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System Infrastructure for Asia and the Pacific**

REPORT OF THE WORKING GROUP 2: FUNDAMENTAL DATA

**Submitted by the Permanent Committee on Geographical Information
System Infrastructure for Asia and the Pacific (PCGIAP)
Working Group 2: Fundamental Data ***

* Prepared by Bebas Purnawan, Chairman of Working Group 2, Zhou Xu, Sang-Ki Hong and Steeve Ebener, Vice Chairmen



**Permanent Committee on GIS Infrastructure for Asia and the Pacific
(PCGIAP)**

**Working Group 2
Fundamental Data**

STATUS REPORT 2006-2009

For

**18th UNRCC-AP Conference and 15th PCGIAP Meeting
Bangkok, Thailand, 26-29 October 2009**

Chair:

Mr Bebas Purnawan (Indonesia)

Vice Chairs:

Dr Zhou Xu (China),
Prof Sang-Ki Hong (Korea),
Dr Steeve Ebener (Switzerland)

**Report of PCGIAP WG2: Fundamental Data
For
The 18th UNRCC-AP and 15th PCGIAP Meeting
Bangkok, Thailand, 26-29 October 2009**

The Resolution 5 of the 17th UNRCC-AP recalls that the PCGIAP Fundamental Working Group (WG2) needs to take actions to respond to the disasters that happened in the Asia and the Pacific region. Following the Indian Ocean tsunami in 2004 that hit countries like Bangladesh, India, Indonesia, Malaysia, Myanmar, and Thailand, it was considered important to develop a seamless framework dataset of the Asia Pacific region for mapping of the potential area for disasters such as earthquakes and tsunamis in the region.

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Objective of the Working Group: "Develop, maintain and distribute a seamless 1:1'000'000 scale framework data set covering the all AP Region"

Workplan and report of activities

Until the next UNRCC-AP, and for the all region, the activities of the working group will focus on the development of:

- framework data set (Mr Bebas Purnawan, Dr Steeve Ebener)
- metadata profile (Prof Sang-Ki Hong)
- data node network (Dr Zhou Xu)

The coming section presents the Fundamental Data Working Group (WG 2)'s work plan and activities which have been performed since the 17th UNRCC-AP.

1. Development of a regional framework data set

1.1 Workplan

The 14th PCGIAP meeting recommended that:

- a. The development of the Asia-Pacific fundamental dataset include countries: Korea, New Zealand, Russia, Papua New Guinea, and Pakistan in the dataset;
- b. The Asia Pacific fundamental dataset be used:
 - To identify problems such as matching between adjacent countries and data integrity
 - For data maintenance including update and the custodianship of data
 - For test cases such as mapping of countries hit by tsunami;

- c. Each country maintain their office or email addresses with the PCGIAP secretariat, because WG2 will send the Asia-Pacific dataset (vector and images) for editing to the countries in September 2008, by both FTP and courier;
- d. For helping in data update, WG2 consider the use of ALOS data as well as LANDSAT data;
- e. WG2 applies the revised work plan as follows:

Table 1 shows the 2008-2009 workplan for the development of a regional framework data set as accepted during the 13th PCGIAP meeting in Seoul and as revised and accepted during the 14th PCGIAP meeting in Kuala Lumpur, Malaysia 19-22 August 2008.

No	Activity/Steps	Date	Revised Date (21/08/08)
1	Invitation to the countries to participate to the project during the PCGIAP EB meeting	April 2008	April 2008
2	Modification of the WG2 web site	May 2008	August 2008
3	New set of standards and protocols and guidelines	May 2008	November 2008
4	Provision of the necessary data to the countries that wish to participate	August 2008	November 2008
5	Deadline for submitting the new data set	April 2009	April 2009
6	Aggregation, cleaning and presentation of the dataset	18th UNRCC-AP	18th UNRCC-AP

Table 1 - revised 2008-2009 workplan for the development of a regional framework data set

1.2 Report of activities

Followings are report of activities of the Framework Data Set Task Force which consists of Modification of WG2 website and the Creation of a seamless data set using Global Map.

1.2.1 Modification of the WG2 website

The modification of WG2 website has been implemented since the 14th PCGIAP Meeting. Thanks to the PCGIAP Secretariat for carrying out this modification.

