PC-IDEA, the availability of fundamental data in the Americas and the GM initiative

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Abstract

This paper (i) briefly presents PC-IDEA aims and scope; (ii) explores availability of fundamental data for the Americas, by comparing what is available, without restraints, in the region –analog or digital format- with the data sets produced as the result of Global Map Phase 1; (iii) make specific considerations about immediate applications for improved project formulation and decision making in the region; (iv) finally, from the Americas perspective, present some considerations supporting the need for a GM second phase.

Key words: Regional development, spatial data infrastructures, fundamental data, sustainable development, decision making.

Introduction

The concept and the processes by which Spatial Data Infrastructures (SDI) are built today are essential part of Geography around the world. The way data is being produced, organized and analyzed from local to global levels and vice versa, via powerful initiatives like Global Map (GM), one of the pioneers in this field, results in a broad and dynamic exchange of ideas, methods, better understanding of diversity, all in sum, impacting the way territorial planning and sustainable development are pursued.

The contribution of global organizations such as the Global Spatial Data Infrastructure (GSDI), regional ones as the Permanent Committee on GIS for Asia/Pacific (PCGIAP) and, at the national level, in cases like Japan, Australia the United States and many others, is fundamental for the results so far obtained with GM Phase 1 and will be vital for Phase 2.

In the Americas, for the benefit of the region and its members, the recently created Permanent Committee on SDI (PC-IDEA), intends to be mature

enough in a short period of time in order to play its due role in GM development and take advantage of its application. As presented later on this paper, already GM Phase 1 contributes meaningfully, by increasing the amount and quality of seamless data available, without restraints, in the region

1. The Permanent Committee on SDI for the Americas (PC-IDEA)

During the 6th United Nations Regional Cartographic Conference for the Americas (New York, 1997), in considering establishing the GSDI, a set of recommendations were approved linking the role of spatial data infrastructures, enabling technologies, the need for a permanent committee on SDI for the region and development of the Global Map. This initiative being recognized as vital for understanding global environmental problems, amongst other issues related to social improvement and economic growth for sustainable development.

Culminating a three years process, with support from multilateral organizations and cooperation from various nations, PC-IDEA was created as a result of the International Seminar on SDI (Bogota, 2000). PC-IDEA is compound by 21 nations, representing North, Central, South America and the Caribbean Islands. Following the experience of other initiatives and similar regional organizations, PC-IDEA has three working groups: (i) Technical, (ii) legal and economic affairs and (iii) communications and SDI awareness. Following PC-IDEA meetings will take place in New York, 2001 along with the forthcoming 7th UNRCC for the Americas and Cartagena, 2001 simultaneously with GSDI 5 and 8th ISCGM Meeting.

There is a direct relation between PC-IDEA and Global Map.

On one side, the above mentioned 6th UNRCC for the Americas Resolution 6 on "Development of the Global Map" recommends the "*strengthening of existing efforts and the establishment of new initiatives between global mapping and various national and regional spatial data infrastructures*".

On the other, there are the main drivers for PC-IDEA action:

(a) Increasing production of spatial data, impacting Research and Development activities for regional sustainable development;
(b) Migrating from local data to the concept of National Spatial Data Infrastructures, leading to the construction of regional spatial data sets;
(c) Increasing knowledge capabilities for all nation members, by incrementing access to data and information dissemination;

(d) *Contributing to the development of GSDI and Global Map initiatives, as well as other relevant global and regional initiatives for sustainable development*;
(e) Creating an Inter American forum leading to a better understanding of national, regional and global GIS and SDI issues and (f) Placing geoinformation as one strategic sector for national and regional development.

PC-IDEA expects to significantly stimulate the production and use of new and more powerful data sets, is the case of GM, by regional organizations and decision-making entities. When evaluating the need for this regional forum, it was evident the need for regional policy concerning spatial data required to promote economic and social development and harmonization of spatial data production.

