GEOSPATIAL INFORMATION FOR DISASTER RISK REDUCTION AND SUSTAINABLE DEVELOPMENT

By
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Outline

1. About AIT
2. Overall project scope
3. Need assessment survey
   - Questionnaire survey
   - Web survey
4. Capacity building program
5. Pilot projects
6. Regional platforms to share geospatial data
7. Conclusions and Recommendations
1. About AIT

- Over 1,600 Graduate students from 40+ countries
- 14,000 alumni from 74 countries
- 22,000 short-term trainees from 71 countries
- Over 100 faculty members from 26 countries
Integrated Systems for data analysis, risk mapping, alerting/warning and, information sharing

Needs Assessments and Surveys

Regional Networking and Representation

Sentinel Asia (PDAN) and IDC (PM)

Emergency Response, Activation, VAP

Integrated Systems for data analysis, risk mapping, alerting/warning and, information sharing

Capacity building, training, Consultancy

Donor and Clients including ESCAP, ADB, World Bank, ....

GIC (AIT)
2. The Project

**Title** - Strengthening multi-hazard risk assessment and early warning systems with applications of space and geographic information systems in Pacific island countries

**Scope of AIT** - is to support Pacific Island countries in the use and dissemination of geospatial information for disaster risk reduction (DRR) and sustainable development

**Objectives** –

1. Implementing web-based geospatial data sharing platforms (geo-portals) with tools to manage and share DRR data; *Spatial and socio-economic data*;

2. Improving capabilities for web-based mapping and geospatial data management (geo-database);

3. Conducting capacity building training programs on Remote Sensing, GIS and geospatial data sharing frameworks for enhancing effectiveness of using these technologies for DRR
The Project Flow

1. Start
   - Project Inception Workshop in Fiji – Sep 2016
   - Technology Review

2. Gaps and Needs Assessment
   - Identify potential areas to build capacities
   - Resource availability in terms of infrastructure and man power

3. One Month Capacity Building Program
   - In AIT, Thailand – Oct-Nov 2016
   - RS, GIS, GeoNode, Geo-Databases

4. Pilot Projects
   - AIT Expert visit PICs – Feb-My 2017
   - Implementing GeoNodes

5. Results
   - Operational GeoNodes in PICs
   - Effective usage of geospatial data for DRR activities

The Project Flow
AIT Experiences

- World Bank Funded Project
- A GeoNode to share geospatial data of 6 Caribbean countries - http://www.charim-geonode.net/
AIT Experiences – Cont.

- UNESCAP Funded Project
3. Need Assessment Survey

Under the project on "Strengthening multi-hazard risk assessment and early warning systems with applications of space and geographic information systems in Pacific island countries“, Asian Institute of Technology together with the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) conducted a need assessment survey.
Objectives of the Need Assessment Survey

• To have a better understanding about the status of the Pacific Island Countries (PICs) in terms of geospatial data usage and sharing

• There by to adjust the future project activities to address the identified gaps and needs of PICs

• To identify potential people and local organizations to move forward with the project
3.1 Online Questionnaire Survey - Participated Countries

- 14 PICs were contacted regarding the online questionnaire survey
- 11 feedbacks were received from 9 countries (highlighted in green)

<table>
<thead>
<tr>
<th>Cook Islands</th>
<th>Nauru</th>
<th>Solomon Islands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiji Islands</td>
<td>Niue</td>
<td>Tonga</td>
</tr>
<tr>
<td>Kiribati</td>
<td>Palau</td>
<td>Tuvalu</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>Papua New Guinea</td>
<td>Vanuatu</td>
</tr>
<tr>
<td>Micronesia</td>
<td>Samoa</td>
<td></td>
</tr>
</tbody>
</table>
On-line Questionnaire Survey – Findings

**Web GIS**

Are you currently using any Web GIS platforms to share geospatial data?

Do you think it is useful for your organization to have a Web GIS platforms to share geospatial data?
On-line Questionnaire Survey – Findings cont.

*Infrastructure Support*

Can your organization provide a server room/data center space to keep a new server? 100% Yes

Can your organization provide Internet connectivity to a new server? 27.3% Yes

Can your organization provide a medium scale server to build a geo-portal? 63.6% Yes
On-line Questionnaire Survey – Findings cont.