1.2.2 Creation of a seamless data set using Global Map

The second activity to be reported is the development of the regional fundamental dataset. Referring to the recommendation of the 14th PCGIAP meeting, the development of the AP fundamental dataset should include countries: Korea, New Zealand, Russia, Papua New Guinea, and Pakistan, and should be sent to each country for editing.

Unfortunately, until now the inclusion of countries of Korea, New Zealand, Russia, Papua New Guinea, and Pakistan into the existing dataset cannot be completed because of lack of person to carrying out this process. The person who usually took care of the job was away for training and

after that he was very much occupied with his routine job. Besides, it was very difficult to find another person as a replacement in the end of Indonesian fiscal year where people are busy completing their job.

In December 2008, the development of AP fundamental dataset restarted and it is now in progress. However, it was found that there was a problem in edgematching among countries like Pakistan, India and China, Russia and China, and this covered a very long boundary line starting from Pakistan to Russia. Until now, the development of these country datasets is still in progress.

From this situation, it is difficult to keep up with the workplan, particularly because there is no time left now to ask participation from the countries for editing their own dataset. So, I would suggest that at the 18th UNRCC-AP, WG2 will present the AP Fundamental Dataset aggregated and cleaned but without any editing from the countries. And in October 2009, WG2 will deliver the country dataset to each country.

Data sources of these countries are dataset created by UN organizations, Second Administrative Level Boundary (SALB) of the WHO, and the International Steering Committee for Global Mapping (ISCGM), GMv1 and GMv2. There are 22 countries now included in the AP fundamental dataset. However, the WG2 considers that Mongolia, Nepal, and Bhutan are also to be included so there will be a solid AP dataset.

NR	COUNTRY	DATA SOURCE			
		Boundaries	Road	Hydrography	Pop. Places
1	Australia	GMv1	GMv1	GMv1	GMv1
2	Bangladesh	SALB	GMv0	GMv0	GMv0
3	Brunei Darussalam	SALB	GMv0	GMv0	GMv0
4	Cambodia	SALB	GMv0	GMv0	GMv0
5	China	SALB	GMv0	GMv0	GMv0
6	India	SALB	GMv0	GMv0	GMv0
7	Indonesia	SALB	GMv0	GMv0	GMv0
8	Japan	GMv1	GMv1	GMv1	GMv1
9*	Korea	GMv0	GMv0	GMv0	GMv0
10	Laos	SALB	GMv0	GMv0	GMv0
11	Malaysia	SALB	GMv0	GMv0	GMv0
12	Maldives	SALB	GMv0	GMv0	GMv0
13	Myanmar	SALB	GMv0	GMv0	GMv0
14*	NewZealand	GMv0	GMv0	GMv0	GMv0
15*	Pakistan	GMv0	GMv0	GMv0	GMv0
16	Papua New Guinea	GMv0	GMv0	GMv0	GMv0
17	Philippines	GMv1	GMv1	GMv1	GMv1
18*	Russia	GMv0	GMv0	GMv0	GMv0
19	Singapore	GMv1	GMv1	GMv1	GMv1
20	Sri Lanka	SALB	GMv0	GMv0	GMv0
21	Thailand	SALB	GMv0	GMv0	GMv0
22	Vietnam	SALB	GMv0	GMv0	GMv0

Table 2 – list of countries and the data sources of the regional framework data set

* in progress

1.2.3 Proposed Technical Specification

To help focal point countries in developing or updating their own dataset the Working Group 2 (WG2) proposes a technical specification (see appendix A). In addition to that the WG2, ask to the Executive Board, that this technical specification to be considered as one of PCGIAP's publications.

1.2.4 Next Plan

Apart from catching up with the workplan presented Table 1, the working group is looking at the possible application of the work done.

Among those explored so far, the 2010 round of population censuses could represent a could framework for the continuity of the activities of WG2 during the years to come because:

- even if it is at a different scale, the fundamental data set presented here is needed for the preparation of the census,
- the census represent a unique opportunity to improve these datasets,
- this could be a good opportunity to strengthen the connection between the National Mapping Agencies and the Statistical Offices in countries,
- the coming round is priority n°1 for the UN Statistical Division and they will need to find a way to represent the data collected through the census.

In addition to that, the Global Mapping initiative could also be interested in the work done by the working group and the lessons learned through it current work in view of version 2 of their product as this product is supposed to be seamless. In addition to that, they are always looking for example of application of their data.

