An Information System for Sustainable Environment Management: An Ugandan Example

Frank Turyatunga

Center for International Development and Environment
World Resources Institute
1709 New York Avenue, NW, Suite 700
Washington, DC 20006

1994

This discussion paper is prepared by Center staff and collaborators. WRI takes responsibility for choosing the topic and guaranteeing authors and researchers freedom of inquiry. Unless otherwise stated, all the interpretations and findings are those of the authors.

B

AN INFORMATION SYSTEM FOR SUSTAINABLE ENVIRONMENT MANAGEMENT; A UGANDAN EXAMPLE

Over the last decade, developing countries which would seek to address their environmental information needs were invariably encouraged to introduce Geographical Information Systems (GIS). sometimes, these systems were presented as a panacea to all environmental information problems that these countries were facing. A GIS is defined as *a computer based information system that allows capture, verification, storage, retrieval, analysis, update and output of data which are spatially referenced to the earth (geo-referenced*[1].

However, as a result of a number of experienced from a developing countries, the focus seems to have now turned to the introduction and development of Environmental Information Systems (EIS). An "Information System" has been loosely defined to refer to both the technical and institutional structures through which information is produced and used[2]. A "*system*" is known to involve common a objective - in this case the management of the environment - and the existence of links among the various technical and institutional components.

The *environmental* part of EIS does not only refer to data on the physical and natural environment, but rather to <u>all</u> information needed to manage the environment. Thus in our own understanding, any organized system that is able to perceive environmental information needs, collect data, analyze it, store it in an organized manner, retrieve it, disseminate it and receive a feedback on the usefulness and quality of the information constitutes an EIS. Although computerized databases such as GIS may form part of EIS, the latter is much larger than merely technical and technological considerations.

Development of NEIC

The National Environment Information Center started as an environmental database within the Ministry of Natural Resources in late 1990. Its development benefitted from the assistance of the Global Resource Information Database (GRID) of the United Nations Environment Program (UNEP) and the Norwegian aid agency, NORAD. Originally, the focus had been on developing a computerized database using GIS technology, establishing a Center that would coordinate <u>all</u> efforts to collect, analyze and disseminate environmental information in the country, and become a repository for existing and future information on the environment.

This later turned out to be too ambitious and unrealistic. A number of reasons militated against this approach. The following are worth mention:

a) Computerized databases alone could not address the country's environmental needs.

b) The approach did not fully consider the role sectoral institutions play in the management of natural resources information, instead it sought to duplicate their efforts.

c) Establishing a focal point for all natural resources information would put too much responsibility on a database that neither had the mandate nor the capability of addressing all environmental information needs of the country.

These observations have helped to shape the current focus of NEIC which recognizes that:

a) It is important to concentrate on environmental information (needs) in the broad sense first, and then deal with technology. Modern environmental information technology only speeds up what we do, analyzes our data better, and is a powerful tool when it comes to visualization of the problems, and available alternatives.

b) Sectoral institutions are mandated to manage and collect information on the natural resources under their jurisdiction. They possess the technical expertise and human resources to accomplish these tasks. An environmental database could not possibly assume these responsibilities. The approach is now to encourage and facilitate the functioning of an environmental information network whose key elements include those public and private sector institutions involved in the management of environmental information. The role of NEIC here is to initiate and facilitate the functioning of this network. The network should be beneficial to all, and that should probably be the main reasons why the individual sectoral players should continue to participate in it.

c) A lot of information on the environment exist in the country. Much more efforts, however, need to be put in addressing the user-interface - specially information dissemination to the users. Public sector institutions in Africa Have been known to spend hundreds of thousands of dollars in data collection, analysis and storage, but a pittance on dissemination. These institutions contribute to developing "oceans of data and drops of information" as the saying goes.

During the development of NEIC, there has been a lot of argument as to whether the Center should not concentrate on particular "priority" natural resources areas, rather than trying to provide information on the enviornment broadly. Experience has shown us that as an institutions responsible for providing information to guide policy development, environmental planning and monitoring, we could not possibly concentrate on the so-called priority areas. These can be left to projects, which have the time and resources to carry out an in-depth assessment on certain selected resources. As long as one is established as a national institution to deal with all environmental information, one is not able to concentrate on one particular resource leaving gaps in the whole environmental picture.

