



Regional Committee of United Nations Global Geospatial
Information Management for Asia and the Pacific

(UN-GGIM-AP)



Working Group 2

Data Sharing and Integration for Disaster Management

Status Report 2013– Nov. 2014

for the

3rd plenary Meeting of UN-GGIM-AP

10-12 November, 2014

Bali, Indonesia

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TERMS OF REFERENCE FOR WORKING GROUP2

1. Background

Based on the resolutions of the 18th UNRCC-AP in Bangkok (Thailand, 2009), the Working Group II was intended to act on three items including Capacity Building in Disaster Management, Data Access and Data Integration. These items were the objectives of WG2 Work Plan (2010-2012).

The 19th UNRCC-AP (Thailand, 2012) adopted nine resolutions, a number of which charged the UN-GGIM-AP with undertaking further activities on geodetic framework, data sharing and disaster management, and place based information management for economic growth.

1.1. RESOLUTIONS ADOPTED AT THE 19th UNRCC-AP 2012 (corresponds to WG2)

Data Sharing and integration for disaster management

The Conference,

Recognizing that the Asia-Pacific region is prone to many natural hazards and devastating disasters, and that geospatial information plays a very important role in making timely information available to support and respond to emergency situations,

Recalling that the Rio+20 outcome document urged governments and organizations to commit to disaster risk reduction in order to enhance the resilience of cities and communities to disasters, according to their own circumstances and capacities,

Also recalling that the Rio+20 outcome document specifically recognized the ‘importance of comprehensive hazard and risk assessments, and knowledge- and information-sharing, including reliable geospatial information’,

Noting that one of the issues identified by the UN-GGIM Inventory of Issues included the sharing of geospatial information between government agencies in an official and sustainable manner,

Mindful of the existing national, regional and global projects and activities relevant to data sharing for disaster management,

Mindful also that implementing any solution to improve data and information sharing for disaster management needs to be based on an understanding of different user requirements, and recognition of the variability of spatial data infrastructures and their content between member States,

Recommends that PCGIAP undertakes

- (a) Initial research on existing national and international geoportals for the sharing of data and information related to disaster management in order to identify the different types of user requirements associated with different hazards types, different phases of the disaster management activity (e.g. risk assessment; preparedness planning; rescue and recovery), and how this reflects on data requirements;
- (b) A phased approach to developing a standards-based sub-regional pilot(s) to support data sharing for disaster management to demonstrate the federation of national data, metadata and web services to a regional level;
- (c) Initial design and implementation of a regional geoportal for disaster management with an objective to have in place a sub-regional portal as a minimum outcome in the next 3 years.

1.2. RESOLUTIONS ADOPTED AT THE 2nd UN-GGIM-AP Plenary Meeting , 2013 Tehran, (corresponds to WG2)

Resolution 3: Developing a Regional Geoportal for Disaster Management

The Committee,

Recognizing that the region is prone to many types of natural hazards, including earthquakes, floods, tsunamis, landslides, droughts, and tropical storms, and that geospatial information has a potential to play an essential role in reducing the impact of such hazards when integrated into disaster information management system ,

Recalling the resolution at 19th UNRCC-AP that recommended the Committee to design and develop a disaster management Geoportal through a pilot project,

Acknowledging that some member countries have already had some experiences in developing such Geoportals,

Noting that the pilot project should involve multiple member countries of potential hazard risks, focusing particularly on two major types of hazards that have largest impact in the region, to develop balanced standards, especially common georeference and operational schemes that are applicable for the whole region, 3

Recommends

- To work with at least three experienced member countries which have been coping with the two types of hazards to identify and share technical and non-technical ingredients and standards for successful development and operation of disaster management Geoportals,
- To start collaborating with some member countries, which are currently without a disaster management Geoportal, to develop a pilot national Geoportal for each country and test its feasibility to understand the requirements for a regional Geoportal.
- To seek support from member countries in developing disaster management Geoportals in the region.

