#### JPTM2014 International Organization Report - Asian Development Bank

Presentation by Yusuke Muraki Infrastructure Specialist (Space Technology) Asian Development Bank November 19 2014



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- 1. Introduction
- 2. DRM activities in ADB using Remote Sensing
  - a) Flood Management (TA8074)
  - b) Drought Monitoring (TA6521)
  - c) Damage assessment (Typhoon Yolanda)
  - d) Information collection for DRM (New TA)

# **Introduction of ADB**

#### <u>Regional development bank</u>

- Economic development and Poverty reduction
- <u>Projects</u>
  - Loan, grant, and technical assistance (TA)
  - With knowledge to address development issues
- \$15.3 billion assisted in 2013



# **Introduction of ADB**



#### Headquarters in Manila, Philippines





## **Introduction of ADB**

ADB concluded LOI with Japan Aerospace Exploration Agency (JAXA) in 2010 to promote space technology applications in its activities.



Became Sentinel Asia Data Analysis Node (DAN) since January 2012.



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## a). SBT and ICT applications for flood management

- TA-8047 REG <u>"Applying Remote Sensing</u> <u>Technology in River Basin Management"</u>
- JFPR funded, 2 million US\$
- Philippines, Bangladesh, and Viet Nam
- 2012/4 to 2015/3
- Impact: reduction in losses from flooding events
- Outcome: improved river basin management including flood risk management using Space Based Technology (SBT) and ICT
- Output:
  - (i) SBT and ICT applied for flood risk management
  - (ii) Selected staff able to apply SBT and ICT in river basin management.

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## Satellite-based Drought Monitoring and Warning System in GMS

#### Satellite-based Daily Drought Information

#### GMS-AIN (Agricultural Information Network) Website



# Free and Automatically Updated -> No operational cost



#### <<mark>Subregion</mark>al page>



http://webgms.iis.u-tokyo.ac.jp/dmews/GMS/

# Provincial drought graph

Gap between current and average

#### **Current drought index**

drought index > 40 % -> Drought Alert



<u>Average drought index</u> (Dotted line)





#### Vientiane, Lao P.D.R – May 23, 24, 2013







#### Hanoi, Viet Nam – July 9, 10, 2013





#### Kunming, PRC – October 30, 2013



Nay Pyi Taw, Myanmar – May 15, 2014





Phnom Penh, Cambodia – October 14, 2014



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### b) Post Disaster Needs Assessment for the Typhoon Yolanda



Image from Openstreetmap

Base maps (Layers of houses, infrastructure, roads, etc.) GIS Analysis



Image from International Charter

Damaged infrastructure by visual check of satellite imagery

Initial Data Source -Open Street Map

- 1. Number of damaged infrastructure
- 2. Damaged infrastructure maps

Initial Data Source -Open Street Map







#### **GUIUAN CITY CENTER**

Data source: GIS calculations from Open Street Map - Humanitarian OSM Team, Status of data:19 Nov 2013

| Buildings       | Tacloban | Guiuan | Daanbantayan | Roxas | Bantayan | Grand Total |
|-----------------|----------|--------|--------------|-------|----------|-------------|
| Collapsed       | 11931    | 4189   | 1125         | 555   |          | 17800       |
| Damaged         | 8235     | 24     | 1170         | 476   |          | 9905        |
| Ok / not mapped | 13185    | 2909   | 4940         | 15000 | 16656    | 52690       |
| Grand Total     | 33351    | 7122   | 7235         | 16031 | 16656    | 80395       |
| Total affected  | 20166    | 4213   | 2295         | 1031  | 0        | 27705       |
| % affected      | 60%      | 58%    | 32%          | 14%   | 0%       | 34%         |

Table 1: Buildings collapsed or damaged (mapping status as of 19 Nov 2013)

Table 2: Facilities collapsed or damaged (mapping status as of 19 Nov 2013, proximity to collapsed or damaged building)

|                | Tacloban  |         | Guiuan    |         | Daanbantayan | Roxas City | Grand Total |
|----------------|-----------|---------|-----------|---------|--------------|------------|-------------|
| Facility       | Collapsed | Damaged | Collapsed | Damaged | Collapsed    | Damaged    |             |
| Attraction     | 3         | 3       |           |         |              |            | 6           |
| Bank           | 3         | 8       |           |         |              |            | 11          |
| Bus station    |           | 1       |           |         | 1            |            | 2           |
| Entertainment  | 1         | 2       |           |         |              |            | 3           |
| Ferry terminal |           |         |           |         | 1            |            | 1           |
| Gas station    | 5         | 9       | 1         |         |              |            | 15          |
| Hospital       | 1         |         |           | 1       |              |            | 2           |
| Hotel          |           | 13      | 1         |         |              | 1          | 15          |
| Pharmacy       | 5         | 5       |           |         |              |            | 10          |
| Police         | 2         | 2       |           |         |              |            | 4           |
| Religion       | 1         | 5       |           |         |              |            | 6           |
| Restaurant     | 4         | 17      |           |         | 1            |            | 22          |
| School         | 1         | 5       | 1         |         |              |            | 7           |
| Shopping       | 1         | 2       |           |         |              |            | 3           |
| University     |           |         |           |         |              | 1          | 1           |
| Grand Total    | 27        | 72      | 3         | 1       | 3            | 2          | 108         |

## Could calculate the number and locate the damaged hospitals, hotels, schools, etc. on maps



## Satellite data can provide good information at the early stage

- Number of damaged houses for Tacloban city from the results was <u>20166</u> / 33351 (60%)
- Number of damaged houses for Tacloban city reported in NDRRMC update was;
  - 382 for 11/10 to 11/21
  - <u>58,823</u> (12,270(Totally), 46,553(Partially)) for 11/21 to 12/20

Satellite-based assessment has advantage for the quick assessment until field data is available

# **Timing of ADB activities**

- 11/8 
  Typhoon Yolanda

- 12/13 <a>20 million \$ Grant approved</a>

♦MIRA released

DaLA completed and RAY released



### Challenges for "Making" Satellitebased Damage Information

- Availability of basic GIS data in the affected area
- Limited coverage of free satellitebased damage information
- 3) Lack of coordination among organizations conducting data analyses



## (1) Lack of basic GIS data



# How to prepare GIS data?

#### From government agencies

- A. Lack of coordination/sharing
  - Making coordination mechanism and share data before disasters



- B. Lack of data
  - Support developing maps
- From OSM
  - A. Lack of capacity
    - Establish local community which can make OSM maps.
  - B. Lack of understanding
    - <u>Coordinate with agencies to promote the use of OSM</u>



#### (2) Data availability was limited....



### Challenges for "Utilizing" Satellitebased Damage Information

 Difficulty to use numbers from satellite-based information for <u>official</u> <u>reports</u>

 Sharing and utilization of satellitebased information <u>at the local level</u>



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## SBT and ICT applications for DRM Information Collection

- TA-XXXX REG <u>"Applying Space-based Technology and</u> <u>Information and Communication Technology to</u> <u>Strengthen Disaster Resilience</u>"
- JFPR funded, 2 million US\$
- Pilot countries; Armenia, Bangladesh, Fiji, Phlippines
- For 2 years (2015/4 to 2017/3)
- Impact:More information-based DRM
- Outcome: Improved quality and timeliness of information for disaster preparedness and response using Space-based Technology (SBT) and Information and Communication Technology (ICT) in the target DMCs





# Thank you!

If you have any questions, please contact Yusuke Muraki ymuraki@adb.org

