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**COUNTRY REPORTS**

**TECHNICAL COOPERATION IN SURVEYING, MAPPING AND CHARTING BY JAPAN**

**Submitted by Japan \*\***

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# **TECHNICAL COOPERATION IN SURVEYING, MAPPING AND CHARTING BY JAPAN**

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## **SUMMARY**

In the Japanese government, several organizations are responsible for fundamental surveying, mapping and charting projects. Basic geodetic surveys are carried out mainly by the Geographical Survey Institute (GSI) and the Hydrographic and Oceanographic Department (HOD), and various cartographic works are conducted by the GSI, the HOD, the Ministry of Land, Infrastructure and Transport (MLIT), the Geological Survey of Japan/AIST (GSJ/AIST) and other organizations. In order to provide technical assistance and implement the transfer of technology in the field of cartography, these bodies are actively engaged in various technical cooperative projects, implemented by Japan International Cooperation Agency (JICA), which is commissioned by the Ministry of Foreign Affairs.

Technical cooperative activities in the fields of surveying, mapping, hydrography, oceanography and geoscientific research can be grouped into three categories: namely, acceptance of trainees, dispatch of experts and cooperative projects.

## **1. Training**

### **1.1 Training Courses in Surveying and Mapping**

#### **(1) Group Training Course in Planning and Management of National Mapping and Surveying (JICA)**

At the Second United Nations Regional Cartographic Conference for Asia and the Far East held in Tokyo in 1958, the importance of professional education in surveying and mapping for technical personnel of developing countries was recognized. As an outcome of this conference, Japan started, after a five-year preparation period, a group training course in surveying and mapping in 1963. The curriculum of the course has been reconsidered and improved when necessary.

Especially in 1992, this group training course was largely reorganized to cover all fields of surveying and mapping technology, which had shown rapid progress, including geodesy, photogrammetry, cartography and map reproduction as well as Global Positioning System (GPS), Geographic Information System (GIS) and remote sensing.

This course was completed with a total of 371 participants from 62 countries, and was succeeded by a group training course in Planning and Management of National Mapping and Surveying in 2000. The new course is designed to support developing countries or regions to learn good practices of survey administration and project management, namely, laws and regulations, project planning and management, education and dissemination of information. Total number of participants from 2003 to 2005 was 23

from 17 countries.

This training course, upon completion of the five-year cooperation term in FY 2004, is to be newly started in FY2005 with a strengthened focus on survey administration management under the same name of "Planning and Management of National Mapping and Surveying".

Table 1 Number of participants in "Planning and Management of National Mapping and Surveying (JICA)"

Country	2003	2004	2005	Total
Bangladesh	1	2		3
China	1			1
Cuba		1		1
Colombia			1	1
Kenya		2	1	3
Malaysia			1	1
Mali	1			1
Mongolia	1			1
Philippines	1			1
Saint Lucia			1	1
Swaziland	1			1
Syria		1		1
Tanzania(Zanzibar)			1	1
Thailand	1	1		2
Timor-Leste			1	1
Uganda		1	1	2
Vanuatu	1			1
Total	8	8	7	23

## (2) Group Training Course in Global Mapping (JICA)

A new group training course "Global Mapping-Contribution to Global Mapping Development by GIS" started in 2004 succeeding the former group course "Global Mapping" from 1999-2003. The new course aims at capacity building to promote Global Mapping project through transferring technologies of remote sensing and Geographical Information Systems (GIS). The cumulative number of participants of global mapping related courses from 1994 to 2005 reaches 58 people from 34 countries.

Table 2 The number of participants in the Global Mapping course(JICA) for the last five years

Region	Country	2001	2002	2003	2004	2005	Total
Asia	Afghanistan					1	1
	Bangladesh				1		1
	Cambodia				1		1
	China		1		1		2
	India			1	1		2
	Iran		1				1
	Laos	1					1
	Myanmar	1					1
	Nepal					1	1
	Oman				1		1

	Pakistan		1				1
	Palestinian Authority					1	1
	Philippines			1			1
	Saudi Arabia		1				1
	Thailand			1	1		2
	Uzbekistan					1	1
	Viet Nam		1				1
Africa	Algeria					1	1
	Ghana	1					1
	Tunisia				2		2
	Uganda	1					1
Europe	Macedonia					1	1
North-South America	Brazil					1	1
	Guatemala				1		1
	Nicaragua	1					1
Oceania	Fiji			1		1	2
	Samoa					1	1
Total		5	5	5	9	8	32

\*In all tables in this report, each year represents Japanese fiscal year which starts from April of the year and ends in March of the next year.

### (3) Individual Training

The individual training program is prepared in order to meet the needs of each trainee and his/her home government. The training period lasts one to six months. From 2003 through 2006, 3 trainees from 2 countries were accepted.

MLIT has been contributing to training of cadastral surveying as a part of these programs.