2. Objectives

Based on the RESOLUTIONS ADOPTED AT THE WG2 Session in 19th UNRCC-AP. 2012 Thailand the main objectives of WG2 are:

Recognizing that the Asia-Pacific region is prone to a number of devastating disasters including earthquakes and floods, and that geospatial information plays a very important role in making timely response the emergency situations,

Recalling that one of the inventory issues listed for the UNCE-GGIM includes the sharing of geospatial information between government agencies in an official and sustainable manner with much relevance and application to disaster management and response,

Mindful of the existing national, regional and global projects and activities relevant to data sharing for disaster management,

1. UNRCC emphasizes that for achieving best analysis and result from the Working Groups activities all members should participate in any related referred actions, especially filling out and returning the questionnaires that have been already distributed by the WG2 chairman.
2. Design and implementation of a regional Geoportal for disaster management is the main task of PCGIAP-WG2 work plan 2012-2015, recognizing that this will be a phased and piloted approach. At the end of this term we expect to have in place a sub-regional portal as a minimum outcome.
3. Initial research should be carried out on existing national and international geoportals for the sharing of data and information related to disaster management.
4. A phased approach to developing a regional pilot(s) to support data sharing for disaster manage should be initiated, dealing with issues such as:
 - a. Standards to be used for data, metadata and services
 - b. Catalogue federation within a geoportal
 - c. Examining the thematic data contents and user requirements to support disaster management; the commonality of these between hazard types; methods of hazard and risk assessment
5. Liaison between working groups is essential to avoid duplication of effort and expedite results.

2.1. Timeline

The work began 2012 and continues through to 2015.

3. Membership of the Working Group2



UN-GGIM-AP WORKING GROUP 2 Data Sharing and Integration for Disaster Management

Title		Country		Name
CHAIR		Islamic Republic of Iran		Mr. Peyman Baktash
VICE-CHAIR		Indonesia		Dr. Antonius Bambang Wijanarto
VICE-CHAIR		China	No image	Dr. Zhou Xu
VICE-CHAIR		New Zealand	No image	Mr. Robert Deakin
VICE-CHAIR		Republic of Korea		Dr. Lee Sang-hoon

3.1. Responsibilities

3.1.1 The Chair of the UN-GGIM-AP WG2 will:

- (1) Develop more specific terms of reference based on each project,
- (2) Implement and complete work plans,
- (3) Report regularly on working group activities at the UN-GGIM-AP Executive Board Meetings, Plenary meetings, UNRCC-AP meetings,
- (4) Provide expert advice, on request, to agencies and organizations,
- (5) Lead discussions at relevant meetings,
- (6) Prepare Draft resolutions.

3.1.2. Vice Chairs of the UN-GGIM-AP WG2 will:

- (1) Carry out the Chair's duties in his or her absence,
- (2) Provide support and assistance to the Chair in carrying out his or her responsibilities,
- (3) Take on specific responsibilities from the Chair.

4. Revised Work plan of UN-GGIM-AP-WG2 (for 2013-2015)

Operation items	Executive manager	Time table		
		And Status		
		2013	2014	2015
<p>A. Investigating disaster management Geoportals (DM-GP) at the national and regional levels.</p> <ol style="list-style-type: none"> 1. Investigating Disaster Information Networks (DINs) 2. Investigating existing disaster management portals/geoportals 3. Selecting two disasters as case studies and clarifying: <ol style="list-style-type: none"> a. spatial data requirements for disaster response b. spatial analysis required for emergency operations (e.g. sheltering, path finding) c. unit spatial operations to satisfy spatial analyses d. composition flow of unit operations to satisfy spatial analyses 	<p>The chair with the cooperation of the vice-chairs</p>	<p>Done (Research Result is in attachment A1)</p>		
<p>B. Design and development of a disaster management Geoportal (DM-GP): pilot project.</p> <ol style="list-style-type: none"> 1. Design the architecture of the DM-GP. <ol style="list-style-type: none"> a. to request the architecture of the DM-GP of experienced countries (Indonesia, New Zealand, Korea, Japan, Australia). b. investigate the received architecture of the DM-GP to design the architecture of the regional DM-GP. 2. Clarification of required standards and specifications for the development of DM-GP <ol style="list-style-type: none"> a. to request the titles of standards that used for development of the DM-GP of experienced countries (Indonesia, New Zealand, Korea, Japan, Australia) in respect of metadata, data and services. b. investigate the standards of the DM-GP to adopt required standards for the regional DM-GP. 	<p>The chair with the cooperation of the vice-chairs</p>		<p>In Progress</p>	

