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ECONOMIC COMMISSION FOR AFRICA

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Item 4 of provisional Agenda

CARTOGRAPHIC INVENTORY OF BASIC SURVEY DATA

IN AFRICA

(Report submitted by the secretariat)

INTRODUCTION

1. In 1974 the International Development Research Centre (IDRC) approved a grant for the United Nations for use by the UN Economic Commission for Africa to enable ECA to carry out a cartographic inventory for Africa with the following objectives:

(a) To make an inventory, on a country-by-country basis, of the extent of the existing:

- (i) topographic mapping,
- (ii) topical mapping,
- (iii) aerial photographic records,
- (iv) geodetic triangulation and levelling records, and
- (v) gravity measurements and geophysical surveys;

(b) To publish the inventory in a series of indexed maps of the continent, thus identifying the cartographic work that still remains to be done; and

(c) To analyse the existing material, to determine the methods and specifications adopted by the different countries, and to recommend an optimum set of specifications for future cartographic work in Africa.

LAUNCHING THE PROJECT AND DESCRIPTION OF THE INDEX MAPS OF THE INVENTORY

2. The project was effectively launched in April 1976. The modalities of reaching the objectives gradually emerged from considerations of the basic requirements of the planning of development schemes, particularly in regard to the exploration and use of the natural resources 1/. It was concluded that the continent, without the Republic of South Africa, would be covered in twelve overlapping blocks (Fig. 1). For each block 13 index maps would be prepared, showing:

- I. Aerial photography at 1/25 000 and larger scales;
- II. Aerial photography at scales smaller than 1/25 000;
- III. Triangulation, traverses, astro points and Doppler satellite stations;
- IV. Levelling;
- V. Topographic surveys at 1/50 000 and larger scales;
- VI. Topographic surveys at scales smaller than 1/50 000;
- VII. Geological and hydrogeological surveys;
- VIII. Water courses and water holes;
- IX. Hydrological station networks;
- X. Meteorological and agrometeorological stations;
- XI. Surveys of land use and land potential;
- XII. Geophysical surveys using gravimetric, seismic and electrical methods and regions prospected for groundwater and hydrocarbons;
- XIII. Geophysical surveys using magnetic, electromagnetic and radiometric methods, geochemical surveys and areas prospected for minerals.

3. All the index maps are at the uniform scale of 1/4 000 000 and can be matched with the Michelin Road Map of the region at this scale. The location of the surveys shown on the index maps and the access to their areas can thus be easily identified.

4. Each survey is delineated on the appropriate index map. For each survey the following information appears on the face of the map:

- (i) The type of survey and the scale of the resulting map (if one has been made);
- (ii) The date;
- (iii) The agency which carried out the survey, and
- (iv) The agency for which the survey was carried out. (iii) and/or (iv) may be dropped out if the agency involved is governmental.

5. For the notation, a system has been developed involving only the letters of the alphabet 1/. Capital letters indicate observation stations. Small letters, single or in pairs, indicate the type of survey. Instrument carriers are represented by inverted capital letters or mirror images of capital letters. The representation is unique throughout. For example, on the index maps showing geophysical surveys.

gr, si/69/X/Y Reads gravimetric and seismic surveys made in 1969 by Agency X for Agency Y.

1000bg/69/X Reads Bouguer anomaly map at the scale of 1/1 000 000 made in 1969 by Agency X.

50 V 760 ma, ra/73/X/Y Reads airborne magnetic and radiometric surveys made in 1973 by Agency X for Agency Y; for this survey the terrain clearance was 760 metres and the results were shown on maps at the scale of 1/50 000.

The printing on translucent material also allows easy collation of the coverage of related surveys, e.g. geological and geophysical surveys. No multicolour printing is needed. However, each index map will in the final printing be assigned a separate colour.

6. An examination of the draft printings of the atlases E and G exhibited at this Conference will show the extent to which this multi-disciplinary exercise fulfils the need to provide basic data to the national and international agencies involved in the planning and execution of development projects in various sectors. For instance, the agencies interested in water resources management will find in the atlas maps based on the most reliable available information showing the water courses and the location of the water holes, the type and location of the hydrological stations, the type and location of the meteorological and agrometeorological stations, the areas covered by hydrogeological surveys together with basic data on these surveys, the distribution of piezometric stations, and the levelling networks in the region. The planners of land resources development will find, in addition, a map indexing land use and land potential surveys, including soil surveys, irrigability studies, forestry inventories, etc. For mineral resources prospecting and development, the atlases offer the procured data on ground and airborne geophysical surveys, geochemical surveys and the coverage of geological surveys. The maps showing the extent of geodetic control relate directly to the accuracy of all location maps and bear on studies of crustal movements. The maps recording aerial photographic missions should be useful to everyone and, in particular, to environmentalists who will find there information on the photographic coverage that can reveal environmental changes due to development (or the lack of it). To all users of imagery obtained by remote sensing devices the atlases will provide indispensable information on the existing ground truth data. Needless to say that the "Explanatory Notes" of the atlases will contain a bibliography to guide researchers wishing to go into details regarding any particular survey to the appropriate references. Eight thousand bibliographic items have been entered on cards since the inception of the project.

