

Report on
UN-SPIDER Capacity Building Programme
“Space Technology for Flood Hazard Mapping, Flood Forecast and
Rapid Mapping in Bangladesh”
Follow-up Activity of Technical Advisory Mission to Bangladesh in June 2011

12-16 May 2013





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1. Context and Justification

UN Office for Outer Space Affairs (UNOOSA), under the framework of UN-SPIDER carried out Technical Advisory Mission (TAM) to Bangladesh in June 2011 upon invitation from the Ministry of Disaster Management, Bangladesh. The mission team had in-depth discussions with all agencies involved in disaster management and identified the need to upgrade technical know-how in using space technology to improve hazard mapping. As a follow-up the recommendations in the TAM report, these agencies and other institutions will be provided an exposure on advances in space technology and its applications in flood hazard mapping, flood forecast and rapid mapping.

2. Objectives of the Training (summary, link to TAM Recommendations)

The broad objective of the training is to implement recommendation made by the UN-SPIDER Technical Advisory Mission in order to strength the capacity of the national agencies to use Geo-Spatial Technologies for flood hazard mapping, flood forecast and rapid mapping.

3. Terms of Reference / Purpose of the Training Activity

The purpose of the training programme is to provide understanding of remote sensing and GIS application in disaster risk reduction and rapid response mapping, mainly for managing flood disaster. A week long training is expected to enhance capacity of participants in preparing flood hazard maps, mapping elements vulnerable to flooding, and compiling remotely derived information into products (flood inundation maps, damage assessment map) relevant to disaster managers. It is expected that participants will be aware of global and regional mechanisms and frameworks, its activation protocols during disaster events.

4. Summary of the training programme

The UN-SPIDER organised a Capacity Building Programme in Bangladesh from 12-16 May 2013 on topic “Space Technology for Flood Hazard Mapping, Flood Forecast and Rapid Mapping in Bangladesh”. The programme was jointly organised with the Ministry of Disaster Management and Relief, Comprehensive Disaster Management Programme (CDMP) and Space Research and Remote Sensing Organisation (SPARSO) of Bangladesh. This event organised as a follow up of the UN-SPIDER Technical Advisory Mission to Bangladesh from 19-23 June 2011. The training was inaugurated by the Secretary of Ministry of Disaster Management and Relief. The training programme covered wide range of topics such as Overview – Role of earth observation in disaster management, Regional Plan of Action on Promoting Space and GIS Applications for Disaster Risk Management and Sustainable Development, Global and regional flood hotspot assessment, Flood hazard/risk mapping,



Multi-Hazard Risk and Vulnerability Assessment, Flood Inundation Mapping using multi-resolution satellite data, Flood response rapid mapping etc. (Schedule attached as an annex). Participants were provided hands on sessions to develop skills in mapping and modelling floods.

The experts from following organisations conducted sessions:

1. UN-SPIDER Beijing Office, UNOOSA, China
2. International Water Management Institute (IWMI), Sri Lanka
3. National Disaster Reduction Centre of China (NDRCC), China
4. International Centre for Integrated Mountain Development (ICIMOD), Nepal
5. United Nation's Economic and Social Commission for Asia and the Pacific (ESCAP), Thailand
6. Pacific Disaster Centre (PDC), Hawaii
7. Asian Disaster Preparedness Centre, Bangladesh and Thailand
8. SPARSO, Bangladesh

SPARSO provided the training room equipped with ArcGIS and Erdas software Resources persons conducted hands on sessions using Bangladesh data sets. The participants appreciated potential of the global datasets with open access and developed skills in flood modeling and mapping. CDMP appointed a consultant to prepare standard operating procedures (SOP) for implementation of TAM recommendations. Taking advantage of capacity building programme, participants were briefed about TAM recommendations and further action to prepare SOP.

