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Status of mapping in the world

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Report by the Secretariat

The present paper contains the report on the status of mapping in the world, prepared pursuant to the resolution entitled “New study on the status of mapping by country and region”, adopted by the ninth United Nations Regional Cartographic Conference for the Americas, held in New York from 10 to 14 August 2009 (see E/CONF.99/3, chap. VI.B). A background paper was prepared by the International Society for Photogrammetry and Remote Sensing and presented to the Committee of Experts on Global Geospatial Information Management at its second session, held in August 2012 (see E/C.20/2012/8/Add.1). In its background paper, the International Society discusses the survey-based study that has been carried out with its support and that involved all the national geospatial information authorities in the world. The report sets out the main objective of the study, the responses collected from countries and the main findings on national mapping activities. It is supported by the background paper, which also provides a complete data analysis of the key trends, issues and gaps in the status of mapping and geospatial information. The information collected will be used to develop country profiles, good practices and lessons learned in the collection and use of geospatial data through the geospatial information knowledge base. The Committee of Experts is invited to take note of the report and to express its views on the way forward, including by repeating the profiling of the status of mapping in the world; integrating the results with the data analysis obtained from the Committee of Experts questionnaire on the status of geospatial information management; and considering such an activity as an effective tool to monitor progress towards the development of a road map for the work of the Committee.

* E/C.20/2013/1

I. Introduction

1. The Ninth United Nations Regional Cartographic Conference for the Americas, held in New York in August 2009, adopted a resolution (3/IX) tasking the United Nations to prepare a study on the status of mapping in the world, to be carried out in consideration of national geospatial information/mapping authorities, and other institutions active in the field of geospatial information as well as the private sector¹.

2. The International Society for Photogrammetry and Remote Sensing (ISPRS) offered its technical support to the UN-GGIM Secretariat for the conduct of this survey and the related study. A survey-based study has been carried out, involving all official national geospatial information authorities in the world. A preliminary progress report has been presented at the second session of the Committee of Experts on Global Geospatial Information Management, held in New York in August 2012, and a second progress report was presented at the Second High Level Forum on GGIM, held in Doha, Qatar in February 2013. The progress reports provided the main content of the questionnaire, the status of the responses as of the end of December 2012, the results of the analysis of each question illustrated by maps, and the timeline of the completion of data analysis and dissemination.

3. The technical background report constitutes the final account of the survey-based study, outlines the major findings that take stock of the current status of mapping in the world and the future activities to be carried out to maintain a regular overview on this status of mapping in the world. In addition, the Secretariat has taken note of the recommendation in collaborating with the International Hydrographic Organization (IHO) to receive status reports on hydrography and mapping on the world's seas, oceans and coastal waters and invited the IHO to report separately on the topic of "Critical issues relating to the integration of land and marine geospatial information" (see E/C.20/2013/10 in this session).

4. The Committee of Experts is invited to take note of the report and to express its views on the way forward, including by repeating the profiling of the status of mapping in the world; integrating the results with the data analysis obtained from the Committee of Experts questionnaire on the status of geospatial information management; and considering such an activity as an effective tool to monitor progress towards the development of a road map for the work of the Committee.

II. Major findings

5. The results of the analysis concern 91 responses (from 90 UN Member States and 1 from Northern Ireland) that have been received as of the end of May 2013. Some of the countries have been contacted for further clarification and/or completion of their responses. The full details are available in the technical background document, prepared by ISPRS, from which this report draws some general findings:

- (a) **National topographic mapping coverage:** Most countries responded to the questions concerning the extent of existing geospatial data or map coverage at various scale ranges; the current age of existing map data; the restrictions imposed on map data distribution; the sale of maps approach (with cost or

¹ "Recommends that the United Nations conduct, within available resources, a new study of the status of mapping by country and region throughout the world. The study should take into consideration official national mapping agencies, other institutions, and the private sector, including both the status of technological and legal issues pertaining to geospatial data" (See Report of the Conference, E/CONF.99/3).

free); the strategy and methodology for updating maps; and the in-house mapping capabilities and/or outsourcing operations.

While countries have very good national coverage at small and medium scales, the situation appears quite different for large scale map coverage (1:1000 and 1:5000) where the information is not fully provided. This is due mostly to the fact that for some countries, large scale maps of urban areas are not under the responsibility or mandate of the national geospatial information authorities, but with other governmental organizations such as local governments and municipalities. Only 5 countries offer paper maps for free. In 65 countries, paper maps are accessible without restrictions, while 21 countries have restrictions on paper maps for the general public. National geospatial information authorities of 50 countries lead their own in-house mapping operations, while 12 countries practice outsourcing and 26 countries combine in-house operations with outsourcing. Most of the countries (76) update their maps on a regular basis, but 15 have no identified updating programmes in place. Thirty three countries use imagery (photo or satellite) supported by field surveys for their updating methodology, while 23 countries combine photogrammetry with field surveys. Only 9 countries use crowd-sourcing combined with other methods for updating.