Role of EIS in National Environment Action Plans (NEAP)

EIS (is developed by NEIC) and the National Environment Action Plan (NEAP) have had a reciprocal relationships in Uganda. This is probably because NEIC was in existence before the NEAP process was formally launched in Uganda. The most common approach in Sub-Saharan Africa (SSA) has been for NEAPs to recommend the establishment of EIS in the countries concerned.

First of all, the NEAP process is characterized by several steps which in themselves are guided by availability (or even lack of) information. These include:

- Identification of key environmental issues and their underlying causes.
- Reviewing existing policies and law with the goal of recommending remedial measures, which may be in the form of policy and legislative reform.
- Recommending remedial action for on-going projects and programs so that they are brought in line with the spirit of the action plan.
- Recommending and prioritizing actions through the development of an environmental investment program.

NEIC has been able to lend its experience in the accomplishment of the above steps, either through direct participation or identification of key institutions and individuals to assist in the process. The Center was also able to direct resource persons to important sources of information, and identify gaps in the key natural resource management issues discussed by NEAP.

Based on the experience from some of the reports the Center has prepared recently, it is through t that if the existence of EIS had been given due recognition, and its stronger participation sought from the inception of the action plan, a stronger information base could have been developed.

Secondly, NEAP usually end by recommending appropriate institutional mechanisms for environmental management in the countries concerned. But it is also well known that these institutions cannot perform their functions properly if they are not served with accurate, up-to-date and timely information on all aspects of environmental management. EIS cannot,therefore, be divorced from sustainable environmental management if the former are to play their role in guiding policy formulation, environmental planning and monitoring. EIS must be integrated in the institutions identified to spearhead environmental management in the country. In Uganda's case, NEIC is to be integrated in the National Environment Management Authority (NEMA), identified to be the institution for environmental governance in the country. NEIC will be placed in the division responsible for policy, planning and information.

Thirdly, during the implementation of the Action Plan, there are requirements for monitoring not only the state and trends of natural resources, but also performance of the priority investment programs.

Environment Management institutions must develop capability to carry out both these monitoring activities. There is no better place to develop this than within the EIS program.

Needless to say, very little may be accomplished at the beginning and some form of technical backstopping may be sought. However, in the longterm, in-house capability must be let to develop and carry out these functions. NEIC has already started addressing

environmental monitoring needs through the production of the first state of environment report for Uganda as a contribution to the NEAP process.

The fourth area in which EIS has assisted and will continue to assist the NEAP process is in the decentralization of environmental management to the local level in Uganda's case, the district.

Countries which have adopted the decentralized approach to planning will not doubt have recognized the need for decentralizing environmental management as well. This means that the local planning levels must be assisted to appreciate the opportunities and constraints existing in the utilization of the natural resources in their areas.

Development planning at these levels must be assisted to integrate environmental concerns in the development programs. In Uganda one way of ensuring this has been to encourage and assist districts to prepare District Environmental Profiles. These give an overview of the state of natural resources and the socio-economic well-being of the district. In workshops attended by district resource officers, administrators, people's representative and opinion leaders, recommendations of action geared towards achieving sustainable management of natural resources are agreed upon.

One area that still has to be addressed in Uganda is how to ensure that these recommendations are indeed incorporated into district development plans. Uganda has since the colonial times practised centralized planning and it was an oversight on our part to assume that local level managers and planners, who have been only implementors of policies coming from the center, can be turned into planners overnight. A lot of training in local development planning, including knowledge utilization, still has to be done at district level.

So far, three district profiles (two rural, one urban) have been completed. Lastly, it is through that as the NEAP implementation gets underway, the NEIC within NEMA will continuously identify information gaps and perceive information needs of the various users within the public and private sectors.

An EIS capable of generating a feedback on the information it provides will be well suited to respond to new information challenges which will unfold as new and emerging environmental issues come to bear.

Environment information priorities of NEIC

NEICs involvement in the action plan process has helped to shape its priorities especially during the implementation phase. Although partly mentioned above, the following will be the major areas of focus in the foreseeable future:

a) *Monitoring of the environment* - working with the relevant sectoral institutions, NEIC will maintain up-to-date information on both the natural resources and the human environment. A state of environment report in which the quality and health of the environment is reported will be produced biennially.

b) *Monitoring the NEAP investment programs* - the investment programs under the action plan will seek to address technical, policy and legal issues in the hope of improving environmental management. It will, therefore, be important to monitor these programs in order to assess how far they go in meeting the objectives for which they are set.