<p>3. Investigation of service composition techniques</p> <p>a. to request the techniques used for service composition of unit services in the DM-GP of experienced countries (Indonesia, New Zealand, Korea, Japan, Australia)</p> <p>b. investigate the received composition techniques of unit services to adopt or design appropriate technique for service composition of the regional DM-GP.</p> <p>4. Development of sample web services to satisfy unit operations (clarified in A.3.c)</p> <p>a. to request the list of unit services that are presented in the DM-GP of experienced countries (Indonesia, New Zealand, Korea, Japan, Australia)</p> <p>b. investigate the received list of unit services to adopt some sample web services and develop them.</p> <p>5. Development of the DM-GP</p> <p>6. Development of a service composition technique within the DM-GP(clarified in A.3.d)</p>				
<p>C. Implementation of the Geoportal: pilot test</p> <p>1. Evaluation of the DM-GP at the national level</p> <p>2. Implementation of DM Geoportals for three member countries which are currently without a disaster management Geoportal based on the architecture, standards, unit services and composition techniques in B (sub-region implementation)</p> <p>3. Evaluation of the DM-GP at the sub-regional level and test the feasibility of these Geoportals to understand the requirements for a regional Geoportal Implementation of the Geoportal: pilot test</p> <p>4. Planning the development and implementation of the DM-GP at Asia and Pacific region</p>	<p>The chair with the cooperation of the vice-chairs</p>			<p style="text-align: center;">In Progress</p>

5. Current State and Performed Activities

5.1. Investigating disaster information networks

As spatial data describing the disaster, information gathered from different organizations and NGOs are critical for emergency management. This highlights the need for both Intra- and Inter-Organization communications. There, hence, arises a need for an Integrated Communication and Information Network for Disaster Management. So in working group2 existing disaster information networks are being investigated to reveal the best alternative. These activities satisfy item A.1 of work plan.

5.2. Investigating Geoportals

Existing Geoportals that aim to assist disaster management at national and regional levels are investigated. The aim of this investigation is to extract the disaster types and the disaster management phases they support, the information they represent and the analyses and services they provide. It could form a guideline for a regional disaster management Geoportal. Item A.2 is supported by these activities.

5.3. Investigating required data for disaster management Geoportals

For this investigation we have limited the research domain. We choose earthquake and flood as the first two case studies to investigate required data. The required data must support spatial analysis in order to manage disaster. These activities satisfy item A.3.a of work plan.

5.4. Investigating required spatial analyses

Disaster relief involves the response phase of disaster management. GIS and GIS professionals can assist immediately by helping decision makers understand the scope of the damage and identify locations where people may be trapped or injured or require medical support and rescue. As with the previous objective, earthquake and flood case studies present some important examples of required spatial analyses for review.. We will investigate existing implemented disaster management projects to extract the analyses they performed related to flood and earthquake. Items A.3.b, A.3.c and A.3.d are supported by these activities.