In relation to the earthquake that was just happened in West Sumatra, Indonesia and understanding that the Asia and the Pacific region is a potential area for disasters such as earthquake and tsunami, the working group considers that the existing AP framework dataset would further be used as a framework for supporting of the disaster related application in the region.

2 Development of a metadata profile for the region

2.1. Workplan

In relation to the development of a Metadata Profile for the Region, the 14th PCGIAP meeting recommended that:

- a. WG2 call for a Project Team to develop the Asia-Pacific Metadata Profile;
- b. WG2 continue the Asia-Pacific Metadata Profile Survey;
- c. WG2 organize Asia-Pacific Metadata Profile Project Team meetings and workshops in Singapore in January 2009 and in Bali, Indonesia in August 2009;

- d. ISO Global Registry of Regional Profiles be supported;
- e. The projects of Data Node Network and Metadata Profile Development be combined to effectively carry out important capacity building including education and training on technical aspects of metadata implementation,;
- f. Solid use-case scenarios be developed that a regional profile can be exploited to help manage a disaster, for humanitarian support and environmental management;
- g. A WG2 web site for the combined projects be set up and linked to the PCGIAP web site;
- h. Work Plan for Asia-Pacific Metadata Profile:

Table 3 shows the 2008-2009 workplan for the development of metadata profile for the region as accepted during the 13th PCGIAP meeting in Seoul and as revised and accepted during the 14th PCGIAP Meeting in Kuala Lumpur, Malaysia on August 19-22, 2008.

No	Activities	Date	New Date
1	Modification of WG2 web site	May 2008	May 2008
2	Creation of a new draft based on the already existing ones	June 2008	June 2008
3	Discussion about the draft profile	August 2008	August 2008
4	Feedback from the countries regarding the new draft profile	October 2008	December 2008
5	Proposition of a final profile	December 2008	Before 18 th UNRCC-AP
6	Presentation and agreement of the final profile	2009 PCGIAP EB or 18 th UNRCC-AP	18 th UNRCC-AP

Table 3 - revised 2008-2009 workplan for the development of a metadata profile for the region

2.2 Report of activities

The organization of the Asia and the Pacific Metadata Profile in the 14th PCGIAP Meeting was a succesful and important event. There were four presentations presented in the workshop, the presentations are as follows:

1. Regional ISO Metadata Profiles: Status, presented by Henry Tom, Co-Chair ISO/TC211 Advisory Group on Outreach.
2. PCGIAP Metadata Profile Survey & Resulting Draft ISO Metadata Profile for Asia and the Pacific, presented by Prof. Sang-Ki Hong, Vice Chair of PCGIAP WG 2 and Convenor of ISO/TC211 WG10.
3. ANZLIC ISO Metadata Profile: Experiences and Status, prepared by John Hockaday and presented by Greg Scott, Geoscience Australia.
4. Geospatial Metadata Profiles, Catalogues and Interoperability, presented by Jeroen Ticheler, Director of GeoCat, Founder and chair of Geonetwork Opensource, and Board of Directors of OSGEO.

In this workshop, professor Sang-ki Hong introduced the draft of the Asia and the Pacific Metadata Profile (see Appendix C). However, so far there is no information of the finalization of the profile yet.

3.Development of a data node network for the region

3.1 Workplan

Table 4 shows the 2008-2009 workplan for the development of a data node network for the region as accepted during the 13th PCGIAP meeting in Seoul as revised and accepted during the the 14th PCGIAP Meeting in Kuala Lumpur, Malaysia on August 19-22, 2008.

	Activities	Date	New Date
1	Modification of WG2 web site	May 2008	May 2008
2	Compile existing training material for countries to develop their own clearinghouse development plan	18th UNRCC-AP	December 2008
3	Provision of standards, protocols and guidelines that would insure the interoperability between the different nodes		June 2009
4	Provision of a list of tools that complies with the recommended standards, protocols and guidelines		After 18th UNRCC-AP
5	Being able to provide countries with technical support in order to implement their plan		After 18th UNRCC-AP

Table 4 - revised 2008-2009 workplan for the development of a data node network for the region

3.2 Report of activities

The compilation of the existing training material for countries to develop their own clearinghouse development plan is in progress The material consists of:

- The concept of APSDI
- The concept of datasharing
- Introduction of IT environment
- Metadata development
- Metadata service creation
- Geospatial database development
- Map service creation

These training materials are still in development.

