

Task Group 1: Core Geo-database November 2007 Progress Report

Task Managers

John Latham (FAO)
Steeve Ebener (WHO)

Objectives of the Task Group

The objectives of this Task group are to:

- Identify and prepare a global framework core data layers for the UN systems
- Provide the international community with a working platform for the collection, management, analysis, visualization and sharing of sub-national data down to the 2nd sub-national level.

Activities planned for the October 2006-October 2007 period

The following activities have been planned for the task group for the 06-07 period during the 7th plenary meeting of UNGIWG:

- By the next UNGIWG meeting, deliver core data sets based on agreed upon data production targets.
- Continue updating, maintaining and validating the core geo-database (asses needs for new relevant layers, conduct quality assessment and suitability analysis,....)

In order to be able defining the priority layers and production targets mentioned above, a survey has been initiated in December 2006 among the UNGIWG members. Unfortunately, only 5 institutions (UNESCAP, UNICEF, SWALIM, UNJLC and UNOSAT) provided a full reply and 1 institution (WHO) a partial one to this survey stopping therefore the task group to really implement the activities in an integrated way like it was planned.

The task managers also planned to come up with a proposition of structure and mechanism in order to manage and coordinate the activities of the task group. The very large scope of the task group made this exercise difficult. A proposition will nevertheless be presented for discussion during the coming plenary meeting.

In the meantime, the activities and progresses made by UNGIWG members regarding core layers managed at the global level are presented here.

Activities and progresses made in the context of projects and initiative taking place outside UNGWIG are also summarized here.

Report of activities by layer

International boundaries

Members: Guillaume Le Sourd, Vladimir Bessarabov, Alice Chow, Jeffrey Bliss and Jessica Sloan (UNCS) in coordination with Steeve Ebener (WHO)

Activities

Perform updates of the international boundary layer at 1 million scale regarding Sri Lanka, Mozambique, Serbia and Montenegro and the border between Namibia and Zambia, Timor Leste and Indonesia, Burkina Faso and Niger.

Perform updates of the international boundary layer at 25 million scale for Serbia and Montenegro.

The changes were achieved in line with the current validation process and collaboration with the SALB project. The 2007 release of the databases will be made available from the UN boundaries web site (<http://boundaries.ungiwg.org/>) by the end of November 2007.

Re-evaluation of the methodology and base processes was done in view of enhancing the quality of the 1million database.

Methodology evaluation and assessment of update processes

The process aiming at ensuring the maintenance, consistency and quality of the 1:1'000'000 scale international boundary dataset was re-evaluated on the basis of:

- Evaluation of the processes, standard operating procedures and methodology of the improvement of the 1million dataset
- an evaluation of the accuracy of the source material for boundary delimitation (boundary evidences: UN Treaty, ICJ decisions, SALB...) for a set of borders (Mali-Algeria, Niger-Algeria, Mongolia-China, Niger-Benin, Timor Leste-Indonesia, Nepal-India...)
- a research and development of a database on boundary status (delimitation and disputes) and treaties resources (for Africa), to be completed by January 2008

The way forward for 1 million international boundary dataset methodology will be based on the following to ensure quality in the published data:

- **Creation of boundary evidence** datasets for the use of Cartographic Section (from various sources of information including Treaty Series from UN, International Court of Justice statements, International boundary studies encyclopedia) with accurate metadata on source of information
- **The use of SALB source** will be used under drastic verification process to fill the gaps of unavailable areas and agreement of both side
- **Generalization** of these evidences to 1 million scale in order to implement and integrate in the international boundary layer
- **Integration of the references** of correction made on each boundary segment in its related attribute (source, date, status, signing countries...)

The reliability of the information will therefore be embedded in each of the boundary to ensure the UN user is aware on the accuracy of the information. This process will enable as well to refer to the source of the boundary delimitation to possibly improve it if better evidences arise.

Workload

The workload to achieve the complete enhancement of the international boundary datasets according to boundary evidences and the reflection of boundary status and treaties resources needs important

resources for expediting the adequate enhancement of the 1 million dataset. Cartographic Section is currently requesting and looking for additional resources.

Scope of work

Estimated amount of boundary segments to urgently verify (Africa – Asia – Latin America): approximately 250-270.

Estimated amount of time to improve one segment (sometimes several treaties for 1 segment) of the 1million data set: approximately 3 days

Amount of work (urgent zone to verify only)

Estimated work load time for one person full time: approx. 3 years

Estimated amount of person to complete the full task: approx. 25 person/month

Work plan for 2008

Priority to gather those evidences and improve international boundary datasets will be set on Africa in accordance to the priority of the international community's efforts to support the development of the continent. A parallel process will nevertheless ensure that the needs of the SALB projects for maps to be sent to validation are answered according to priorities set by Cartographic Section.