5.5. Design Disaster Management Geoportal

With the aim of designing and creating the Asia and Pacific Disaster Management Geoportal, a questionnaire for the vice chairs was prepared and sent to them. The results of their responses were summed up in the following section, and the questionnaires and comments will be provided as attachments (A3 to A8):

5.5.1. Perspectives on Capability and Expectations of Regional Disasters Management Geoportal

Identification of required items to be placed in Geoportal

The data required depends on the conditions of each region, but can be commonly generalized as:

- Base maps
- Satellite Imagery if available
- Thematic Map according to custodian
- Survey data when needed
- Permanent GPS Point for Automatic process and Strain analysis
- The results of the analysis
- Survey data when needed
- The results of the analysis
- Risk sources; pollution sources; potential hazard;
- Identification of sample processing results
- Management map sample of derived map made
- The access level for users in Geoportal

There is also a required capacity for processing this data.

5.5.2. Disaster Management phases

- Identification of DM phases priority to support Geoportal

Disaster management Geoportal for the Asia and Pacific should provide service for three phases: preparedness, response and recovery, for both flood and earthquake.

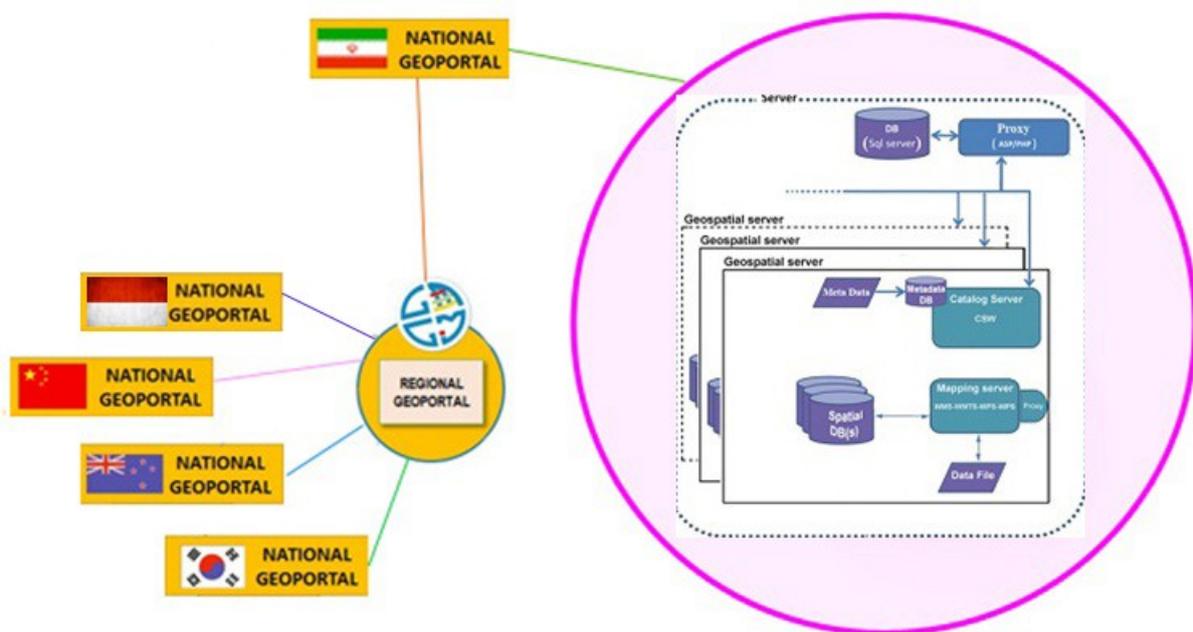
5.5.3. Geoportal architecture

- Identification of components to create the disaster management Geoportal
- Detection of connections between catalogue services and map servers with the Geoportal
- Anthology definition for catalogue services in Geoportal

DM-GeoPortal is provided by distributed SDIs and several specific decision support systems operated within each member's mandates. Interoperability under standard architecture provides use of geospatial data resources with common standards and use-cases, such as spatial reference system, geo-feature, metadata, OGC WMS, WFS and etc. As mediator's role, DM-GeoPortal has a meta-data clearinghouse to facilitate semantical discovery of heterogeneous datasets using common terminology (vocabulary ontology) and the users'

geospatial context.