The provision of standards, protocols and guidelines that would insure the interoperability between the different nodes is also in progress. The standard of AP fundamental dataset will be the standard created in PCGIAP EB Meeting in Chengdu China. This standard was derived from the Global Mapping Data Specification. This specification has been applied in the creation of the AP fundamental dataset. The standards, protocols and guidelines will be ready in June 2009

The communication protocol that will be applied in the APSDI network is the TCP/IP that is now widely used by all network worldwide including the internet. To insure the interoperability in sharing of data all standards published by the Open Geospatial Consortium (OGC) and

ISO/TC211 will be adopted. The countries may applied any geospatial database management system as long as it is comply with the OGC standards, the Web Map Service (WMS), the Web Feature Service (WFS) protocols etc.

The provision of a list of tools that complies with the recommended standards, protocols and guidelines has also been started. The WG2 is considering the use of the opensource software products including geospatial database management system, map service, protocols, ect.

APPENDIX A
PCGIAP WG2 PROJECT
DEVELOPMENT OF A SEAMLESS DATASET FOR THE PCGIAP REGION

Technical specifications and process

1. Introduction and objective of the project

Based on the PCGIAP resolutions from the PCGIAP EB Meeting in Bali and Brunei in 2005, WG2 established a pilot project to develop the regional tsunami dataset. This dataset, developed by the WG2 in 2006, demonstrated the possibility to extend the initial project to cover the all Asia and Pacific Region.

The dataset in question should be a seamless vector dataset consisting of the following layers:

- international and administrative boundaries,
- road network,
- hydrography
- populated places.

The Regional Fundamental Dataset will be developed in close collaboration with the National Mapping Agencies of each country, PCGIAP WG1, ISCGM and the SALB project.

The characteristics of the final product as well as the proposed implementation process for this project are presented in the coming section.

2. Characteristics of the final product

At the end of this process it is expected to have access to a seamless dataset that would correspond to the following specifications:

1. Resolution: 1:1,000,000
2. Horizontal accuracy 500 meter.
3. Data format ESRI shapefile
4. Datum: WGS84
5. Map Projection: Geographic Projection.
6. File format: shape file
7. Attribute information complying with the Global Mapping [1] Specification for the rivers, roads and populated places and with the ones of the Second Administrative Level Boundaries dataset project (SALB) for the administrative boundaries [2],

In order to obtain some homogeneity between countries the following features will be mapped:

- international boundaries and coastline
- administrative boundaries down to the district level (2 levels below the national level)
- road network: the first 3 levels starting from the highest one (e.g. highways)
- hydrography: the 2 most important levels of the river network and water bodies of more than 4km²
- populated places: any populated places presenting a population of more than 1000 inhabitants

3. Implementation process

3.1 Use of the Landsat global mosaic as ground reference

In order to ensure an homogeneous accuracy over the all region and also the seamless aspect of the dataset the 2000, or more recent when available, Landsat global mosaic will be used as ground reference to reevaluate the positional accuracy of all country datasets.

In addition to cover the all globe this data set present the advantage of being freely available on the internet [3], downloadable by tiles in Tiff format or aggregates of tiles in MrSid format.

This complete mosaic can be accesses trough a WMS service from: onearth.jpl.nasa.gov (complete address to include in ArcGIS: <http://onearth.jpl.nasa.gov/wms.cgi?>).

The mosaic, in MrSID format, as well as the scene by scene dataset can also be downloaded from: <http://glcfapp.umiacs.umd.edu:8080/esdi/index.jsp>

If none of these options is manageable by the country, WG2 will send the tiles covering the respective countries to the focal point identified for the pilot projects in countries under the form of a CDs or DVDs depending on the size of the files to be transferred.

3.2 Source of the vector layers

The layers to be included in the final dataset will be coming from the countries themselves and, if necessary, adjusted to fit the characteristics described under section 2.

For the roads, the hydrography and the populated areas, and in order to avoid duplication of efforts, countries might be willing to consider using the data they provided to the Global Mapping initiative and work at updating them in order to comply to the characteristics reported in section 2 of this document.