The estimated achievement for next year is difficult to predict due to the limited resources available for the moment at the UN Cartographic Section (currently one person half-time). If no additional resources are found an estimate of 30 to 40% of international boundaries of Africa is planned to be achieved for 2008.

Administrative boundaries

Members by region/function and alphabetical order (directly implicated in the technical work of the SALB project, the persons indicated by a * are new members):

Africa: Chukwudozie Ezigbalike (UNECA), Teshome Abebe (UNECA)
Americas: Brenda Brookes (UN Map Library), Elisa Gagliano (UN Map Library), Alejandra Silva (UN ECLAC), Grill Guenther (WHO/AMRO)*, Claudia Lambe and Jorge Espinoza Santander (Consultants)*
Asia: Guoxiang Wu (UNESCAP)*, Lal Samarakhon (AIT), Nah Kulapramote (AIT)*, Thilantha L. Dammalage (AIT)* and
Europe: Tony Mathew (WHO)*
Middle East: Ahmed Bayomie (WHO/EMRO)*
Coordination: Steeve Ebener (WHO) and Yaniss Guigoz (WHO)

The following paragraphs gives a short summary of the activities performed and the description of the results which have been obtained over this past year. For more details, please look at the last 4 editions of the SALB newsletter (http://www.who.int/whosis/database/gis/salb/salb_PO.htm).

Activities

In order to make as much progresses as possible over this past year, and thanks to the funds received from USAID, WHO and UNHCR, most of the efforts have been concentrated on extending the capacity of two of the nodes and create two new ones as well as meeting with as many country representative as possible.

The capacities of the node for the Americas and Europe have been extended respectively through the hiring of a consultant since November 2006 and an half time staff since April 2007. Since last fall the

project also greatly benefit from the help provided by the WHO Regional Office for the Americas (WHO/AMRO).

With the support of UNESCAP a node has been established at the Asian Institute of Technology (AIT) in Bangkok since July 2007 (two part time staff). A node has also been established at the WHO Regional office for the Eastern Mediterranean (WHO/EMRO) since January 2007 (one full time staff).

The project also received some support from two interns who worked on the possible improvement of the coastline used both within SALB and the UN international border template.

Meeting with country representatives from National Mapping Agency or mission to the UN (79 in total) took place during the following meetings/conferences that SALB attended:

- 9th GSDI Conference and 13th ISCGM meeting (Santiago de Chile, November 06)
- the FIG week (Hong Kong, May 07)
- 13th PCGIAP meeting and EB (Seoul, June 07)
- the Cambridge conference (Cambridge, July 07)
- 9th UNCSGN and 24th UNGEGN (New York, August 07)

The slides and/or papers presented during these meetings/conferences can be downloaded from the overview page of the SALB web site: (http://www.who.int/whosis/database/gis/salb/salb_PO.htm).

These meeting have also been the occasion to continue supporting the activities on Working Group two of PCGIAP towards the development, maintenance and distribution of a seamless 1:1'000'000 scale framework data set covering the all Asia and Pacific Region as well as strengthen the connection with the Pan American Institute for Geography and History (PAIGH) in charge of the development of the Americas Global Map.

Moving towards the institutionalization of the project new discussions took place with the UN Statistics Division and the UN Map library. A UN email address has also been created for the project (SALB@un.org) and the web site is going to be redesigned and accessible from UN URL some time next year. The implementation of a user registration module has been the first step in this direction.

When it comes to resource mobilization, USAID has extended their support to the project for the 2008-2009 period with a grant of 111'495 USD. Funds have also been received from UNHCR (15'000 USD) since the last UNGIWG plenary meeting.

Results

The information reported in this section describes the new information and data that have been posted on the SALB web site since the last UNGIWG plenary meeting.

NMA Contact information

The contact information for 160 countries (+26 compared to last year) can now be accessed from the SALB web site: http://www.who.int/whosis/database/gis/salb/salb_contact.htm. The contact information for several countries, already available in 2006, have also been updated.

January 2000 data

To date tables for 168 countries (+2) are available online from the SALB web site (http://www.who.int/whosis/database/gis/salb/salb_coding.htm).

In terms of validated maps, 47 (+8) of them can now be downloaded from the SALB web site (http://www.who.int/whosis/database/gis/salb/salb_MDATA.htm). The maps for 50 other countries remains under validation (+6).

2005-2007 data

The historic changes tables for 105 countries are now at least reaching 2005 (+21), 18 of them reaching 2007 and 31 other going until 2006. These tables are currently being improved in order to provide more information to the users.

In terms of maps, it is now possible to download validated maps representative of the situation observed between 2005 and 2007 for 32 countries (+8). The maps for 10 other countries remain under validation at the moment (+7).