Architectures of some Geoportals including Indonesia, India, Europe (INSPIRE) and ESRI Company were studied. Also in order to design the architecture of disaster management geoportal, the recommendations from Republic of Korea and Indonesia as vice chairs in WG2 are being investigated. In order to effectively be understood and share semantics, datasets and business models of Geoportals among various stakeholders, vice chair from Republic of Korea proposed the DM-GeoPortal architecture needs to be developed using process standard, RM-ODP: ISO/IEC10746, Information technology — Open Distributed Processing — Reference model. The RM-ODP standards are used in multiple geospatial and related portal architectures, e.g. the ISO19100 series of geographic information/geomatics standards, and the OGC Reference Model.



- Required standard for web service
 - Imagery data processing: OGC-WPS
 - Geospatial analysis: OGC-WPS
 - Spatial query: OGC-WFS
 - Geo-statistics: OGC-WFS/WPS
 - Mapping and presentation: OGC-WMS/WMTS
 - OGC Catalog Service for the Web (CSW)
 - OGC Styled Layer Descriptor (SLD) Profile of WMS

5.5.4. Required processing for Disaster Management phases

In the **warning phase**, two separate sections are to be designed, one for flood and the other one for earthquake.

- The required processing for earthquake prediction is as follow:
 - Automatic processing
 - Strain Analysis
 - Specifying hazardous areas
 - Spatial query
 - Geo-statistics
- Required processing for flood are:
 - Utilizing information from DEM
 - Increasing the volume of water
 - Considering the areas covered by water

In **response phase**, items below should be considered:

- Collecting data
 - periodic photogrammetry and after the occurrence of the event
 - Producing orthophoto
 - Extracting features
 - Inserting data in Geoportal
- Required processing in response phase is:
 - Automatic detection of damaged area and estimating the amount of destruction
 - Suggesting areas for temporary settlement automatically
 - Navigation (Navigation) in critical situation

Recovery phase provide facilities like positioning for creating new cities and implementing plans on the current maps in Geoportal

5.5.5. The access levels for users in Geoportal

- Public users
- Expert users

- Data publisher
- Data consumer
- Data processor
- Model developer
- Service publisher
- Decision makers
 - Do not use data, use services

5.5.6. VGI-based Geoportal for Disaster Management

Republic of Korea as a vice chairs suggested the volunteered geospatial information (VGI) could be efficient and cost-effective method for generating and sharing large disaster-related geospatial data. When a disaster or emergency situation happens somewhere it includes the governmental and the public activities. The disaster preparedness and response phase of disaster management need GIS and GIS professionals to help decision makers identify vital reasons of the possible damage and assign response resource. Recently, the web, smart device and explosive spatially-related service– ubiquitous computing technologies - have ushered in a new era where the public are not only information consumers, but also act as producers of new, enriched information including disaster-related geospatial data. The national mapping organizations that have played the role of major geospatial collector have been moving toward the considering public participation data collecting methods. As VGI can act to encourage public participation and empower citizens, mapping agencies could make a partnership with members of the VGI community to help to provide well-structured geospatial data. In this regards, UN-GGIM-AP WG2 introduce the idea of a VGI-based Geoportal (VGI-GeoPortal) to provide cost-effective and real-time disaster-related information through collaboration with the public.

In order to effectively understand and share public semantics, datasets and the action model of the public participation Geoportal, VGI-GeoPortal architecture should be designated on the basis of ISO 19154 Geographic Information-Ubiquitous Public Access-Reference Model and the ISO 19101 Geographic Information – Reference Model and OGC Reference Model. Services and Component types are described as ISO 19119 Geographic Information – Services and the components of OGC Geospatial Web service standards. The service component of VGI-GeoPortal could be identified as implementable standards in the basis of the Open-Source GIS and SOA (Service-oriented Architecture), e.g. GeoServer, the Geospatial Web Service standards of OGC. The proof of concept of a VGI-GeoPortal has been implementing for an urban flooding use-case in Republic of Korea to collect data from the public, and analyze disaster-related geospatial data including high-disaster potential information such as the location of poor drainage sewer, small signs of landslides occurring, flood vulnerability of urban structures etc.