More importantly, PC-IDEA can contribute to increase the level of participation in GM, taking into consideration that nine countries involved in PC-IDEA are not in the GM project, whilst Cayman Islands, Bermuda, Holland Antilles and Cuba are participating in GM and not yet in PC-IDEA (Table 1, Figure 1).

Table 1
Country participation in GM and PC-IDEA

2. Global Map and the availability of Fundamental Data for the Americas

Before GM Phase 1 is introduced to the scientific community, in order to present a reliable picture of the situation concerning the status of seamless reference data for the Americas, available without restraints, a comparison is here presented, taking for this purpose the most recent report on "Status Maps for Cartography and Geodesy in the Americas", produced by the Pan American Institute of Geography and History (PAIGH Commission on Cartography, 1997).

In spite of current increasing levels of data production in digital format, mostly concentrated in large scales, in looking at this information, the situation for the region, concerning intermediate and small scales, can be resumed as follows:

- Regarding topographic and planimetric maps, total and homogenous coverage can only be observed in North America. A diversity of scales and partial coverage, especially in the Andean countries and the Caribbean Islands, is found in the rest of the continent. As well, a similar but more dramatic situation is observed when looking at the production of digital maps.
- Image map production is relevant in North America. There is national coverage available for Mexico, Venezuela, Guatemala and Panama. An increasing production is observed in other areas. This is the case, for instance, of Central America where this type of product is used in the recovery phase out of the hurricane "Mitch" natural disaster.
- As for vertical geodesy, coverage using conventional technology is significant for first order leveling, though there is not updated information when considering GPS based geodesy. In any case there are relevant areas, such as the Amazons, where there is not information.
- There are thematic charts covering the continent at scales ranging from 1:100.000 to 1:1.000.000. This is the case for hydrographic (including bathymetry) and aeronautical charts (Figure 2).

This few elements easily lead to the obvious conclusion about the need for improved and accessible framework data for the Americas. Precisely, this is one of the core responsibilities for PC-IDEA and relevant work is in progress, trough the Technical Working Group (Fundamental Data Sub Group). When dealing with the issue of reference data there is global common ground but there are also relevant differences, especially when considering regional characteristics. Based on the draft document "Fundamental Data" (PC-IDEA, 2000) available for consultations by country members, differences with GM Phase 1 are located only in the incorporation of a layer for geodesy.

More relevantly, when defining GM Phase 2, differences my vary greatly as initial contributions from PC-IDEA members call for consideration of additional thematic data layers such as bathymetry, various biodiversity indicators and cadastral information, including specific aspects like Indian reservations, state parks and natural reservations. Though these motivations are related to the existence of different points of view based on cultural and geopolitical aspects, they all may enrich GM Phase 2 in its conceptualization and development stages. In any case, it is in the interest of PC-IDEA to contribute to GM vision, given the need to enhance accuracy and completeness of fundamental data for the Americas (Table 2).

Table 2
Comparing Fundamental Data sets: PC-IDEA and GM

Additionally, in times of information infrastructures development, needs to reduce duplication and other cost efficiency considerations, at PC-IDEA there is understanding about the relevance of data sets such us GM products, which are accessible, documented, well structured and reliable.

3. Global Map applications: The impact on project formulation and Decision-Making in the Americas

During the mentioned 6th UNRCC for the Americas, when considering the resolution to be adopted on establishment of a permanent committee on GIS/SDI issues for the Americas, the reasons mentioned by the delegates went beyond the need for a regional forum to share experiences, consult on matters of common interest or develop a regional geographic information infrastructure, behind the idea really was the need to maximize the economic, social and environmental benefits derived from geographic information.

To obtain these ambitious goals, PC-IDEA must be efficient in terms of placing new data sets for improved regional project formulation and decision-making. For instance, regardless of its economic and social short-term feasibility, a visionary mega project like IFSA, aiming at integration of main rivers in South America, is affected by the lack of seamless multinational geographic information (CIFSA, 1999). GM will allow these type of initiatives to advance.