5. Details on Dates and Venue

Dates: 12-16 May, 2013

Venue: SPARRSO, Dhaka

6. Detailed Topics for the Training:

The training programme covered following topics:

- **Flood Hazard Mapping:** Flood is the frequent disaster experienced in Bangladesh and more likely affected more than 50 % of the area. Participants will be exposed to flood risk modelling and hazard mapping techniques. ICIMOD will be able to cover topics related to flood inundation mapping and identifying flood shelter sites using GIS and Remote Sensing.
- **Flood Risk Mapping and Modelling:** IWMI has recently generated operational remote sensing datasets in flood risk mapping covering South Asia. Participant will be exposed for the case of Bangladesh on how to apply tools and techniques



using RS data in mapping floods and its potential application. Also participant will be briefed on current and future flood risk using hydrological and hydraulic models. The participants will be benefitted from the hands on training on this model.

- **Rapid mapping during floods:** Often when flood hits, the first-hand reliable information can be provided based on satellite images. However, there is need to standardise rapid mapping practices, including the sources of data required to conduct rapid mapping. NDRCC, with its vast experience of monitoring flood disasters in China and other countries will be able to cover this topic with hands on session.

Some of the theoretical topics will include lectures from experts on following topics:

- Hyogo Framework for Action
- Remote sensing and GIS for flood risk mapping
- Use of Space Technology in Disaster Management
- International mechanism for emergency response

Besides this, the participants will be briefed about TAM recommendations that addresses issues related to use of space based information for disaster risk reduction and emergency response.

7. Participants

A total of 20 officials from following 17 government departments participated in the programme:

1. Department of Disaster Management (DDM)
2. Bangladesh Space Research and Remote Sensing Organization (SPARRSO)
3. Bangladesh Bureau of Statistics
4. Local Government Engineering Department (LGED)
5. Bangladesh Meteorological Department (BMD)
6. Forest Department
7. Flood Forecast and Warning Center [FFWC]
8. Joint Rivers Commission, Bangladesh (JRCB)
9. Urban Development Directory (UDD)
10. Institute of Water and Flood Management (IWFM)
11. Dhaka University (DU)
12. Department of Agricultural Extension (DAE)
13. Geography /Disaster Science and Mngt. Dept, Dhaka
14. Dhaka WASA

15. Armed Forces Division (AFD)
16. Survey of Bangladesh (SoB)
17. Water Resources Management Organization (WRMO)

8. Experts

Following experts contributed to the course by conducting specific sessions:

Experts	Organisation	Topics
Shirish Ravan	UN-SPIDER	UN-SPIDER TAM in Bangladesh and its Recommendations
		Overview – Role of earth observation in disaster management
		Flood response rapid mapping – Experiences, issues and regional/international mechanisms, opportunities – An interactive session
Puji Pujiono / Shahidul Islam	CDMP	Use of Space Information in CDMP / SOP for effective use of Space Technology in Bangladesh
Wang Keran	UN ESCAP	Regional Plan of Action on Promoting Space and GIS Applications for Disaster Risk Management and Sustainable Development.
Giriraj Amarnath	IWMI	Overview on concepts of 1. Global and regional flood hotspot assessment 2. Flood hazard mapping
Deo Raj / Kabir	ICIMOD	
Todd Bosse	PDC	Overview of Pacific Disaster Center's DisasterAWARE
Deo Raj / Kabir	ICIMOD	Flood hazard/risk mapping (Lectures and Hands on)
V. Hari Prasad	ADPC	Multi-Hazard Risk and Vulnerability Assessment and Modeling - A world Bank project for Bangladesh
Zahedul Islam	SPARRSO	Development of a National Flood Monitoring System Based on Remote Sensing Techniques
Giriraj Amarnath	IWMI	Flood Inundation Mapping using multi-resolution satellite data– Lectures and hands on exercise
		Global Flood Detection System – Lectures and Demo
		Flood Inundation Modeling using HEC Tools– Lectures and hands on exercise
		Flood Inundation Mapping and Modeling – Lectures and hands on exercise
Fan Chunbo	NDRCC	Flood monitoring – Rapid Information Collection and Monitoring – Lecture and hands on
		Hands on exercise – Rapid Information Collection and Monitoring
Shirish Ravan	UN-SPIDER	Global datasets for flood monitoring
Giriraj Amarnath	IWMI	

9. In-kind contributions by

CDMP, the programme managed by UNDP, sponsored local expenses such as tea and lunch breaks.

SPARSO offered the venue with computers and software (ArcGIS and Erdas Imagine).