Monitoring will also ensures that the programs will keep on track, and provide opportunities for modification where necessary. Once capacity has been developed, NEIC intends to participate in these monitoring programs, and also set a firm foundation for monitoring any post-NEAP activities.

c) *Decentralization of environmental information systems* - Uganda recently launched a program which seeks to decentralize planning from the center to the districts. Under this system, all the 30 districts of Uganda will be required to raise their own funds for development. The national economy is based on natural resources, and therefore, to ask districts to raise their own development funds is to put extra pressure on these resources. The districts have to be assisted in identifying what resources exist within their jurisdiction, their state, existing opportunities for sustainable utilization, and constraints related to their exploitation. In other words, districts must be assisted to develop their own comprehensive information base to support development planning. NEIC intends to work with districts in developing their own environmental profiles and in so doing, establish and strengthen the local environmental information systems. There will be institutional, technical and financial issues to address alongside development of models for knowledge utilization at the district.

d) *Improvement of dissemination of available information* - data collection, analysis, storage, retrieval, and dissemination have collectively been the domain of the public sector in Uganda.

The public sector has, however, been very poor on information dissemination. Yet, it is generally agreed that he return on investment in EIS is measured by how many people get access to and use the information produced, and also the impact of this information on policy and management practices. NEIC intends to address issues connected with the user-interface with the objective of widening dissemination and meeting users' demand. Thus technical bulletins will be produced regularly, the existing mailing list up-dated, and a continuous users' needs assessment undertaken.

e) *Development of an EIS network* - as mentioned earlier, sectoral institutions responsible for the management of natural resources are involved in information management. The private sector also possess valuable information on the environment. In order to foster good information flow between NEIC and these institutions, it is necessary to develop an environment information network in the country. Participation in this network will of course be guided by mutual benefit, and it is therefore, important for all institutions involved to develop a clear understanding and participate at equal level. The network will also assist the

country in addressing issues of data standards, data collection methodologies, units of measure, harmonization of data collection efforts, etc.

NEIC will seek to facilitate the establishment and functioning of this network. Already, the initial workshops to discuss the nature of this network have been scheduled for March, 1994.

f) *Participation in regional and international studies and programs* - as is already the case NEIC is using its existing capacity to support regional and international studies and research. For example, the center participated in the production of two country studies - one of biological diversity, the other on combating drought and desertification (in support of the proposed convention on desertification).

NEIC is also the national focal point for the GlobeSAR '93 project, in which, in collaboration with the Canadian Remote Sensing Center, the use of Synthetic Aperture Radar in Mapping Natural Resources in Eastern Africa is being tested.

h) *Development of EIS technology in the country* - NEIC is interested in gaining access to modern information technology as long as it contributes to better analysis, visualization and delivery of environmental information in Uganda. The Center also encourages both the private and public sectors, including research and teaching institutions to take up the use of modern information technology. To this end, NEIC is about to start a collaborative program with the Makerere University Institute of Environment and Natural Resoruces on training in GIS. The center will also continue to carry out in-house training especially for those in the public sector. Currently, one trainee from he Uganda Wetlands Program and one from the Trypanosomiasis Control Council are undergoing training.

In order to achieve all the above goals, certain policy, legal, technical and financial bottlenecks need to be overcome. Strengthening of EIS in Uganda is therefore, been made one of the priority areas for immediate investment under the NEAP.

Conclusion

In Uganda we have learned through experience that EIS are crucial in the planning and implementation of programs geared towards achieving sustainable environmental management. EIS are particularly important in NEAPs which are now viewed as the most logical processes to analyze the major issues that relate to the environment in each country, and also to plan measures to effectively address these issues.

Because planning is one of the major ingredients in rational decision making, it is that having reliable and up-to-date information and integrating it in the decision making process are major considerations that any planner should take into account. In addition, information is one of the tools that the sub-national planning levels need to have if they are to have systematic development programs. Informed decision making is in the end reflected in better natural resoruces management, and a correct balance between environment and development at any planning level.

I would like to encourage those developing countries which have not yet established environmental information systems to do so as a matter of urgency and integrate them with their environment action plans. Where NEAPs have proceeded without the support of EIS, development of the latter should be a priority consideration in the investment program.

UGANDA.EIS

1.

2.