Table 3 Individual Training conducted in 2003-2006

Country	Subject	Term
Bangladesh	Surveying and Mapping Technology	2004 (4 months)
Philippines	Spatial Data Infrastructure	2006 (2 months)

## 1.2. Training Courses in Hydrographic and Oceanographic Department

(1) From F.Y. 2003 to 2005, the HOD conducted one group training courses and several individual training courses under the JICA scheme as follows:

### (1-1) Group Training Courses in Hydrographic Survey

This Group Training Course has been authorized by the FIG/IHO International Advisory Board as Category B Course pertaining to Specialization in Nautical Charting and Port and Near Shore Surveys since June 1, 1988.

- a. Purpose: This course is designed to improve the knowledge in modern theory and techniques of hydrographic surveying for technical personnel currently engaged in port and near shore surveying.
- b. Duration: From May to December every year.
- c. Curriculum: The curriculum of the course includes lectures and practical components

strictly complying with the requirements under the International Standards of Competence for Hydrographic Surveyors, 8th edition, 1997.

- Lecture: Approx. 77 days
- Practice: Approx. 10 days
- Field/shipboard training: Approx. 36 days
- Observation and study tour: Approx. 12 days

Table 4 Number of participants accepted to Group Training in Hydrographic Survey (2003-05):

Country	2003	2004	2005	Total
Bangladesh	2	1		3
China		1	1	2
Egypt		1		1
Jamaica			1	1
Indonesia	1	1		3
Kenya	1	1	1	3
Malaysia	2	1	1	4
Mauritius	1	1	1	3
Pakistan	1	1	1	3
Philippines	1	1	1	3
Sri Lanka		1		1
Laos			1	1
Thailand			1	1
Total	9	10	10	29

### (1-2) Individual Training

The HOD conducted individual training as shown in Table 5.

Table 5 Individual Training conducted in 2003-2005

Country	Subject	Term
Mauritius	Chart Compilation	2003 (2 months)
Philippines	Mapping Policy Administration	2003(3 months)
	ENC Data Producing	2003 (3 month)
	Management of ENC Updating	2003 (1 month)
	Planning and Management of ENC	2003 (2 weeks)
	Operator of ENCs Updating	2004 (3 months)
	Manager of ENCs Updating	2004 (1month)

(2) From F.Y. 2003 to 2005, the HOD conducted a group training course under the auspices of Japan-UNESCO Funds-in-Trust scheme as follows:

#### **IOC/WESTPAC Training Course on NEAR-GOOS Data Management**

a.Purpose: This course is to provide personnel currently involved in oceanographic data management in the WESTPAC Member States with basic concept of the International Oceanographic data and Information Exchange (IODE) system and its function, NEAR-GOOS Real Time and Delayed Mode Data Base, and acquisition, procession and compilation of oceanographic data including how to operate “Resource Kit” set up by IODE as self-training tools.

b. Duration: From October to November every year.

c. Curriculum: Approx. 12 days

Table 6 Number of participants accepted to IOC/WESTPAC Training on NEAR-GOOS Data Management (2003-05)

Country	2003	2004	2005	Total
China	1			1
Indonesia	1			1
Rep. of Korea	1			1
Philippines	1			1
Russian	1			1
Thailand	1			1
Vietnam	1			1
Total	7			7

\*The course in 2004-05 has been canceled due to overlap with other meeting.

### 1.3. Training Courses in Geosciences

Training of technical personnel from developing countries in geosciences is conducted as part of the technical activities at Geological Survey of Japan (GSJ/AIST), and GSJ accepts researchers in the general fields of geology geoinformation and geo-engineering.

## 2. Dispatching of Technical Experts

### 2.1 Experts in Surveying and Mapping

In 1964, GSI sent out four senior staff members to survey the national boundaries between Saudi Arabia and adjacent countries. Since then, GSI has sent 331 senior, experienced engineers as technical assistance experts. 269 of them were dispatched as short-term experts, who generally remain from several weeks to two months, to carry out particular projects based on requests to the Government of Japan from the recipient governments, while others are long-term experts who stay longer than one year and cooperate with their host governmental organization by providing technical assistance.

Table 7 Dispatching of long-term experts (2003 - 2006)

Country	Subject	GSI or MLIT	Term
Kenya	Advisor, Survey of Kenya	GSI	2003 - 2005
Bangladesh	Advisor, Survey of Bangladesh	GSI	2001 - 2003
	Expert in Mapping Technology, Survey of Bangladesh	GSI	2003 - 2005
	Improving of Digital Mapping System of Survey of Bangladesh	GSI	2005 -
Senegal	Geographic Information Management	GSI	2001 - 2003
Philippines	GEO-Spatial Data Administration, NAMIRIA	GSI	2004 -

### 2.2 Experts in Hydrographic and Oceanographic Department

From F. Y. 2003 to 2005, the HOD sent 25 staff members as experts in the field of hydrography. 23 staff members of them were dispatched as short-term experts.

Table 8 Dispatching of long-term experts after 2003.

