EIS-AFRICA'S MODEL FOR TRAINING AND CAPACITY BUILDING

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ABSTRACT

This paper describes a model for developing skills and building capacity in EIS that is being attempted by EIS-AFRICA, a non-profit organization of individuals, institutions and companies in, and outside Africa, whose main objective is to promote the utilization of environmental information systems (EIS) for decision making throughout the continent. The model is based on building a network of networks throughout Africa based on both geographical areas and academic areas of interest. It incorporates institutions of higher learning which, in many African countries, so far, have not taken much responsibility in training and education in EIS, leaving this responsibility to individual development projects undertaken and specialized institutions. While these have provided very significant contributions in the development of EIS on the continent they are not able to satisfy the demand for EIS skills that has been created. The paper describes a pilot application of this model in Southern Africa where networks for the training and education in EIS have been established and points to the challenge to EIS-AFRICA to build similar networks in other parts of the continent.

1. INTRODUCTION

A world-wide concern with the environment as the basis of sustainable development has been expressed at various fora. One of the most significant of these was the Earth Summit in Rio where Agenda 21 expressed the importance of protecting the environment. One of the ideas very much stressed at the Rio Summit was the importance of networking in building capacity to use relevant techniques and methods in environmental and natural resources management. In sub-Saharan Africa the necessity for networking in building this capacity is critical because of the extreme shortage of skills and financial resources when compared to other parts of the world. This paper outlines a model for capacity building through education and training in environmental information systems (EIS) that is being used by EIS-AFRICA. It describes the objectives of EIS-AFRICA as an organization and shows how the model outlined promotes its overall program in line with what was expressed at the Earth Summit.

2. THE OBJECTIVES OF EIS-AFRICA AND ITS IMPORTANCE IN CAPACITY BUILDING IN EIS

EIS-AFRICA is a non-profit organization which has received financial and technical support over the years to promote the development of EIS in Africa. Its history and functions have been very well documented elsewhere (Prevost and Gilruth, 1997) Currently it is a network of institutions and individuals both in and outside Africa dedicated to:

- Developing common principles and practices for EIS development and application;

- Improving access to data and information for environmental planning and natural resources development in sub-Saharan Africa;

- Encouraging data policy development throughout sub-Saharan Africa;

- Facilitating the co-ordination of national and international EIS programs;

- Documenting and sharing “best practices” in EIS development and application;

- Building capacity and increasing skills and expertise in EIS throughout sub-Saharan Africa through training and education.

These objectives are expressed in a document giving the overall strategic objectives of EIS-AFRICA which was presented and adopted at the organization's meeting in Nairobi in September, 2000 (EIS-AFRICA, 2000). The development of each of the strategic objectives is overseen by a working group of dedicated individuals who guide the EIS-AFRICA network on the specific responsibility the work group has been assigned to carry out. Altogether the network has six Working Groups. Education and training is undertaken by the Working Group 5 on Education, Training and Capacity Building (WG5). The responsibility of |WG5 is considered central to all the other objectives of EIS-AFRICA. For example, in those countries where EIS skills are lacking the development of common principles and practices for EIS development cannot be sustained beyond the preliminary stage. This has been a key problem in sustaining the development of spatial databases. Likewise in the co-ordination of national and international EIS programs, those countries that are below the required critical mass for sustainable EIS development will lag behind, even if funds are available to pay for consultants to design systems of co-ordination. Particularly at the country level effective co-ordination of EIS programs depends on the technology being utilized at the district and sub-district levels. To attempt international co-ordination without an effective national framework of EIS utilization will mean that the international link is only grafted at the top without ground roots support. This situation may be tolerable only temporarily at the introduction of EIS in a country and should be corrected with education and training.