**Geospatial Data Usage**

How often does your organization use geospatial data?

How often does your organization acquire for free or purchase spatial data?
Expertise

Which of the following tools are being used in your organization?

- GIS: 82%
- RS: 27%
- Google Earth: 91%
- Web GIS Applications: 45%
- GPS: 73%
- None: 9%
On-line Questionnaire Survey – Findings cont.

**Expertise – country wise**

- **Cook Islands**: 1
- **Micronesia**: 1
- **Fiji**: 1
- **Kiribati**: 2
- **PNG**: 1
- **Samoa**: 1
- **Solomon**: 1
- **Tonga**: 1
- **Vanuatu**: 2

**GIS**
- Vanuatu, 2
- Tonga, 1
- Solomon, 1
- Samoa, 1
- Kiribati, 1
- Fiji, 1
- Micronesia, 1
- Cook Islands, 1

**RS**
- Vanuatu, 1
- Fiji, 1
- Micronesia, 1

**GOOGLE EARTH**
- Vanuatu, 2
- Tonga, 1
- Solomon, 1
- Samoa, 1
- Kiribati, 2
- Fiji, 1
- Micronesia, 1
- Cook Islands, 1

**WEB GIS APPLICATIONS**
- Vanuatu, 2
- Tonga, 1
- Solomon, 1
- Kiribati, 2
- Fiji, 1
- Micronesia, 1
- Cook Islands, 1
- Vanuatu, 2

**GPS**
- Vanuatu, 2
- Tonga, 1
- Solomon, 1
- Kiribati, 2
- Fiji, 1
- Micronesia, 1
- PNG, 1
3.2 Web Survey - Findings

- Disasters from 1990 to 2015
  - Disaster wise
  - Country wise
- Population Information
- Existing geospatial data sharing platforms
## Disasters from 1990 to 2015

<table>
<thead>
<tr>
<th></th>
<th>Storm</th>
<th>Flood</th>
<th>Earthquake</th>
<th>Volcanic Activities</th>
<th>Drought</th>
<th>Landslide</th>
<th>Tsunami</th>
<th>Wild Fire</th>
<th>Total</th>
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<tbody>
<tr>
<td>PNG</td>
<td>5</td>
<td>13</td>
<td>7</td>
<td>10</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>48</td>
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<tr>
<td>Vanuatu</td>
<td>12</td>
<td>2</td>
<td>7</td>
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<td>2</td>
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<td>0</td>
<td>26</td>
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<td>1</td>
<td>0</td>
<td>3</td>
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<td>Samoa</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
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<tr>
<td>Cook Islands</td>
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<td>5</td>
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<tr>
<td>Kiribati</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
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<td>2</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>3</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>Niue</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Tonga</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Palu</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nauru</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No Data</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>64</td>
<td>35</td>
<td>16</td>
<td>15</td>
<td>10</td>
<td>9</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Source: [http://www.emdat.be/country_profile/index.html](http://www.emdat.be/country_profile/index.html) (The International Disaster Database)
Disasters from 1990 to 2015 – Disaster Wise

Source: [http://www.emdat.be/country_profile/index.html](http://www.emdat.be/country_profile/index.html) (The International Disaster Database)
Disasters from 1990 to 2015 – Country Wise

Source: http://www.emdat.be/country_profile/index.html (The International Disaster Database)
# Population by Country

<table>
<thead>
<tr>
<th>Country</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>PNG</td>
<td>7,464,000</td>
</tr>
<tr>
<td>Fiji</td>
<td>886,500</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>572,200</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>258,900</td>
</tr>
<tr>
<td>Samoa</td>
<td>191,800</td>
</tr>
<tr>
<td>Kiribati</td>
<td>110,500</td>
</tr>
<tr>
<td>Tonga</td>
<td>105,600</td>
</tr>
<tr>
<td>Micronesia (Federated States of)</td>
<td>104,000</td>
</tr>
<tr>
<td>Marshall Islands (the)</td>
<td>52,900</td>
</tr>
<tr>
<td>Palu</td>
<td>21,100</td>
</tr>
<tr>
<td>Cook Islands</td>
<td>14,974</td>
</tr>
<tr>
<td>Nauru</td>
<td>10,084</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>9,893</td>
</tr>
<tr>
<td>Niue</td>
<td>1,190</td>
</tr>
</tbody>
</table>