5.5.7. Processing for Disaster Management phases

- Identification of required processing for Disaster Management phases
- Recognition of required standards for processing implementation

5.5.8. Implemented Sample of Disaster Management Geoportal

- Presentation of national Disaster Management Geoportal

5.6. Minute of one-to-one Teleconferences with Secretariat and Vice Chairs of WG2

5.6.1. Teleconferences were held by

Minutes of Teleconference between chair and secretariat is in attachment A2

Mr. Peyman Baktash (*WG2 Chair and General Manager of GIS and SDI in NCC*)

Mr. Hamed Moradian (*Expert of technical and international organization from International Department of NCC*)

Iran, as the chair of WG2, called each vice chair and talked about

1) The latest changes in the agenda which was the removal of the first 10 minutes from Indonesia to save it for the summary and discussion part in WG2

2) Clarifying any concerns for the overlap of the main theme speeches and WG2 speeches by saying that in the main theme speeches, speakers will give a holistic view on disasters happened in their countries ;however, in WG2 session, details of geoportal , its items and stages will be discussed

3) As the chair already sent the sketch of geoportal architecture through mails to the vice chairs, we reviewed the stages mentioned there and asked their view points, also we discussed the possibilities and capabilities of each vice chair regarding that.

4) As the chair sent a questionnaire template for harmonization of speeches in the WG2 session in Bali, we discussed each items and kindly asked to answer any of the questions up to their capacities. We understood that each vice chair will talk on the sample of their own countries regarding disaster management and its use on geoportal

- **Indonesia, Dr. Antonious Bambang Wijanarto**

Date and Time: 20 September, 2014 - 9:00 a.m. Iran local time/ 12:30 Indonesia local time

He is going to talk about Indonesian geoportal in detail, about the items of the geoportal and

its architecture thoroughly. He will use a real example / sample on how to enter data at different stage

- **Korea, Dr. Saghoon**

Date and Time: 24 September,2014- 1:00 p.m. Iran local time/ 6:30 Seoul local time

He is going to talk about crowd sourcing in his speech by a sample example and how to use this technique in the geoportal. He emphasized that 10 minutes is short for presentation, and ask us to convey this matter to the Secretariat

He had a concern of overlapping the main theme session on disaster management and WG2 session on geoportal for disaster management for the Asia and the Pacific.

- **New Zealand, Mr. Rob Deakin**

Date and Time: 29 Spetember,2014 - 8:00 a.m. at Iran local Time/ 5:30 p.m. New Zealand

He mentioned that they have an information exchange portal which can be helpful in disaster management but they do not have a geoportal designed for disaster management. He emphasized on the level of access in geoportal. He said that they have worked on flood and have experience in this respect; also he mentioned that his speech focus on 2 phases of disaster management, one is on immediate response and the other one is on recovery phase.

- **5.7.Implemented Sample of Disaster Management Geoportal**

The initial plan of Asia and Pacific Disaster Management Geoportal was developed in Iran and the data related to Iran has been placed in Geoportal. The Geoportal has been created for the issues of flood and earthquake. Search possibility for the layers based on existed metadata has been located in this Geoportal. All software used for the Geoportal has been open source. Permanent GPS points and automatic processing and strain analysis results would be represented in Geoportal as well.