ICIMOD sponsored two experts from their own office to conduct one day training session.

10. Programme Schedule

Please refer to Annex 2.

11. Conclusions and Recommendations

The training programme was very well appreciated by the participants. Since the programme was supported by the Ministry of Disaster Management, the selection of participants was done based on the organisations that are stakeholders in all disaster management activities. The right target group as the key factor for generating great interest of the participants in the training programme.

The support from ICIMOD (UN-SPIDER Regional Support Office) and experts from IWMI, ADPC and PDC added the value to the training programme. It is recommended to bring more such partnerships in the training programme to lift the quality of such events.

12. Lessons Learned

The training conducted based on the need assessment, involving local organisations is effective. The datasets of the country used in the training made the participants relate the training to real situation.

ANNEXES

1. List of Participants

No.	Name	Designation	Organization
01	Netai Dey Sarker*	Assistant Director	DDM
02	Shaleha Khatun	Statistical officer	BBS
03	A.Z. Md. Zahedul Islam*	Principal Scientific officer	SPARRSO
04	Kazi Md. Fazlul Haq	Associate Professor	DU
05	Kazi Mohammad Khalid Ahsan	System Analyst	DWASA
06	Dr. Anil Kumar Das	Program Director, ICT	DAE
07	Shahriar Hussain	Assistant Engineer	FFWC, BWDB
08	Iftexhar Ahmed Dinar	SDE	JRC,B
09	Tanzeer Hasan	DU	DU
10	Major Md. Sadeque Mahmood	Assistant Director	SOB
11	Mohammed A.K. Fazlul Hoque	Surveyor	SOB
12	Md. Shadukul Alam	Meteorologist	BMD
13	Md. Shahabul Islam	Urban Planner	LGED
14	Lt M Mahmudul Hasan Khan	Commanding Officer	NAVY
15	Lt Ahmed Muhtasim Taj	Recce officer	Army
16	Sonia Binte Murshed	Assistant Professor	BUET
17	Fahmida Akhtar	Sr. Scientific Officer	WARPO
18	Quazi Md. Fazlul Haque	Sr. Planner	UDD
19	Sarmin Sultana	Assistant Professor	DU
20	Sanzida Murshed	Assistant Professor	DU
21	Md. Mozammel Haque	Executive Engineer	LGED
22	Md. Kabir Hossain Patwary	ACF	Forest Dept.

* Participants contributed as resource persons

2. Final Training Agenda

Time	Program	Resource Persons
Day 1 (Sunday, May 12, 2013)		
09 :00 - 09:30	Registration	
09:30 - 11:00	Inaugural session Bangladesh Flood Risk Atlas (CD) by IWMI with short presentation	Secretary, MoDMR – Chief Guest Chairman, SPARRSO – Special Guest NPD, CDMP II – Special Guest Shirish Ravan, UN-SPIDER – Guest of Honor PM, CDMP – Vote of Thanks DG, DDM – Chair
11:00 - 11:30	Tea/coffee break	
11:30 - 12:00	UN-SPIDER TAM in Bangladesh and its Recommendations	Shirish Ravan, UN-SPIDER
12:00 - 12:45	Use of Space Information in CDMP / SOP for effective use of Space Technology in Bangladesh	Puji Pujiono / Shahidul Islam, CDMP
12:45-13:45	Lunch Break	
13:45 - 14:15	Overview – Role of earth observation in disaster management	Shirish Ravan, UN-SPIDER
14:15 – 14:45	Regional Plan of Action on Promoting Space and GIS Applications for Disaster Risk Management and Sustainable Development.	Wang Keran, UN ESCAP
14:45 – 15:15	Open discussion session: Availability of remote sensing data, ongoing projects utilizing geospatial information for flood mapping, modeling etc.	Panel: SPARSO, CDMP, DDM, ICIMOD, IWMI
15:15 - 15:30	Tea/coffee break	
15:30 - 17:00	Overview on concepts of 1. Global and regional flood hotspot assessment 2. Flood hazard mapping	Giriraj Amarnath IWMI Deo Raj / Kabir, ICIMOD
Day 2 (Monday, May 13, 2013)		
09:00 - 09:15	Review of previous day's lessons	Participants
09:15 - 11:00	Overview of Pacific Disaster Center's DisasterAWARE	Todd Bosse, PDC
11:00-11:30	Tea/coffee break	
11:30 - 12:45	Flood hazard/risk mapping (Lectures and Hands on)	Deo Raj / Kabir, ICIMOD
12:45-13:45	Lunch Break	
13:45 - 15:15	Flood hazard/risk mapping (Lectures and Hands on)	Deo Raj / Kabir, ICIMOD
15:15-15:30	Tea/coffee break	
15:30 - 17:00	Flood hazard/risk mapping (Lectures and Hands on)	Deo Raj / Kabir, ICIMOD
Day 3 (Tuesday, May 14, 2013)		
09:00 - 09:15	Review of previous day's lessons	Participants
09:15 - 10:00	"Multi-Hazard Risk and Vulnerability Assessment and Modeling - A world Bank project for Bangladesh"	V. Hari Prasad, ADPC
10:00 - 11:00	Development of a National Flood Monitoring System Based on Remote Sensing Techniques	Zahedul Islam, SPARRSO
11:00 - 11:30	Tea/coffee break	



