55a18

International Association for Official Statistics

International Statistical Institute

United Nations Economic Commission for Africa

African Statistical Association

IAOS/AFSA/IS.4/07

JOINT IAOS/AFSA CONFERENCE

Addis Ababa, 22-24 May 1995

Managing Development in the 1990s and Beyond: New Trends in Statistics

INVITED SESSION 4:

DATA FOR DIVERSE AREAS; THE GEOGRAPHIC DIMENSION IN DATA

A HEALTH INFORMATION SYSTEM WITH GIS CAPACITY FOR WHO/RWANDA

By

G. SARTORI

WHO/PTC
Addis Ababa

ADDIS ABABA
MAY 1995

A HEALTH INFORMATION SYSTEM WITH GIS CAPACITY FOR WHO/RWANDA

by

G. Sartori, WHO/PTC Addis Ababa

Paper presented at the Joint Conference of the International Association for Official Statistics and the African Statistical Association

22 - 24 May 1995

Addis Ababa, Ethiopia

SUMMARY

The author has been working since 1990 for the World Health Organization Panafrican Training Centre , Addis Ababa Ethiopia, as officer in charge of the Information System Section.

The author's main fields of interest are: data management, hazard and vulnerability analysis and mapping, which requires geographic analysis, mostly performed by PC ArcInfo.

Within his professional activities, he is promoting Geographic Information System methodology by integrating GIS capacities in data base packages, making GIS more friendly to use.

The experience hereby described comes from Rwanda, where the author worked from October 2 to November 2, setting-up the new National Health Information System that includes a GIS component.

The package uses Windows softwares customized by the author, including ESRI ArcView. GIS is only one part of the package, it can be used by computer-illiterate people, and users do not have to know the geographic software in order to produce maps.

Maps are dynamically linked to the data base, therefore the user can access to data from the maps.
Very little training is needed. The author provided 3 hours presentation to personnel from Ministry of Health, WHO and UNICEF, who are using the system at present.

A HEALTH INFORMATION SYSTEM WITH GIS CAPACITY FOR WHO/RWANDA

In October 1994, the World Health Organization, Panafrican Training Centre, assigned the author to Rwanda to assist the Ministry of Health in setting up a new Health Information System. The previous one had been disrupted during the recent war together with many health facilities.

The mission achieved two major objectives:
A new Health Information System was set up and is now run by personnel of the Ministry of Health Rwanda. Reports are printed out and distributed both to the international community, and to health workers. These reports, so far, are the only publication issued on regular basis by a Rwandese institution.

The second achievement is related to the features of the package which was built to this purpose: the software was though and designed for computer-illiterate people, tailored to local needs and skills, and built specifically to accommodate a medical way of thinking.

The result is a very user-friendly tool. At the same time the package offers powerful, fully integrated, functions, including GIS capacity.

A Health Information System can be defined as a network that must:

- ensure a continuous flow of data from health facilities to Ministry of Health Headquarters
- ensure feed-back
- facilitate data processing and analysis by users at all levels.

The data collected are related to different, inter-linked, fields:

- population and environment
- health status and needs
- demand and activities
- resources
- infrastructures
- management.

Due to the nature of the data, geographic and spatial analysis is vital to provide decision makers basic information.

The new Rwanda HIS has two categories of users: the personnel in charge of data entry - mostly basic health workers-

and medical doctors, who should detect anomalies in epidemiological patterns, and plan for appropriate response. Thus, the software must provide adequate analysis capacity, taking in account and inter-linking:

- occurrence and spatial distribution (the GIS component)
- magnitude of the event (number of cases: the data base component)
- trend (rates of increase/decrease: the statistical component).

A part from the primary requirement that the user should know how computers work, GIS software still remain complex instruments, namely:

- the more a GIS is powerful, the more complex it is and, consequently, the more training it needs
- the user must have basic knowledge of topography, topology and graphic file formats.

In contrast with this complex requirements, the computer skills of the average physician in Africa, can be summarized as following:

- poor computer competence; thus, either the software is set up according to his/her skills, or special training is needed
- frequent changes of post and high turn-over, because of political instability, low salaries, socio-economic constraints; thus, either training is repeated often, or the software must not require training
- no time to re-read the manual even if he/she has not used the software during a long time.

Given the above, it is hopeless to provide medical doctors with a normal GIS package which needs appropriate training, or to train "GIS experts" to support physicians in their tasks.

To avoid these constraints the author included GIS capacity in the Health Information System, by linking ArcView to the data base which is providing the mapping application front-end.

Since WHO has no resources to write an appropriate software, the package was built-up by customizing different softwares, including ArcView, donated by Environmental System Research Institute (ESRI), USA, to Ministry of Health Rwanda, through WHO.

The core of the system is Microsoft Access, which is in charge of data management.

Maps related to geographic features have been retrieved from the Digital Chart of the World. Additional maps showing

administrative boundaries, road network, villages and health facilities have been digitized by the writer in PC ArcInfo. Microsoft Access selects data according to the requests (i.e. period, topic, area) and changes the dbf file in the AAT or PAT of the maps. Thus, the attributes attached to geographic features responds to the queries performed.

Finally ArcView is launched by Access and shows a maps carrying the selected data.

Each single action is performed by clicking on self explanatory buttons. Menu bar commands have been restricted to Help function only.

Thus, maps pop-up from the Access font-end, and the user does not even need to know that a second software is visualizing his requests.

Maps can be produced in two sections of the package:

a) a section devoted only to mapping, gives:
   . geographical features and location of health facilities
   . origin of the epidemiological reports collected
   . notified cases of illness and death, among children under-5 and adults, and health resources
   . consolidated number of notified cases of illness and death in simplified maps for the National Report.

b) mapping capacity is also included in the warning section, which can:
   . detect potential problems
   . provide trends
   . plot relevant problem-related data onto maps.

Both sections can link data on notified illness and deaths, with data on resources and infrastructures, allowing analysis by geographicalareas and/or by category of problem/resource. The second section is particularly useful in identifying disease prone areas and in providing information for emergency management.

CONCLUSIONS

The Health Information System that WHO set up for Rwanda integrated full GIS capacity in the package.

The user-friendly approach provided by the front-end of the data base allows physicians, with no specific training, to use the GIS component to perform geographic analysis, crossing data on notified cases of illness with data on available resources.

This tipe of analysis is essential to understand how diseases are propagated within the country and to plan the most appropriate actions for emergency response.

By making the use of GIS more and more friendly, the author hopes that this useful technology can be spread beyond the realm of experts.