Indeed, the availability of this information in a region used to a national interpretation of the Americas territory, will impact for the better the works of many regional organizations. In other words, if GM was conceived to facilitate implementation of agreements and conventions related to environmental protection, disaster mitigation and the promotion of growth in the context of sustainable development (ISCGM, 1999), there is no doubt that the main sub regional economic agreements will soon exemplify the benefits of this project.

In fact, as the majority of the decisions and in particular those market-related has a geographic dimension or are georeferenced, international agreements such as the Central American Common Market (MCCA), the Andean Community of Nations (CAN), Caribbean Community (CARICOM), among others, will immediately benefit from GM as they have requested this information for years.

Moreover, within the context of GM definition, a look at the Americas continent and those particularities observed in the various sub regions, should induce or make evident the need for a GM Phase 2:

- The lack of appropriate seamless spatial information is directly related to the possibility to improve quality in the decision making process, concerning prevention and mitigation policy related to natural disasters. This is the case, for instance, of the South American Pacific coast in relation to "El Niño" phenomena and Central America regarding the social and economic impact of hurricanes every year.
- Tropical soils, covering 50% of South American productive lands, are affected by serious fertility limitations derived from conventional agriculture practices. There is need for multinational spatial information related to viability of treatment options, eventually leading to increments in their productivity.
- Many of the mega diversity nations are located in South America, owning rich ecosystems of enormous biological importance. More consistent spatial information, leading to comprehensive analysis is required to conceive improved protection and adequate management policies.

Lastly, pertaining initial impact of GM for PC-IDEA, a note on the evolution of institution with responsibilities for geographic data production is in order, in particular for National Mapping Agencies. The development of spatial data infrastructure concepts, information and communication technologies and the performance of initiatives like GSDI, GDIN and GM are impacting these organizations, not only in terms of reviewing its main functions and mission as producers of fundamental data and the need for capacity building to take advantage of these developments, but regarding the economic externalities each society can derived from this information (Groot, 2000).

4. Other considerations on the need for a Global Map Phase 2 concerning PC-IDEA

In conclusion, to reiterate the relevance of GM for the Americas as demonstrated in this paper, taking the same area, corresponding to a part of a northern territory called "Cesar" (Colombia), a graphic comparison at scale 1:1.000.000 is presented, showing evident improvements in terms of quantity and quality of data (Figures 7,8). Moreover, derived from this exercise, additional products, elaborated at the Colombian Geographic Institute "Agustín Codazzi", indicate the potentialities of the GM Phase 1 (Figures 9,10).

A final consideration, from the PC-IDEA perspective, is necessary concerning GM Phase 2. Indeed, once GM be available for public use, a whole new experience, in some ways unexpected, will be gather and its impact, properly

collected and studied, will affect future developments of GM and other regional and global geographic information initiatives as well. Among other situations, this will be a consequence of the following:

- The use of GM will impact global environmental awareness at various levels, creating demand for new information, research and development.
- Once maintenance of GM data layers are operational, it will have consequences on the way many national mapping agencies perform and will raise their level of interest on regional and global issues.
- Cooperation amongst nations and geographic institutions, given the experience derived from participating GM categories, will facilitate data production in sub regions where this is actually impossible, benefiting in addition other global initiatives like the proposed United Nations Geographic Data Base.
- Looking at global issues from a different perspective will also create new drivers, causing new requirements in terms of training and capacity building. In the short run, regional training centers available in most of the regions may facilitate these processes efficiently.

In sum, GM a complex project by nature given technical, geopolitical and multicultural considerations involved, is clearly showing its potential with the outcomes presented at Global Forum 2000 (Hiroshima, Japan); however and precisely, because of these results, should move into a second phase, in order to contribute meaningfully to sustainable development, by providing essential information to users at all levels.