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STANDARDIZATION OF MAP SPECIFICATIONS

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Introduction

In this article, an attempt is made to discuss actions already taken by the United Nations Economic Commission for Africa, as well as those envisaged, towards the standardization of specifications for selected topographical map series in Africa. It is worth the while acknowledging at this early stage, the support given to the Commission by other institutions in Africa in its endeavour to standardize specifications for topographical maps.

Background

Fundamentally, the essence of standardizing specifications for topographical maps is to bring together into homogeneity and in conformity with the established standards in surveying and map production, and in logical form, those elements that constitute topographical reference documents. Here attention is focused on uniformity in the general presentation of detail within international requirements. They refer essentially to cartographic data such as: Ellipsoid, projection system, sheetlines, division, map scale, conventional signs and toponymy transcription. The principal objective in standardizing maps is to enhance their usefulness of application, in regional planning and in executing development projects that span across frontiers.

For whatever the reason, if mapping remains unmatched to economic expansion, it may not be possible to produce maps of significant value in light of the ever growing need for new types of maps needed to support socio-economic evolution. Whilst, we recognize the importance of maps in responding to national requirements, we cannot overlook the obligation to address the issue of cartographic standardization in order to:

- foster international and regional cooperation among countries in Africa with a view to producing topographical maps that would respond to common interests and facilitate the development of African geo-scientific cartography;
- ensure that African maps extended their usefulness beyond international borders, and that they play their rightful role in regional planning operations.

Scope

It has to be acknowledged that not always are we in a position to adopt truly uniform norms for the entire African continent, but at least standardizing specifications for basic topographic maps should be regarded as a goal to achieve. The objective is to bridge the gap between specialised mapping institutions through their participation in defining common specifications which they themselves would adopt and which would meet needs at national, regional and continental levels. It was

expected that soon after the objectives were achieved, mapping agencies would embark upon converting all existing map series to the new set of specifications at the same time taking the advantage to revise old maps. For Africa to achieve that goal, would mean a major breakthrough in expanding usage of basic maps, inter-country cooperation, and enabling systematic regional planning operations for timely continental economic integration.

This subject if viewed from another angle, we find the Economic Commission for Africa together with other United Nations agencies and non-governmental organisations engaged in studies concerning the continent. Most studies are of a character such as to cover groups of countries or the entire African continent. In this category, we find studies to cover international communication systems, cross border trade, hydrogeological features, utilization of international river waters, to name but a few. Suffice it to say most studies on projects require the use of topographical maps as reference material in planning, then as permanent records. However, when it comes to matching maps along international boundaries, in the case where national particularism to basic topo map specifications is adopted, the task of reconciling detail across frontiers is made more difficult. It is at this stage the need to obtain continentally acceptable standardized specifications becomes more evident.

Maps commonly used in inter-country or continental projects usually range in scales from 1:50,000 through 1:5,000,000. The 1:50,000 topographical map, as in nearly all cases, is constructed from aerial photographs, hence it forms the national basic map series. As a matter of fact, subsequent smaller scale topographical map series derive from it. In the recent past there has come on the scene photo-maps constructed by combining linework and aerial photographic or satellite images over a given area on the ground. A closer look at a set of maps of countries with unrelated political background, reveals that the symbols on these maps are peculiar or relative to a particular country. Therefore, that denotes the map was constructed in accordance with the specifications adopted by the country concerned or groups of countries with a geo-politic affinity.

The first attempt

Looking back, we find that the first attempt to standardize map specifications was made as far back as 1949 when the African Scientific Conference was held in Johannesburg, South Africa. The Conference was followed by a meeting of specialist in surveying and mapping at Bukavu in Zaire (then Congo Belge) in 1953, with a view of studying the subject further. The two meetings simply managed to narrow down the differences existing in specific survey and mapping practices; but did not completely achieve all the objectives set for a universal standardization: not even among the countries that were represented. Nevertheless, colonial governments individually had a go at standardization for their respective territories.

