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STATISTICAL COMMISSION and ECONOMIC COMMISSION FOR EUROPE

CONFERENCE OF EUROPEAN STATISTICIANS

Forty-fourth plenary session
(Paris, 11-13 June 1996)

APRIL 1996 WORK SESSION ON GEOGRAPHIC INFORMATION SYSTEMS

Note prepared by the secretariat

I. INTRODUCTION

1. The work session on Geographic Information Systems was held in Arlington, Virginia, United States, from 15-18 April 1996. It was attended by participants from Canada, Czech Republic, Finland, Germany, Israel, Italy, Netherlands, Norway, Russian Federation, Sweden, Switzerland, Turkey, United Kingdom and the United States. The European Union was represented by Eurostat. A representative of the United Nations Food and Agriculture Organization (FAO) was also present.

2. The opening address was delivered by Mrs. Martha Farnsworth Riche, Director of the US Bureau of the Census.

3. The provisional agenda was adopted.

4. Mrs. M. Farnsworth Riche (USA) was elected Chair, Mr. D. Meuldijk (Netherlands) and Mr. J. Sobel (USA) were elected Vice-Chairs.

5. The following substantive topics were discussed at the meeting:

(a) National reports;

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[1] Due to limited capacity in the translation services of the United Nations Office at Geneva (UNOG), this document cannot be translated.

(b) Standardization related to statistical GIS;

(c) Methodological aspects of GIS;

(d) Marketing issues related to GIS;

(e) Data collection processes.

6. The topics were considered on the basis of papers and/or demonstrations prepared by Canada, Czech Republic, Finland, Germany, Hungary, Israel, Netherlands, Norway, Romania, Russia, Sweden, Switzerland, Turkey, United Kingdom, United States and Eurostat.

II. FUTURE WORK

7. When discussing future work, the participants emphasized the usefulness of having value-added output from the work being undertaken in the framework of the Conferences' programme of work. The two representatives from the transition countries especially expressed their desire to benefit more efficiently from the experiences gained by more developed countries in implementing GIS. The possibility was discussed to prepare GIS implementation guidelines that would enable the less developed countries to take advantage of the experiences acquired in this field.

8. In order to get a better overview of the state-of-the-art of GIS in individual countries, the Work Session recommended preparing the national reports in future in a more concise and uniform manner. For this purpose, the Steering Group (Canada, Netherlands and USA) volunteered to prepare a proposal for the unified format of national reports before the next meeting.

9. The Work Session considered the use of GIS for dissemination of statistical data, including the issues addressing marketing, pricing policies, cartography and relations with mapping agencies, to be an important topic for its future discussion. In this connection, the role of Internet and the need for relevant GIS software was especially highlighted.

10. In addition, bearing in mind the merging of topics dealing with geography and regional statistics in the programme of Work of the Conference of European Statisticians to form program element 2.6 “Geographical and regional data” of Sub-programme 2 “Technical infrastructure and other cross-cutting issues”, special attention should be drawn in future to the relations of GIS and regional statistics on both subnational and supranational levels.

11. The Work Session recommended that there should be a further work session on this subject in 1997/98 and that the following should be the agenda: (i) national reports on progress in the implementation of GIS, (ii) use of GIS for statistical analysis and regional statistics, (iii) evaluation of experiences acquired in implementing GIS, and (iv) use of GIS for dissemination of statistical data.

8. The other conclusions which the participants reached at the meeting on the substantive items of the agenda are summarized (in English only) in the Annex.

ANNEX
Other conclusions reached at the work session on the substantive items of the agenda

a) NATIONAL REPORTS

Documentation: Reports prepared by Canada, Czech Republic, Finland, Germany, Hungary, Israel, the Netherlands, Norway, Romania, Russian Federation, Sweden, Switzerland, Turkey, United Kingdom, Eurostat.

1. Countries reported significant progress achieved in the design and implementation of GIS applications. At the time of the first Work Session (Ottawa, 1993) GIS technology was still in its infancy in many countries. Today, GIS is an integral part of the statistical production system in most national statistical offices.

2. The Work Session noted that many transition countries are benefitting greatly from the exchange of knowledge and experiences with more developed countries during the previous sessions. This significantly accelerated progress in this area and enabled them to avoid many mistakes in the preparation and implementation of GIS applications.

3. The Work Session was informed that a user-oriented approach was a driving force in many reported GIS applications. National statistical offices are placing emphasis on the examination of internal and external users needs. In this connection many countries reported GIS as being an important instrument for marketing statistical data. It was mentioned, however, that although GIS creates more attractive possibilities for users, the principles of pricing are still not sufficiently solved. This calls for more common action and policies in this area in the future.