Conclusion and proposed workplan for 2008

SALB has still not reached the present like it was planned last year and will therefore certainly not be able to enter the regular updating mode at the beginning of 2008. Nevertheless the gap is closing itself at a much faster speed than before thanks to the regional nodes that have either been established or strengthened. The maps for several other countries (e.g. Brazil, Indonesia, Laos,..) are actually in the pipeline and will be sent for validation before the end of the year.

Based on the structure and resources at disposal it is proposed to continue on the same line than the one followed this past year trying to have the SALB data completed as soon as possible.

Finally, we would like to take advantage of this report to thank one more time the different donors which are supporting the project as well as all the institutions that have allowed us to make progresses, especially the different nodes.

Coastlines

Members: Guillaume Le Sourd (UNCS), Steeve Ebener and Oumar Cheikh Oumar Dieng (WHO)

The coastlines integrated within the international border UN template is not presenting a high level of accuracy. Without talking about the scale at which the template is supposed to be used (1:1'000'000), several countries, through the SALB project, have reported some important shifts and/or errors which have been confirmed through the use of Landsat ETM+ images.

In order to improve this particular component of the template an accuracy analysis has been performed, in the context of a collaboration between the UNCS and WHO, between the coastline as reported in the UN template, the recently release 1:100'000 scale Prototype Global Shoreline Data (Satellite Derived High Water Line Data) from NGA, the ESRI's ocean mask derived from the SRTM data set and the 1:250'000 scale World Vector Shoreline dataset produced by NOAA on the basis of the 1990 Landsat mosaic.

This analysis has been performed on 72 points distributed over 24 sites located all over the globe on the basis of Natural View scenes, when available, or Landsat EMT+ mosaic images.

The results of this analysis are reported in the table below.

	<i>NOAA dataset</i>	<i>UN Template</i>	<i>ESRI Dataset</i>	<i>NGA Dataset</i>
<i>Mean error</i>	645	553	131	47
<i>Std deviation</i>	839	333	138	55
<i>Min</i>	0	53	0	0
<i>Max</i>	5988	2100	685	297

For the selected sites, the results shows that the 1:250'000 scale data set from NOAA is actually presenting an horizontal error more important than the UN template. Among the two other data sets, the data from NGA seems to be the most promising option to improve the coastline component of the UN

template but the important difference in scale between this product (reported as being 1:100'000) and the UN template (1:1'000'000), the important number of gaps in the line will request some further investigation as well as the possibility to also directly integrate the coastline coming from the countries will have to be further investigated.

The final results of this analysis will be available under the form of a report to be posted on the International and administrative boundaries web site (<http://boundaries.ungiwg.org/>).

Other potential candidates for UNGIWG Core Geo-Database

Administrative Boundaries: the 2007 edition of the GAUL data set has been released in December 2006. This edition of the data set can be downloaded from the FAO Geonetwork node (<http://www.fao.org/geonetwork/srv/en/main.search>). GAUL is about to release version 2008, which will include 17 updated countries at administrative level 2 and 13 countries with boundaries and names at levels 3 and 4; the number of time series layers have also been increased to 12. Future activities, besides the regular update of GAUL boundaries and names, will include the updates of the coastline and the improvement of the international boundaries in coordination with UNCS. The collaboration between the SALB and GAUL initiatives is a subject for discussion in the framework of the UNGIWG activities and the UNSDI Technical governance framework.

DEM: NASA and METI (Ministry of Economy, Trade and Industry, former MITI) of the Japanese Government announced that they will develop a global DEM data of 30 m interval with nominal 7 m accuracy (SD) and distribute it world wide, "free of charge." The development is planned to be completed by December 2008.

Roads: UNJLC will be co-chairing the CODATA Working Group that is being proposed to steer the development of an open source Global Roads database. The objective of this project, initiated by the Center for International Earth Science Information Network (CIESIN) of Columbia University, is to produce an updated global roads database for mapping at 1:200,000 scale or better (5 times the accuracy of current open source global databases) and make it freely available to the humanitarian, environmental, developmental, and scientific communities. The data model used for this project will be based on the UNSDI-T standards. More information on this initiative is available here: <http://www.ciesin.columbia.edu/confluence/display/roads/Global+Roads+Data>.

Irrigation areas: The digital global map of irrigation areas (GMIA) is a collaborative effort, ongoing since 1995 between the FAO and the Universität Frankfurt am Main. The methodology combines irrigation statistics for sub-national units and geospatial information regarding the location and extent of irrigation schemes. It results in a 5 arc-minute cells layer that shows the percentage of land equipped for irrigation based on statistics from 1997-2002. The GIS dataset, methodology, information per country, an assessment of the map quality of the latest version, 4.0.1, and references to the background and history of the irrigation mapping project can be found online. The GIS layer is based on local maps and data sources and has the advantage of allowing for the irrigated area within sub-national units to equal the irrigated area as reported by census-based statistics.