The ECA exercise

In later years, the United Nations established the Regional Cartographic Conference for Africa to look into cartographic matters of common concern to member States in the continent. Here we find the question of standardizing specifications being revived at the first conference in 1963. The same issue was raised at every conference until when the fifth Conference held at Cairo in 1983 mandated the ECA secretariat and the African Association of Cartography (AAC) to join hands and study the matter taking appropriate actions at continental level. Outwardly, the steps taken by ECA after the Cairo Conference marks the beginning of a long journey toward bringing African map series to common specifications. In reality, ECA started assembling materials for an attempt on the exercise as far back as 1970. However, the move was halted in 1971 to make way for other urgent projects. In order to implement the directives of the fifth Conference and as a first step, it meant to review the material that had been put away so as to determine which ones could be of value for the new attempt.

In 1985, ECA convened the meeting of a group of experts to work out a set of standardized symbols for approval by the sixth Conference. The step being taken was to implement resolution 3(V) of the fifth Conference. In the course of preparing for the meeting, the secretariats of the ECA and the AAC, prepared a working document which contained two parts.

The first part covered:

- the fundamentals of mathematical systems for an African cartography; in which plane and ellipsoidal representation systems and projections in use in Africa were dealt with in detail.

The second part was devoted to:

- conventional signs; examining basic principles in map design, comparison between signs used by different countries in Africa, and other aspects of cartography requiring standardization.

Since a related subject to the first part mentioned above has been dealt with elsewhere in this bulletin when discussing the common geodetic datum for Africa, in this article we will retrace the actions taken regarding the second part of that working document. Having discussed the breakdown of map sheets starting from the international one-degree sheet square at the scale of 1:200,000, to the scale of 1:50,000, as standard basic topo map series, the experts examined the entire assembly of sheets of patchwork of symbols extracted from several country map sheets representing different specifications in use at the time. The intention was to demonstrate the negative diversity and to justify the need to standardize.

The meeting had before it separate sets of work sheets for map series at 1:50,000, 1:200,000 and 1:250,000. Each set carried a selection of symbols and conventional signs considered close enough to what could be applicable universally. In presenting the symbols on the sheets, care was taken to ensure wide representation of regional interests and as far as possible to accommodate as many symbols as considered reasonable to represent diversities in geo-cultural, religious, levels in economic development, and other diversities in Africa.

The task in hand being what it was, the experts were only able to deal with symbols and conventional signs for the 1:50,000 series. The report of the meeting recommended continuation of efforts and requested ECA to organise another meeting so as to deal with the remaining aspects of the task. The task included working on a similar exercise for the 1:200,000 and or 1:250,000 series. Furthermore, the experts considered that marginal data could form part of the standardization exercise. The following were the items under this category:

- Sheet name and title;
- Sheet reference number system;
- Edition;
- Name and number of series;
- Scale: statement, representative fraction, and kind of scale bar;
- Index to adjoining sheets;
- Reference panel (legend);
- Conversion table: altitude, and altitude tints;
- Sheet history (construction);
- Meridian convergence and magnetic declination;
- Ellipsoid of reference, geodetic system, projection used and origin;
- Geographic sheet corners;
- Method of reproduction: (indication of survey method of different parts of the map;
- Abbreviation and glossary; and
- List of abbreviations

The elements listed above are widely represented according to specific traditions in different places on the map.

With regard to spelling of geographical names and the abbreviation code, these questions were referred to linguistic divisions in Africa who were urged to submit them to the sixth Conference in a composite report.

The experts acknowledged the fact that the standardization of specifications of basic topographic maps is a valuable step towards the development of cartography in Africa which would open the way to a geo-scientific cartography necessary for resources inventory in accordance with various United Nations development strategies for economic recovery and accelerated socio-economic development. To realize this objective in itself represents the actual sharing of responsibilities by African institutions, and

being an expression of the willingness to forge ahead with intra-African cooperation. Cartographic contribution in this direction is through producing coherent and comprehensible maps for any potential users.

Soon after the expert group meeting, ECA jointly with AAC assembled the adopted symbols which were eventually fair drawn and reproduced in sufficient copies by the Algerian national mapping agency: Institut National de Cartographie (INC). Copies of the sheet containing examples of symbols and some conventional signs for the 1:50,000 series were presented and carefully examined at the sixth United Nations Regional Cartographic Conference for Africa held at Addis Ababa in conjunction with the commemorative activities for the "Year of Cartography in Africa" (YCA-86).