Country	Subject	Term
Philippines	Electronic Navigational Charts Database	2001-2005
Mauritius	Adviser to Hydrography	1999-2003

## 2.3 Experts in Geosciences

The GSJ/AIST is involved in technical cooperation programs of the Japanese Government. The activities of the Survey personnel in the geo-scientific and geo-technical assistance programs cover a broad spectrum of the geosciences, not only for mineral and energy resources but also for groundwater management, environment, environmental geology, geohazards, and geoinformation technology.

## 3. Cooperative Projects

### 3.1 Mapping Projects

In 1971, Japan started its first overseas mapping project in Indonesia to prepare national base maps of that country. Mapping projects in developing countries are conducted as technical cooperation by JICA. The role of the GSI in these overseas mapping projects is to give advice to both the authorities concerned in Japan as well as in the recipient countries on all aspects of surveying and mapping of the projects, and to supervise the survey project.

The projects are, in general, assigned to a survey company in Japan, by JICA for implementation. GSI provides technical guidance through the Advisory Committee and other meetings with authorities concerned.

Most of the projects are to prepare topographic maps as national base maps. In some cases, thematic maps such as land use maps are also made.

Table 9 Overseas Mapping Projects in progress as of 2005

Kenya (Study for Establishment of Spatial Data Framework for City of Nairobi)			2003 - 2005
Digital Topographic Mapping	1 : 2,500	170 km <sup>2</sup>	
	1 : 5,000	415 km <sup>2</sup>	
Spatial Data Framework	1 : 2,500	15 km <sup>2</sup>	
Aerial Photo	1 : 15,000	700 km <sup>2</sup>	
Model GIS		15 km <sup>2</sup>	
Bosnia and Herzegovina (Establishment of Digital Topographic Map)			2003 - 2005
Digital Topographic Mapping	1 : 25,000	7,800 km <sup>2</sup>	
	1 : 5,000	72km <sup>2</sup>	
	1 : 2,500	24km <sup>2</sup>	
Aerial Photo	1 : 40,000	51,000 km <sup>2</sup>	
Kyrgyz (Study for Planning of Total Development in Issyk-Kul Area)			2003 - 2006
Digital Topographic Mapping	1 : 100,000	14,000 km <sup>2</sup>	
Digital Topographic Mapping	1 : 25,000	2,300 km <sup>2</sup>	
Georgia (Study for Establishment of Digital Topographic Map)			2004 -

Aerial Photo	1 : 40,000	30,000km <sup>2</sup>
Digital Topographic Mapping	1 : 40,000	30,000km <sup>2</sup>
GIS Model System	1 : 50,000	
Nicaragua (Study for Disaster Prevention Map and Information Infrastructure) 2004 - 2006		
Aerial Photo	1 : 20,000	1,400km <sup>2</sup>
Aerial Photo	1 : 40,000	12,000km <sup>2</sup>
Digital Topographic Mapping	1 : 50,000	20,000km <sup>2</sup>
GIS Data	1 : 50,000	20,000km <sup>2</sup>
Volcano Disaster Prevention Map	1 : 100,000	2 areas
Earthquake Disaster Prevention Map	1 : 125,000	1 city
Flood Disaster Prevention Map	1 : 7,000 and 1 : 3,500	1 river
Tsunami Disaster Prevention Map	1 : 50,000	4 cities
Macedonia (Study for Establishment of National GIS Data Infrastructure) 2004 - 2006		
Aerial Photo	1 : 40,000	25,000km <sup>2</sup>
Digital Topographic Mapping	1 : 25,000	14,415 km <sup>2</sup>
GIS Data	1 : 25,000	3,556 km <sup>2</sup>
Colombia (Formulation of Geographic Database of the Principal Cities in the Atlantic Coast) 2005 -		
Digital Topographic Map	1 : 2,000	400km <sup>2</sup>

### 3.2 Technology Development for ENC Projects

In response to the request of the Government of Republic of the Philippines, a technical cooperation project is conducting from 2000 to 2005 to carry out technology development for Electronic Navigational Charts (ENCs). The purpose of the project is to produce the ENCs and Electronic Notices to Mariners in the Philippines, under JICA's technical cooperation scheme.

Since the dispatch of the preliminary study team to Philippines in 1999, the HOD is involved in the project. In accordance with the agreement between the relevant authorities concerned of the two governments, the five-year project started in 2000. Government of Republic of the Philippines published the nine ENCs and three Electronic Notices to Mariners until December 2004 as the products of the project.

### 3.3 Geoscientific Research Projects

Geological Survey of Japan (GSJ/AIST) is actively engaged in international geoscience programs in collaboration with many foreign countries. Japan belongs to the region of East Asia where recent economic growth is very rapid, hence we are facing with some global science issues stemming from the social changes, such as environmental protection, mitigation of natural hazard, not to mention the geological assessment /exploration of energy and mineral resources.

Seeking the solutions for these issues through an international research network is one of the important goals of GSJ's research programs.