Rural population: The rural population database (PMUR 2005) from the Environmental Assessment and Management Unit (NRCE-GIS unit), FAO aims at improving the rural/urban population database, which includes different GIS database, such as accessibility to roads and to urban centres, size of the cities (in terms of population density) and satellite images for the detection of the urbanized areas when there is the lack of other information. The definition of the accessibility, considering the Digital Elevation Model and the quality and the classification of the roads, will help in a better identification of urban areas, of vulnerable rural people for the lack of access to the markets. Current updates include: the latest version of the population database provided by LandScan is 2005; an evaluation of the consistency of the data to the total UN population data at country level; standardization of the database to the UN coastline.

Other initiatives of interest to UNGIWG

1. African Water Resource Database (AWRD) from Aquaculture Management and Conservation Service (FIMA), FAO

The African Water Resource Database (AWRD) is a set of data and custom-designed tools, combined in a geographic information system (GIS) analytical framework aimed at facilitating responsible inland aquatic resource management with a specific focus on inland fisheries and aquaculture. The AWRD is an enhancement of the work contained in the FAO's Aquaculture for Local Community Development Programme's Water Resource Database (WRD) of southern Africa. AWRD archive comprises 153 unique data layers. Main data categories (continental and national level datasets) are: Surface water bodies; Watersheds; Aquatic species; Rivers; Political boundaries; Population density; Soils; Satellite imagery and many other physiographic and climatological data types. The source scale of these data support analyses from 1:65 000 to 1:5 000 000 for vector data, and a nominal resolution of 1 to 5 kilometers for raster data.

2. Digital map of hydrological basins in Africa, Southeast Asia and Latin America from Water Development and Management Unit (NRLW), FAO

The dataset is developed under the framework of AQUASTAT, the FAO global information system on water and agriculture. It is an effort to provide a consistent source of major hydrological basins and their sub-basins. The basins are characterized by name and flow direction.

3. The global livestock information system (GLIS) from Animal Production and Health Division (AGA), FAO

The **global livestock information system (GLIS)** includes geo-referenced data on livestock numbers and production collated, standardized, and made available to the general public through the FAO website. Where gaps exist in the available data or the level of spatial detail is insufficient, livestock numbers are predicted from empirical relationships between livestock densities and environmental, demographic and climatic variables in similar agro-ecological zones. The components of GLIS include: a global network of providers of data on livestock and subnational boundaries; an Oracle database in which these data are stored, managed and processed; and a system for predicting livestock distributions based on environmental and other data, resulting in the Gridded Livestock of the World (GLW) at 5 Km resolution. initiative: modelled distributions of the major livestock species (cattle, buffalo, sheep, goats, pigs and poultry) have now been produced, at a spatial resolution of three minutes of arc (approximately 5 km). These data are freely available through the GLW website and through the FAO GeoNetwork.

4. The rural population database (PMUR 2005) from the Environmental Assessment and Management Unit (NRCE-GIS unit), FAO

This project aims at improving the rural/urban population database, which includes different GIS database, such as accessibility to roads and to urban centres, size of the cities (in terms of population density) and satellite images for the detection of the urbanized areas when there is the lack of other information. The definition of the accessibility, considering the Digital Elevation Model and the quality and the classification of the roads, will help in a better identification of urban areas, of vulnerable rural people for the lack of access to the markets. Current updates include: the latest version of the population database provided by LandScan is 2005; an evaluation of the consistency of the data to the total UN population data at country level; standardization of the database to the UN coastline.

5. The rural vulnerability map (Africa) from the Environmental Assessment and Management Unit (NRCE-GIS unit), FAO

Production of a global map of rural vulnerability in terms of food insecurity. The Chronic Undernutrition map was released in December 2003: after three year the map could be updated and improved mainly for a better understanding of the phenomenon in rural and urban environment. It involves a review and update of the database of the anthropometric indicators; evaluating the possibility to move the information to GAUL database; eventually evaluate the possibility to store the time series information for a trend analysis according to the MDGs; collect demographic data at subnational level for combining the information with the rural population database.

6. Degree of rurality for a priority area (Africa) from the Environmental Assessment and Management Unit (NRCE-GIS unit), FAO

Once available a refined transportation dataset for the priority areas (i.e. Africa) identified by UNGIWG members, combining the information with the rural population from the PMUR 2005 in Africa a methodology for the conceptualization of the degree of rurality should be assessed, based on a review of the literature on the concept of rurality. The related activities include the update of the rural population database, the production of the rural vulnerability map (Africa) and the generation of the map indicating degrees of rurality for a priority area (review of literature on the concept of rurality and definition of a methodology for the conceptualization of the degree of rurality).