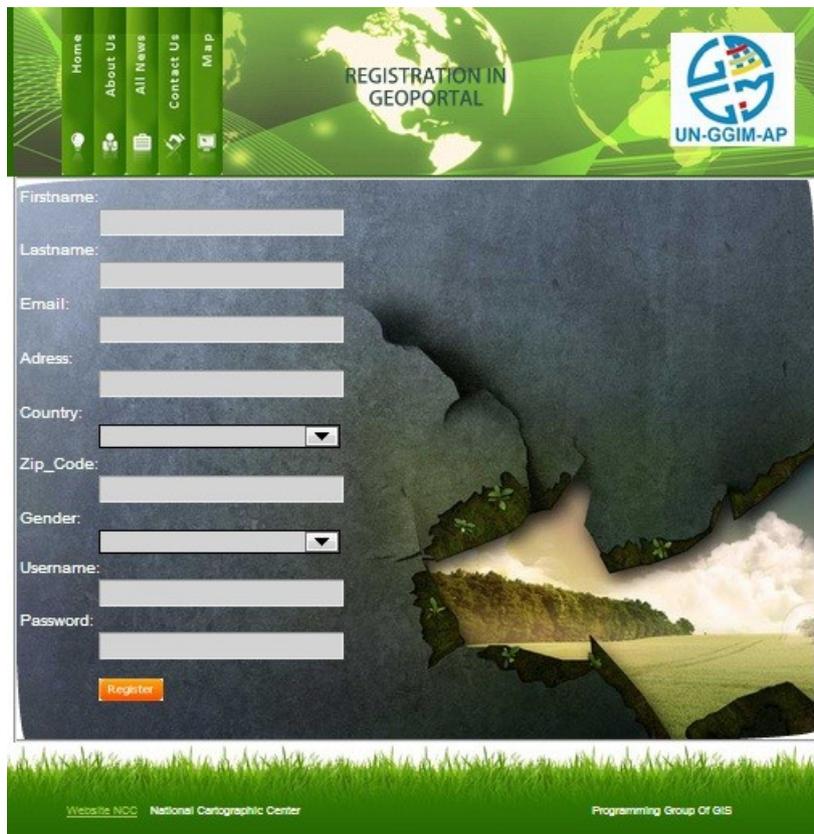
Disaster Management Geoportal includes 5 pages as: Homepage, About us, All news, Contact us and Map

- **5.7.1 .Map:**



• **5.7.2. Home page:**

A home page is the first page and visitor navigating to 5 pages developed in Geoportal from a search engine. On home page we've embedded an email signup box and Registration part that is linked to the registration form page for those who are interested in.



On the right side of the home page the Logo of UNGGIM along with the corresponding linked site is placed. Also In the middle of the page description is given about the UNGGIM



• **5.7.3.About us:**

It's about the members of UN-GGIM-AP Working Group 2 includes the members' title, name and countries.



- **5.7.4.All news:**

On the left side of the home page there is a newsfeed or listing of current news items related to flood and earthquake by relevant images and links that we want to put them up on our website. In the center is a short story of news and to view the complete news should click on Read More.





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FRESH NEWS



Date: 2014.09.03
Title: Preparing for Hazards in the Pacific
Content: Assessing Exposure & Vulnerability for Pacific Island Countries
 The Pacific region is one of the most disaster-prone areas in the world; it is also highly vulnerable to the adverse effects of global climate change, including ocean warming and sea-level rise. To help build resilience to climate change and natural disasters in the Pacific, the Asian Development Bank (ADB) funded the development of a Pacific Exposure Database (PED) containing data on the fragility of critical infrastructure in populated areas. [Read More](#)



Date:
Title:
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Date:
Title:
content:

- **5.7.5. Contact us:**

On this page is a special form to contact us and also some contact information as the Zip Code No., Telephone No. and Fax No. is displayed.



6. Remaining Jobs and Outlook

B. Design and development of a disaster management Geoportal (DM-GP): pilot project.

3- Investigation of service composition techniques

- a. to request the techniques used for service composition of unit services in the DM-GP from experienced countries (Indonesia, New Zealand, Korea, Japan, Australia)
- b. Investigate the received composition techniques of unit services to adopt or design appropriate technique for service composition of the regional DM-GP.

4- Development of sample web services to satisfy unit operations

- a. to request the list of unit services that are presented in the DM-GP of experienced countries (Indonesia, New Zealand, Korea, Japan, Australia)
- b. investigate the received list of unit services to adopt some sample web services and develop them.

For the year 2015, Working group's members, will continue Item C of work plan.