The Conference as a continental authority on this matter, recognized that an expert group had thoroughly studied the need to standardize specifications for topographical maps at basic scales, and that it had established a set of symbols which were recommended for application in Africa. Operative paragraphs of resolution 9 (VI) of the sixth conference read as follows:

"1. Endorses the principle for the adoption of uniform standardized specification for topographical maps in Africa at the scale of 1:50,000;

2. Requests the Economic Commission for Africa inclose collaboration with the African Association of Cartography to publish a set of approved specifications as amended and to send the final text and specimen to all cartographic institutions of member States and to known map publishers outside Africa;

3. Strongly recommends that all topographical map series at the scale of 1:50,000 should be published using the symbols adopted by the Conference for the "Standardized Specifications for Africa" (SSA);

4. Further requests the Economic Commission for Africa to convene a meeting of Experts for the purpose of standardizing specifications in respect of topographical maps at other scales, establish the presentation of marginal data, colour schemes, appropriate map projections, and to review the comments received from publishers who might have attempted using the adopted specifications;

5. Accepts the offer of Morocco and the Regional Centre for Services in Surveying, Mapping and Remote Sensing to publish a mock map based on the adopted specifications;

6. Requests the Government of Morocco and other African institution to work jointly with the Economic Commission for Africa and the African Association of Cartography in the early publication of sets of maps according to the adopted specifications;

7. Invites all member States to report to the seventh Conference on progress in implementing aspects of this resolution".

The approach

The resolution outlined modalities for achieving standardized specifications; but we will now see what happened after that. Immediately after the Conference, ECA and AAC worked in cooperation with the Government of Morocco, conceived a mock map based on the adopted symbols and conventional signs at the same time applying the standard colour schemes internationally set for specific features. Eventually, the map was produced by the Government of Morocco according to operative paragraphs 5 and 6 of the resolution cited above. By the time the seventh Conference was held, no country or institution was in a position to report on any progress in applying the approved "Standardized Specifications for Africa" (SSA).

It might be worth recalling that in 1988, the African Association of Cartography and the Africa Remote Sensing Council were merged hence the birth of the African Organisation for Cartography and Remote Sensing (AOCRS). As one of its roles, the Organisation has the task of coordinating and harmonizing cartographic and remote sensing activities among member States. Here member states refers to those members of the Organisation. So we find two institutions namely: ECA and AOCRS as responsible for playing the lead role in urging all countries in Africa to apply the SSA specifications.

What appears above is but the first step along the difficult road to complete standardization. While we talk about standardization of specifications, we have to keep in view other aspects to standardize on the map. There is the standardization of geographical names for example. In order to facilitate work in this area, the United Nations has provided an international forum, United Nations Conference for the Standardization of Geographical Names. The United Nations periodically convenes the Conference as well as the meetings of the Group of Experts on Geographical Names. It is the duty of this Group to study all aspects concerning linguistic problems, advise on modalities for standardization and recommends appropriate action to be taken by the Conference. The Conference prescribes rules of implementing decisions concerning methods of naming features, establishing linguistic divisions for the purpose of better coordination and assisting countries in setting up national geographical names committees. For as much as without these national committees, it is feared there will continue to appear on maps different orthography of the toponymy on adjoining map sheets along frontiers.

Conclusion

The advent of geographic information systems and computer aided cartography does not signify the end of problems on topographic mapping. In fact they add demand and urgency to efforts towards standardization. We have seen the impact of large format space photography along side satellite imagery covering large areas of the earth's surface. Coverage obtained from any of these sources goes beyond and sometimes across territories. When we have to employ the data acquired by these methods in handling regional projects or programmes, this is when we need base maps, fully standardized, where geographical names are reliable and not instrumental in causing political squabbles among neighbour states.

Having seen the sequence of things, Africa cannot afford to continue with multiple specifications. Nor does it have to wait till when someone will come from outside the continent to design specifications for Africa. It is acknowledged that there are African countries with abilities to produce a full software package for the symbols adopted for use in mapping under the SSA. If that be the case then let African get down to designing a programme to give all the symbols needed for the new specification. There is need, therefore to bring together African computer specialists in cartographic matters to study this issue, and take up the challenge to prove that it can be done and on the continent. Having gone over that hurdle, there will be the question of mass production of software packages containing the symbols. In the case of traditional map drawing, consideration will be given to modalities for mass production and distribution of the symbols. This new dimension will have to be added to the list of points to be studied in order to arrive at complete standardization of specifications for topographical maps in Africa..