoring & Management	15
	GIS and Remote Sensing for Watershed Management	15
	SAR Data Potential & Applications	15
2000	GIS and Remote Sensing for Watershed Management	18
	SAR Data Potential & Applications	18
	Remote Sensing and GIS for Coastal Zone Monitoring & Management	17
2001	Remote Sensing and GIS for Coastal Zone Monitoring & Management	21
	SAR Data Potential & Applications	15
2002	Open Source GIS for Spatial data Sharing	16
	SAR Data Potential & Applications	16
	Remote Sensing and GIS for Coastal Zone Monitoring & Management	17
	Potential of Low to Moderate Resolution satellite Data (GLI)	18
2003	SAR Data Potential & Applications	15
	Remote Sensing and GIS for Disaster Mitigation	17
2004	Potential of Low to Moderate Resolution satellite Data (GLI)	18

2.2 Caravan Training Programs

The term "Caravan" was the name given to one-week training programs that are conducted in various countries in the region. As the name implies, programs are moved from country to country on rotational basis. Through these programs, attempt is made to draw the attention of a larger audience to increase the awareness of remote sensing, GIS and GPS technologies and their real-world applications. Effort was given to develop a training program on a theme that is relevant to the country where the program is scheduled to carryout. Thorough discussions are carried out with local coordinating agency in selecting a suitable topic and an appropriate study site for development of the training module. JAXA provides satellite data acquired over the site selected and when necessary data are purchased from other available sensor. Participants are selected from various local agencies that are using these technologies or agencies that have possibilities to use these technologies with the collaboration of local coordinating agency. Attempt is made to spend at least three full days for hands-on practices helping participants to become familiar with satellite data and generate few products using commercially available remote sensing and GIS software packages. This program is very successful in disseminating current technology and future development to larger audience. In the meantime, local organizations take this opportunity to promote national Geoinformatics with the collaboration of various organizations who are taking part in Caravan training programs.

Table 3 Themes and places that conducted Caravan training

Year	Theme	Country
1997	Geomatics for Mid-Level managers	Philippines
	RS/GIS for Nepal	Nepal
1998	RS/GIS/GPS Applications	Indonesia
	Mapping from Space	Vietnam
1999	Mapping from Space	Sri Lanka
	RS/GIS for Flood Mitigation	Bangladesh
2000	Mapping from Space	Cambodia
	RS/GIS for Forest Management	Myanmar
2001	Watershed Management for ASEAN	Malaysia
2002	RS/GIS for Watershed Management	Lao PDR
	Potentials of SAR Data Applications	Philippines
2003	RS/GIS for Urban Planning	Bangladesh
	Use of Moderate Resolution Satellite Data	Cambodia
2004	RS/GIS for Urban Management	Indonesia
	RS/GIS for Forest Management	Myanmar
2005	RS/GIS for Watershed Management	Lao PDR
	RS/GIS for Disaster Management	Sri Lanka

Table 3 summarizes the Caravan training programs conducted by GIC with the sponsorship of JAXA until 2005. As previously mentioned, selection of a venue is on rotational basis but preference is given to least advanced countries to increase awareness through promotion among national agencies. JAXA is considering to continue this type of training program as it recognized that Caravan programs are very effective in increasing awareness of technologies and could consider as a better stage for promotion of Japanese contribution to individual country.

2.3 Mini-Projects

Mini-Project based capacity building was launched by GIC under JAXA sponsorship in the year 2004. This applied-research oriented activity has given a new face to past traditional capacity building programs by targeting specific topics, selecting appropriate agencies, providing need-basis technical expertises, and finally achieving tangible results. Structured two-weeks training programs targeting advanced technology transfer had been carried out since 1997 providing training to more than four hundred participants increasing awareness and developing technical ability in the field of GIS and remote sensing. Though the outcome is not readily quantifiable, this generous effort of JAXA definitely boosted the knowledge and use of remote sensing and other related technologies in the region. The positive contribution can be identified by the increase in the usage of satellite remote sensing and GIS in the relevant agencies of the region from where trainees were drawn.

Having helped to create a favourable environment for use of remote sensing information and GIS tools, JAXA further considered continuing the support to develop technical competency in adopting these technologies in operational basis. With this aim, a new capacity building program called 'Mini-Project' was launched with the technical cooperation of GIC. Mini-Project topics are selected by two agencies referred to as "user agency" and "service providing agency" and it is expected both of these agencies nominate participants to work on the selected topic together with GIC staff at least for a year with short term visits. Specific training is provided at GIC, fieldwork will be carried out together and if necessary local support is provided. Ample time is provided to participants to work independently at GIC to use remote sensing, GIS and GPS technologies and other relevant information in brining in best solution for the objective selected by them. This develops self-confidence of participants as the program structure allows them to develop individual skill by working on a project that is relevant to their individual organizations.

Table 4 shows Mini-Projects carried out in the year 2005, which is the second year for the new initiative. Most of them are successful but it is not possible to say that all project yielded good results. Success depends on the participants' basic knowledge, level of education and enthusiasm. Further, available satellite data, field data and time that could spend to integrate the phenomenon with Geoinformatics plays an important role in the success ratio. It is very difficult to control some of the factors such as selection of participants, effective data sharing, and adaptation of new technologies.

Table 4 Themes of Mini-Projects conducted in year 2005

Theme	Country
Water Induced Disaster Management - A case study on Application of Remote Sensing and GIS Techniques for Flood Mitigation	Bangladesh
Land Use/Land Cover Changes and Flood Risk assessment in Cambodia Using RS & GIS	Cambodia
Application of Remote Sensing and GIS for Earthquake Disaster Mitigation in Kathmandu	Nepal
Integration of RS & GIS with Flood Simulation Models for Flood Hazard Mapping and Mitigation - A Case Study of Bagmati River	Nepal
Rice Area Mapping and Backscatter Analysis Using Multi-temporal Radarsat Images in the Rainfed Areas of Pangasinan and Nueva Ecija	Philippines
Modeling the Spatial Occurrences of Rain-Induced Landslides and Identifying Potential Landslide Hazard Zones Using RS/GIS as a Tool	Philippines
Application of RS & GIS Technology for Landslide Susceptibility Assessment	Sri Lanka
Application of Multi-Temporal Satellite Data for Land-Use/Land-Cover Change and Flood Mapping in the Coastal Zone of Vietnam	Vietnam
Application of Conventional and Spatial Data in Detection of Underground Karsticic Formations to Store Excess Extreme Floodwater Flows in the Red River Delta in Vietnam	Vietnam

3. FUTURE ACTIVITIES

GIC recognizes the needs of technological support in the region as there are number of countries lack human resources in Geoinformatics. It is expected that JAXA continue to support for technology transfer in Asia-Pacific region looking at the needs and requirements with resources that could be extended to the region. With the launch of new ALOS satellite and new initiatives in disaster supporting activities of JAXA, it necessary to consider knowledge sharing in object oriented manner rather than traditional capacity building approach. Region recognizes the potential of satellite remote sensing and associated tools in various applications including disaster mitigation and management. In the meantime, there is a demand for capacity building to make use of such system in effective manner. In this aspect, current Mini-Project would be the ideal approach to address the needs of each country disaster management agencies to develop their capacities to receive and use of satellite data or products in their national disaster management projects.