4. Many participants highlighted the integrating role of GIS. This was noted especially in connection with the use of different kinds of internal and external registers as well as administrative data in GIS applications. Very often, however, different institutions are responsible for individual registers which complicates the integration process. The opinion was expressed that a more centralized approach at the horizontal governmental level may reduce this problem.

5. Many countries reported the need for cheap and easy access to digital geographic information and also the need to be allowed to disseminate this information together with statistical information. It was recognized that this may require the creation of an appropriate legal basis.

6. General opinion was expressed that the implementation of standards related to GIS is highly desirable. In this connection international institutions and organizations play an important role since it is difficult and very often even impossible for the countries to solve this situation themselves, and because there is an obvious added value if standards are internationally accepted.

7. It was reported that many of the most frequently implemented applications of GIS are related to the population and housing census. GIS

technology implemented in a census produces more accurate and cost-effective results, and more useful products for users. The Work Session noted that many countries reported the use of advanced GIS applications in the preparation and conduct of their Census 2000.

8. Reported GIS applications clearly demonstrated the impact of GIS on the organizational structure of national statistical offices. It influences the statistical production process as well as the inner organization of statistical agencies and their relations to other governmental bodies.

9. The participants noted the information from Eurostat about the ongoing project on integration of geographical boundary information and regional statistical data at the European Union level. The integration of the project Geographic Information System of the Commission of the European Union (GISCO) and the project European Infra Regional Information System (SIRE) was discussed. Current problematic phenomena such as official surface area, coastal borders and inland water bodies require a homogeneous treatment in both administrative and statistical environments. In order to determine solutions for these issues Eurostat is planning a first joint meeting with National Statistical Institutes and National Mapping Agencies in November 1996.

b) STANDARDIZATION RELATED TO STATISTICAL GIS

Documentation: Working Papers by Canada, Finland, Netherlands and United States.

10. The presentations on this topic revealed that regardless of the differences in the level of GIS development in countries, one of the main problems in statistical GIS is how to make existing data available to a wide variety of users. One possible solution is to integrate existing data, another is to establish advanced standards and then to ensure that subsequent activities reflect those standards. Both these approaches indicate that without standardization at the front or back end, data are less useful, and sometimes not useful at all. The need for standards clearly illustrates the role of GIS as an integration instrument. In many cases Government initiatives may be required to establish the standards, because a statistical agency might not have the power to do so on its own.

11. The Work Session noted the presentation on the work done by ISO TC-211, the main standardizing body in the area of geomatics standards. However, participants pointed out that the input from individual National Statistical Offices to the work of the technical committee is not sufficient. The Work Session recommended countries to join TC-211 urgently because the lack of coordination with statisticians can significantly jeopardize the attainment of useful standards for statistical purposes.

12. Standardization related to GIS may also include concerns about software, as different software may require different database characteristics. It is to be hoped that the problem of interchangeability of data originating from different GIS software will be solved in the course of time with stabilizing of the GIS products market. There is a need for more widespread software

packages that enable users to convert data from one system to the other. It was also stressed that there is a strong need for open-GIS formats.

13. The participants highlighted that the GIS standards can only be successful if they meet the needs of users. In this respect the feedback from users is highly appreciated.

14. The Work Session pointed out the importance of compatibility between ISO, statistical and other (e.g., open GIS and CEN (Comité Européen de Normalisation)) standards. The concept of Open GIS is concerned not with the structure but with the behaviour of data which depends on how components of standards fit together. Connecting GIS functionality with metadata is an important prerequisite of GIS related data integration.

15. Success in establishing standards is also affected by financial implications. Decisions have to be made whether to support the status quo or to invest in new processes/standards to take advantage of new technologies.

16. The Work Session also discussed the usefulness of creating a centralized clearing house on the national level aiming to make geographical information easily accessible to all potential users. This requires well-defined metadata and other standards to describe the content and characteristics of geospatial data sets. Many participants considered this approach to be an efficient tool for systematic development and use of GIS in statistics.

c) METHODOLOGICAL ASPECTS OF GIS

Documentation: Working Papers by Canada, Netherlands, Sweden, Switzerland, United Kingdom and United States.