- (b) **National imagery acquisition:** With regard to national imagery acquisition, 55 countries have a national aerial photography programme, while 33 do not. Forty nine countries use digital imagery only, while 11 countries still use only traditional film imagery. Seventy seven countries include the use of satellite imagery for their mapping programme while 11 countries do not. Almost all countries (80) use ortho-photo methods for map updates, reflecting the usefulness of this technology to bridge the time temporal gap between map updates. Two thirds of the countries (64) have established their national digital elevation model (DEM), and about half of the countries (almost all of them from the developed countries) use radar and/or lidar imagery.
- (c) **National surveying and cadastral coverage:** With regard to cadastral activities, less than half (42) of national geospatial information authorities have any cadastral and/or land titling responsibilities. However, 72 countries have licensed surveyors for property surveys (while 15 countries do not), and national cadastral map coverage is available in 58 countries (but not in 27 countries). A substantial number of countries (74) indicated that their cadastral maps are based on geodetic control, while only 8 countries indicated that they are not. In 61 countries property boundaries are monumented in the field, while in 20 countries they are not. Cadastral/property maps are updated in 68 countries via transaction procedures, while in 23 countries the updates are not linked to transactions.
- (d) **Organization:** With regard to the institutional and organizational arrangements, 79 of the national geospatial information authorities indicated that they have a legal or regulatory status, 5 countries do not and the remaining countries have not provided information. Topographic mapping is nationally funded in 78 countries, but not in 6 countries. Digital map data supply is more increasingly being provided, and is exceeding that of paper map products, even in developing countries. In general, online delivery of map data is still confined to developed countries. As per mapping capacities, the gap in the number of staff engaged in mapping is still considerable between the developed and the developing countries. In the latter, it is clear that available skilled resources are still a significant challenge. All countries

archive their map data in paper or digital form, among them 37 countries use digital storage and 39 countries use various archiving methods (15 have not indicated whether they are using digital storage or not).

6. In terms of the number of responses from the various regions, Europe has provided 36 responses, followed by the Americas (15), Africa (20), and by Asia and the Pacific (19). The responses cover only about 50% of the global land areas, and without the coverage of the ocean areas which constitute 2/3 of the globe. Another observation related to the questionnaire itself, is that the proposed 8 categories of the scales of mapping are not used by all countries that responded, making it difficult to compare global map coverage at each of the scales.

7. The background paper has focused on descriptive statistics of those countries which have responded. The Secretariat would like to inform the Committee that there is a need for further analysis of the results collected, particularly in looking into a regional profiling or identifying the gaps where the activities of the Committee of Experts can be targeted, and that such monitoring should be continued on a periodic basis.

III. Future Activities

8. The survey has captured the responses of 90 Member States and provided an overview on the status of mapping in the world. The results of the survey-based study are planned to be included into the global geospatial information management knowledge base, hosted by the Secretariat, and to be enriched by additional responses to be received from Member States.

9. The information collected through this survey will be combined with information captured from the two other UN-GGIM questionnaires on the status of geodetic information management and the status of national geospatial information management and systems, in order to compile good practices and lessons learned in the dissemination and use of fundamental geospatial data. The aim is to develop a country profile which will provide indicators and a benchmark for global geospatial information management, inform the types and level of support that may be needed by Member States, serve as a measure for the Committee's progress and assist in shaping the strategic direction for the work of the Committee of Experts and related working groups.

10. The Committee of Experts is invited to consider proceeding with a periodic update of the status of mapping in the world to monitor the progress of the Member States in the field of mapping (an online approach would be considered to shorten the periodicity of the questionnaire). Further, the ISPRS has recently established a new working group within its Technical Commission IV (on Geospatial Databases and Location Based Services) to analyze the status of mapping as a sustainable and ongoing effort. The UN-GGIM Secretariat will continue its collaboration with ISPRS in order to proceed with a thorough analysis of the data collected, and would like to invite other entities to review the findings in more detail. This further data analysis, combined with the results obtained from both the analysis of the questionnaires on the geodetic framework and the status of geospatial information management, will provide a more comprehensive picture of the key trends, issues and gaps in the status of mapping and geospatial information in the world. The Committee of Experts is invited to take note of the report.