3. THE EIS-AFRICA MODEL FOR TRAINING, EDUCATION AND CAPACITY BUILDING IN EIS

The overall objective of the EIS-AFRICA model for training and capacity building is to develop a method that will provide the fastest way of developing skills in EIS while at the same time anchoring the skills developed to local teaching materials and practice. Education and training for the development of EIS in sub-Saharan Africa has gone through a number of *ad hoc* but very effective efforts to develop skills for the technology. The earliest of these selected individuals from the sub-continent and provided courses to them either at a specialised center in Africa or in Europe. The efforts of the United Nations Institute for Training and Research (UNITAR), and the United Nations Environmental Program (UNEP), together withy those of the many remote sensing centers throughout the continent, have been very well recognised (Prevost and Gilruth, 1997; Mtalo, 2000; Oroda, 2000). In addition, less well known programs, such as that conducted by the University of Stockholm to provide remote sensing skills to "educators" from Africa, and training carried out for individual projects made some significant contribution. The most significant contribution of these various efforts was, however, to create demand for EIS skills that they could not satisfy. Outputs were insufficient and methods to produce greater numbers at all planning levels had to be found, while national/regional specialised centers for EIS training could still focus on specialised projects and training. The EIS-AFRICA model shifts the focus of producing skills in EIS as a combined effort between specialised centers and national institutions of higher learning working together in networks, eventually introducing EIS as part of regular curricula in the latter.

While in many countries institutions of higher learning have provided leadership in building skills and introducing EIS in decision making, for many countries in sub-Saharan Africa they have lagged behind, abdicating this responsibility to projects which train their own people. EIS-AFRICA's model, first presented in 1992, is based on building a network of networks throughout Africa. The networks making up the overall network covering the whole of Africa will be based on geographical or political areas and/or academic disciplines. The details of the framework of the individual networks will vary according to the region. In West Africa for example, Anglophone and Francophone parallel networks might be expected. EIS-AFRICA has focussed on Southern Africa as a pilot region to test its model. Here a number of networks have developed the most prominent of which are the Southern African Network for Training on the Environment (SANTREN) and the SADC EIS Training and Education Sub-program (SETES). SANTREN is based on academic interests as a network of individual scientists in various universities each of whom leads a group of others (i.e. a sub-network) in building teaching materials from case studies of on-going research. SETES, on the other hand, is based on a geographical area, the SADC region, and is a network of nine universities which have developed a common set of teaching materials to promote the development of EIS skills. Each of the universities collaborates with its national or regional government in working on national programs and provides leadership to other institutions of higher learning acting as a node with its own sub-network within the SETES network. Networking has greatly improved exchange of ideas in Southern Africa among different institutions both within the individual networks and among different networks.

Within each network the initial emphasis has been to build up a pool of trainers in a train-the-trainers program that includes academic staff at institutions of higher learning and officers in Government Departments, to speed up the rate at which EIS utilization and development will grow. In addition to having networking as their key feature, the networks in Southern Africa have focussed on strengthening existing institutions, not building new ones, and have tried to limit their operations to manageable mandates. Also, in addition to being the fastest way of developing capacity, the network-of-networks approach will have several advantages including:

- Providing a basis for the standardization of procedures and data, two of the most difficult problems in the development of EIS in sub-Saharan Africa;

- Giving a basis for the development of co-ordinated syllabi with individual institutions contributing in those areas of EIS where they may be strongest;

- Supplying a regional basis for assistance from donors and northern institutions of higher learning for training and research in EIS throughout sub-Saharan Africa.

The more unique component of the model, however, is that each selected institution (itself a node in a broader network) becomes the head of a network of other lower level institutions which it leads in the development of EIS skills at the district and sub-district level. The SADC Pilot project of the model has shown that this model can be developed, very effectively increasing numbers of skilled personnel. Both SETES and SANTREN have developed teaching materials from local research co-ordinated for use with any node of the network that wishes to use them. More importantly, for SETES, since the teaching materials will be developed using donor funds, they will be available for anyone who may want to use them on the EIS-AFRICA website.