7. It is however true that no inventory is ever complete. Here again we find advantages of the concise legend, the use of line work or thin strips of zip-a-tone instead of the more customary pattern patches, the monochrome printing on translucent material and the screw post binding. The user of an atlas can readily enter corrections and up-date his copy; and it should be possible to work out some arrangement to channel such corrections and additions to ECA at regular intervals so as to allow ECA to publish addenda on transparent material of the same format.

PROGRESS OF PREPARATION ON THE ATLASES

8. Twenty-eight countries have so far been visited by the geodetic specialist in charge of the project for the procurement of data and consultations (Fig. 2). Over 500 government officials and UN and foreign experts were interviewed in the course of these visits. Useful contacts were established and discussions held with personnel from a number of overseas organizations which operated or have been operating in Africa. In addition to the supply of relevant information these contacts have helped in sorting out various discordances in the data.

9. It appears from the volume of work so far accomplished that the full set of twelve atlases may now be expected to be published by the end of 1981, assuming that funds will become available (para. 13 below).

REACTION OF REGIONAL AND INTERNATIONAL CONFERENCES

10. Since 1976 the inventory has been the subject of resolutions of the Council of the African Association of Cartography, the International Gravity Workshop of the International Union of Geodesy and Geophysics and the Conference of Ministers of the Economic Commission for Africa.

11. The Council of the African Association of Cartography, which met in November 1977 in Algiers, noted the good progress of the inventory and urged ECA to complete it quickly and to make its results available to the Member States through AAC which would use them to promote the cartographic activities in these States (Resolution No.1).

12. The International Gravity workshop, which was convened in November 1978 in Nairobi, recognized the need for the preparation of a cartographic inventory of basic survey data in connexion with the planning of national and regional development of natural resources, expressed its appreciation of the programme initiated and being implemented by ECA and recommended (a) that all African governments continue to contribute to this programme to facilitate its early completion; (b) that ECA takes the necessary action to ensure the continuous up-dating of the inventory and (c) that other regions consider adopting similar programme (Resolution No.4).

13. The Conference of Ministers of ECA, which met in March 1979 in Rabat, noted the completion of the first Atlas and the concise and effective methods by which this Atlas rendered the existing data, focussed attention on the limitations and gaps in existing knowledge and provided collated data for intelligent planning of investigations so as to avoid wasteful duplication of efforts, commended ECA for initiating this programme and the International Development Research Centre for the foresight in providing financial support of its implementation and recommended (a) that the Executive Secretary of ECA takes the necessary action to assure adequate funds for the completion of the preparation of the twelve atlases of the inventory which cover Africa and the printing of a sufficient number of copies to meet the expected demand - by seeking a supplementary grant from IDRC and/or other sources including the UNDP; (b) that ECA includes in its regular budget submissions posts for professional and supporting staff, as stipulated in the original agreement with IDRC, to ensure the regular revision of the inventory's index maps and the publication at short time intervals of suitable addenda, and (c) that ECA in consultation with the competent international regional and national bodies, arranges for the implementation of Phase II of the programme, in particular the detailed analysis of the inventory's data, the drafting of specifications for future activities in the various disciplines covered by the inventory, and the preparation of preliminary adjustments on unified basis of geodetic operations /Resolution 338(XIV)/.

ACTIONS TAKEN TO ENSURE THE COMPLETION OF THE INVENTORY'S ATLASES AND TO EMBARK ON PHASE II OF THE PROGRAMME

14. The following actions have been taken to implement the above-mentioned recommendations:

(a) IDRC has been approached to provide a supplementary grant to complete preparation and publication of the inventory's atlases and their explanatory notes. The response of IDRC is awaited.

(b) Posts were proposed in the regular budget submission and the request will be followed up to ensure the regular revision of the atlases.

(c) Initial steps have been taken towards the implementation of Phase II in regard to geodetic work. Liaison has been well-established with the International Union of Geodesy and Geophysics and its Associations and Commissions. An outstanding result of their collaboration was the convening of the International Gravity Workshop last year which dealt with problems of specifications, with special reference to Africa's needs and work conditions 2/. Two recent studies of problems of the analysis and the specifications of levelling and triangulation have been published recently in the Journal of the International Association of Geodesy 3/ 4/. Another paper 5/ surveys what appears in the light of some findings of the inventory to be main fields in which geodetic efforts ought to be directed. Studies are in progress on the real value of satellite geodesy for the adjustment and extension of geodetic network in Africa and the search for a geodetic datum for the continent and the ways of monitoring crustal movements in it.

(d) A tentative work plan is under preparation to involve specialists from African universities, technical departments and regional centres in concerted efforts to carry out specific tasks in all the topics covered by the inventory.

OUTLOOK

15. It appears from this review of the progress of the Cartographic Inventory for Africa Project that: (a) there is a good chance to have the 12 atlases covering the continent published by the end of 1981 and (b) a plan for the implementation of Phase II along the lines recommended by the Conference of Ministers is in the making.

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