In line with the recommendation adopted by the PCGIAP EB, the international and administrative boundaries layer will be collected though the Second Administrative Level Boundaries project (SALB, http://www.who.int/whosis/database/gis/salb/salb_home.htm).

3.3 Editing process

Using the global Landsat mosaic as the reference, the horizontal accuracy should be of **500 m** for 90 % of the points (accuracy for 1:1,000,000 dataset).

The investigation made by BAKOSURTANAL, Indonesia demonstrated that the Landsat global mosaic data will be appropriate for evaluating the accuracy of:

- the boundaries but only in terms of coastlines and hydrography
- hydrography,
- roads if they are visible.

This will unfortunately not be possible for settlements but might already help identifying possible important errors (e.g. towns located on top of a mountain).

The editing work will be done by the country themselves with technical support from WG2.

3.4 Compilation, integration and documentation

BAKOSURTANAL, will ensure the compilation and the integration of the country specific data sets into the regional database.

The document of the different layers will be ensured through the use of the metadata profile to be developed in the context of the activities of WG2.

3.5 Distribution policy

The objective of this fundamental dataset being to form a first layer that could be used in order to address issues such as climatic change, disaster risk reduction,...at the scale of the all PCGIAP region, WG2 encourage countries to allow for a free access to this data for non commercial use.

The mode of distribution of the final database will be discussed among the PCGIAP community taking into account the different distribution platform at disposal at the time of the release.

APPENDIX B

ASIA AND THE PACIFIC METADATA PROFILE

	Name	Path	Obliga-tion
1	Metadata point of contact	MD_Metadata.contact > CI_ResponsibleParty	M
2	Metadata date stamp	MD_Metadata.dateStamp	M
3	Metadata language	MD_Metadata.language	C
4	Metadata character set	MD_Metadata.characterSet	C
5	Metadata file identifier	MD_Metadata.fileIdentifier	M
6	Metadata standard name	MD_Metadata.metadataStandardName	O
7	Metadata standard version	MD_Metadata.metadataStandardVersion	O
8	Dataset title	MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.title	M
9	Abstract describing the dataset	MD_Metadata.identificationInfo > MD_DataIdentification.abstract	M
10	Purpose	MD_Metadata.identificationInfo > MD_DataIdentification.purpose	O
11	Keywords	MD_Metadata.identificationInfo > MD_DataIdentification > MD_Keywords	O
12	Dataset reference date	MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.date	M
13	Dataset language	MD_Metadata.identificationInfo > MD_DataIdentification.language	M
14	Dataset topic category	MD_Metadata.identificationInfo > MD_DataIdentification.topicCategory	M
15	Dataset character set	MD_Metadata.identificationInfo > MD_DataIdentification.characterSet	C
16	Geographic location of the dataset (by four coordinates or by geographic identifier)	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicBoundingBox or EX_GeographicDescription.geographicIdentifier	M
17	Dataset responsible party	MD_Metadata.identificationInfo > MD_DataIdentification.pointOfContact > CI_ResponsibleParty	M

18	Spatial resolution of the dataset	MD_Metadata.identificationInfo > MD_DataIdentification.spatialResolution > MD_Resolution.distance or MD_Resolution.equivalentScale	0
19	Additional extent information for the dataset	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.temporalElement > EX_TemporalExtent.extent	0
20	Spatial representation type	MD_Metadata.identificationInfo > MD_DataIdentification.spatialRepresentationType	0
21	Distribution format	MD_Metadata.distributionInfo > MD_Distribution > MD_Format	0
22	Fees	MD_Metadata.distributionInfo > MD_Distribution > MD_StandardOrderProcess.fees	0
23	On-line resource	MD_Metadata.distributionInfo > MD_Distribution > MD_DigitalTransferOption.onLine > CI_OnlineResource	0
24	Lineage	MD_Metadata.dataQualityInfo > DQ_DataQuality.lineage > LI_Lineage	0
25	Source	MD_Metadata.dataQualityInfo > DQ_DataQuality.lineage > LI_Lineage.source > LI_Source or LI_Lineage.processStep > LI_prossStep	0
26	Positional Accuracy	MD_Metadata.dataQualityInfo > DQ_DataQuality.report > DQ_Element > DQ_Positional_Accuracy	0
28	Contraints	MD_Metadata.metadataConstraits > MD_Constraints > MD_LegalConstraints	0