17. The presentations showed that, due to diverse applications of GIS, the associated methodological aspects cover a wide range of problems. Amongst these problems the Work Session concentrated on the following core issues: geographical databases (including the street network databases), use of GIS in order to delineate urban/rural areas and as a preparatory tool for censuses, and use of GIS addressing economic issues connected with cartography. It was also recognized that, without a doubt, issues of standardization and harmonization have an absolute importance and relevance in the field of methodology in GIS.

18. The Work Session noted that the use of geographic databases in GIS requires solving methodological problems concerning the creation/expansion and maintenance of databases, including decisions on what data should be included or what basic reference units should be used. One good example of those integrated multipurpose databases was presented in the form of a street network database that can be used for a wide range of GIS applications.

19. Several presentations concentrated on, or noted the use of, GIS for developing and implementing criteria and definitions (urban/rural areas, census preparation, enumeration/tabulation areas). GIS also allows data users to test strategies, develop scenarios, and propose solutions to policy-related issues.

20. The Work Session noted that GIS can be an efficient tool addressing economic issues. It enables the use of demographic, earth science and other data to produce explanations and solutions to different kinds of economic and environmental problems (e.g., flood insurance, crop disaster payments, planning activities in environmental crisis areas).

21. One of the methodological aspects connected to GIS is its usefulness as a tool to ensure data quality, i.e. maintenance of various data layers originating from different external sources without losing the data quality aspect.

22. Many participants also touched on the importance of basic cartography issues in the area of GIS, and the need to have common methodological guidelines, such as the establishment of classes and their representation, to facilitate the comparability and interpretation of data.

d) MARKETING ISSUES RELATED TO GIS

Documentation: Working Papers by Canada, Sweden and USA.

23. The Work Session noted that issues of marketing and pricing of data are the focus of much discussion at the present time. It recognized that most countries are still somewhat uncertain about their marketing policies. There is general agreement that the goal is to maximize the usefulness and use of geographic and statistical information. To achieve this goal some countries focus strongly on dissemination cost recovery and data sales, but most put the emphasis on facilitating easy data access for a wide range of users.

24. The discussion revealed that establishing appropriate prices for geographic data is one of the most difficult tasks in marketing these data. It was noted that recent trends show a significant change in the value of information. The development of technology (such as Internet) is rapidly driving down the price of data. Some participants expressed the view that in future the focus of marketing of geographic and statistical data would be very likely shifted to the delivery of data packages.

25. One of the key marketing issues is the balance between the private and public sectors in the geographic and statistical information market. On the one hand, there is concern about public sector effect on the free operation of the 'information industry'; on the other hand, some delegates questioned whether the secondary distributors actually increase the range of products and user access to data. An additional concern relates to the confidentiality of statistical data. Nevertheless, one of the clear advantages of the private sector is its ability to innovate and update data dissemination tools, and to keep pace with the rapid changes in technology.

26. Discussion on the role of other, non-statistical government institutions indicated that in many cases they feel obliged to provide data in order to promote development in their area of responsibility. The question of the importance of providing access to geographic data for academic purposes was also raised.

27. The Work Session noted that the market mechanism (i.e. charging market prices for products) may still be an effective way to ensure that a statistical agency produces products that are truly useful and in demand. There are examples of successful sales campaigns that have raised revenues and at the same time have provided valuable feedback to statistical agencies about the data requirements of users.

e) DATA COLLECTION PROCESSES

Documentation: Working Papers by Canada and United States.

28. Much of the discussion was concentrated on the preparation of the forthcoming Census 2000 and the possibilities that GIS can offer in supporting census data collection activities. GIS can play an important role in census preparation in order to obtain the most accurate and cost-effective data (e.g. generating maps and lists of addresses, ensuring completeness of coverage). The Work Session noted that some countries intend to reduce census costs by enlarging the use of sampling and estimation to handle non-response. They are also adopting other strategies so that the public reacts and responds more favorably to census activities and data collection. Some countries will base their data collection on registers; in this case geocoding of these registers is an issue.

29. The interrelations between GIS and data collection processes were also discussed. GIS can influence the organization of the data collection process and improve the data quality already at the data input or output stage. However, without the data provided by data collection processes, GIS cannot operate. When considering the role of GIS in the statistical data collection process, it should always be kept in mind that the technology, the geographic infrastructure and the GIS itself are tools to help accomplish the real purpose of the given statistical task.

f) OTHER BUSINESS

30. The Work Session expressed its appreciation to United States and other countries for the preparation of many interesting papers and/or informative demonstrations.

31. The Work Session expressed its gratitude to the U.S. Bureau of the Census for having hosted this meeting and for the excellent organization and working atmosphere. It also expressed its appreciation to discussants and to all authors of papers.