4. Capacity Building Programs

One month capacity building training program at AIT, Thailand

- Geospatial data handling
- Geospatial data sharing
- Participating countries yet to be finalized (min 6 countries)

<table>
<thead>
<tr>
<th>Week 1 (GIS)</th>
<th>Week 2 (RS)</th>
<th>Week 3 (Geo-DB)</th>
<th>Week 4 (GeoNode)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Introduction to GIS</td>
<td>• Introduction to RS</td>
<td>• Postgres/ PostGIS</td>
<td>• Introduction to GeoNode</td>
</tr>
<tr>
<td>• Creating and Editing GIS Data</td>
<td>• Image Processing</td>
<td>• GeoServer</td>
<td>• Upload data, documents</td>
</tr>
<tr>
<td>• Vector Analysis and Table Management</td>
<td>• Image Classification</td>
<td>• Access PostGIS data from QGIS</td>
<td>• Create, Publish Maps</td>
</tr>
<tr>
<td>• Map Composition</td>
<td>• Flood Damage Assessment</td>
<td>• Access GeoServer data from QGIS</td>
<td>• Security &amp; permissions</td>
</tr>
<tr>
<td>• Coordinates/Projections</td>
<td>• Building Damage Assessment</td>
<td>• WMS/WFS</td>
<td>• Customize GeoNodes</td>
</tr>
<tr>
<td></td>
<td>• Satellite Based Rainfall Analysis</td>
<td></td>
<td>• Backup and Restore</td>
</tr>
</tbody>
</table>
5. Pilot Projects

- AIT expert visits Pacific
- Implementation of operational Geo-Portals
- PICs need to provide infrastructure support
- On the job training
- Countries yet to be finalized (min 3 countries)
6. Regional platforms to share geospatial data - PacGeo

http://www.pacgeo.org/
PacGeo – Cont.

• An open access geospatial data repository for the Pacific Region providing premier geophysical, geodetic, and marine spatial data sets.

• Developed through collaboration between the GeoScience Division of Secretariat of the Pacific Community (GSD/SPC), University of Sydney, Geoscience Australia (GA), and GRID-Arendal.

• [923 Data Layers](#) and [957 Documents](#) are publically available

• Contains data layers of 15 PICs
Regional platforms to share geospatial data - PCRAFI

http://52.64.9.136/
PCRAFI – Cont.

- Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) is a joint initiative of SOPAC/SPC, World Bank, and the Asian Development Bank with the financial support of the Government of Japan, the Global Facility for Disaster Reduction and Recovery (GFDRR) and the ACP-EU Natural Disaster Risk Reduction Programme, and technical support from AIR Worldwide, New Zealand GNS Science, Geoscience Australia, Pacific Disaster Center (PDC), OpenGeo and GFDRR Labs.

- 580 Data Layers, 15 Maps and 87 Documents are publicly available

- Contains data layers of 15 PICs
7. Conclusions and Recommendations

- Gaps and needs assessment results confirm that PICs wish to operate their own Geo-Portals to share their geospatial data.
- Most of the PICs agreed to provide infrastructure support to host Geo-Portals.
- Based on the web survey results, storm and flood are identified as frequent disaster types in the Pacific.
- Based on the web survey results, PNG, Fiji, Solomon Island, Vanuatu and Samoa are identified as priority countries in terms of the number of recorded recent disasters as well as the population.
- A geospatial data sharing platform “GeoNode” is considered to be used when implementing country level Geo-Portals.
- Regional level GeoNodes such as PacGeo and PCRAFI can be linked with country level GeoNodes.
- Expertise in GIS and Remote Sensing should be enhanced through capacity building training programs in order to effectively use them for DRR activities.
- Special attention need to be given for RS related topics as PICs relatively have less expertise.
Expected Scenario

• National GeoNodes can be linked with regional GeoNodes
Thank you

VINAKA VAKA-LEVU*
*THANK YOU VERY MUCH

QUESTIONS?