Time	Program	Resource Persons
11:30 - 12:45	Flood Inundation Mapping using multi-resolution satellite data– Lectures and hands on exercise	Giriraj Amarnath IWMI
12:45 - 13:45	Lunch Break	
13:45 - 15:15	Flood Inundation Mapping using multi-resolution satellite data – Lectures and hands on exercise	Giriraj Amarnath IWMI
15:15 - 15:30	Tea/coffee break	
	Global Flood Detection System – Lectures and Demo	Giriraj Amarnath IWMI
15:30 - 17:00	Flood Inundation Modeling using HEC Tools– Lectures and hands on exercise	Giriraj Amarnath IWMI
Day 4 (Wednesday, May 15, 2013)		
09:00 - 09:15	Review of previous day's lessons	Participants
09:15 – 11:00	Flood Inundation Mapping and Modeling – Lectures and hands on exercise	Giriraj Amarnath IWMI
11:00 - 11:30	Tea/coffee break	
11:30 - 12:45	Flood monitoring – Rapid Information Collection and Monitoring – Lecture and hands on.	Fan Chunbo, NDRCC
12:45-13:45	Lunch Break	
13:45 - 15:30	Hands on exercise – Rapid Information Collection and Monitoring	Fan Chunbo, NDRCC
15:30 - 15:45	Tea/coffee break	
15:45 - 17:00	Hands on exercise – Rapid Information Collection and Monitoring [Contd..]	Fan Chunbo, NDRCC
Day 5 (Thursday, May 16, 2013)		
09:00 - 09:15	Review of previous day's lessons	Participants
09:15 - 10:15	Flood response rapid mapping – Experiences, issues and regional/international mechanisms, opportunities – An interactive session	Shirish Ravan, UN-SPIDER
10:15 - 11:00	Global datasets for flood monitoring	Shirish Ravan and Giriraj Amarnath
12:45 - 13:45	Lunch Break	
13:45 - 14:30	Group Work: 1) How to map Flood Hazard, Vulnerability and Risk in the Bangladesh context? (Taking into account methodologies discussed and available data). 2) How to use Flood Hazard, Vulnerability and Risk maps in the Bangladesh context for disaster preparedness? 3) How to use near real time inundation mapping during emergency response in the Bangladesh context? Presentation	All Participants
14:30 – 15:30	Interaction with Resource persons – Q&A and feedback	
15:30 - 16:00	Closing Session – Certificate distribution	DG, DDM; NPD/PM, CDMP; UN-SPIDER
16:00 - 16:30	Tea / Coffee	
16:30 – 17:00	Meeting of organizer and resources persons to discuss feedback, plan future interventions, multilateral cooperation etc.	DDM, CDMP, UN-SPIDER, IWMI, ICIMOD, UN-SPIDER

3. Contact Points

Shirish Ravan, UN-SPIDER Beijing Office, Beijing, China

Netai Dey Sarker, Ministry of Disaster Management, Dhaka, Bangladesh

Md. Shahidul Islam, CDMP, Dhaka, Bangladesh