Although currently the activities of the networks in Southern Africa are heavily dependent on donor funding, the model has an in-built attempt to make these activities self-sustaining. In SETES for example, tuition fees charged from individuals who take short courses already fully support the running of these courses at one of its nodes, and this is expected to be repeated in future at other nodes of the network. In terms of donor support, the expected scenario for SETES is given in Figure 1 below.

Even at the beginning of the program institutions of higher learning already had input such as computer hardware though in many cases these needed upgrading or supplementing. As income from short courses increase at each of the nodes, donor support is expected to decrease as is shown in Figure 1.

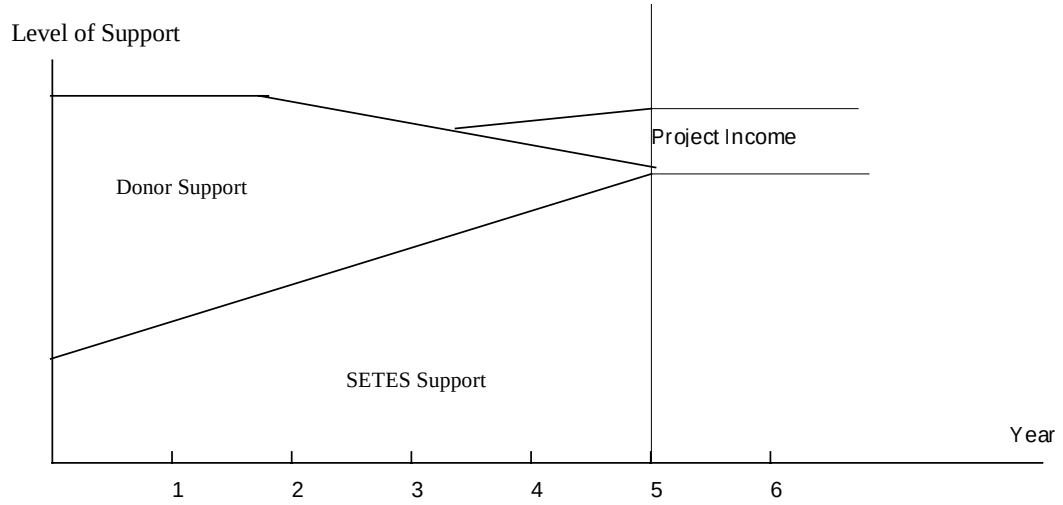

Figure 1 The Expected Ratio of Funding Between Donor and SETES Network Nodes *(Illustrates only relative, not absolute, financial terms).*

The program has many advantages that will ensure that it remains sustainable. Most importantly, it focuses on using existing and well-established institutions: the universities, polytechnics/technicons, and other institutes of higher learning. These institutions carry national/regional mandates for training and education. Adding new techniques for environmental analysis and organization in this case will only be considered special in the beginning and will become part of regular curricula in the long run.

4. CONCLUSION

The current challenge for WG5 is to develop networks in all the regions of Africa (Western Africa, Eastern Africa, Central Africa, and Northern Africa) similar to those that have been developed in Southern Africa and to strengthen those that exist in the latter. Obviously the networks will vary in structure based on the specific circumstances of the individual regions, especially as this relates to linguistic differences. Co-ordination throughout Africa is, however, feasible and desirable. The first task is to identify key individuals that will provide leadership in the development of the networks in each region, each of whom should be at an institution of higher learning located within each of the regions. Such individuals should be able to provide leadership in the development of teaching materials and research in EIS.

In Eastern Africa, the Center for Geographical Information Systems and Remote Sensing at the University College for Lands and Architectural Sties (UCLAS) in Dar es Salaam has shown promise of leadership for building a network in that region. In all cases and for all networks institutions that are willing to work together will each require a person dedicated to the development of EIS who will be a contact person for the network at the institution. All leading persons in each of the networks should have, or should be assisted to have, extensive contacts with institutions outside their regions and/or within the areas of their academic interest throughout the continent.

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BIOGRAPHICAL NOTES

Musisi Nkambwe is an Associate Professor in the Department of Environmental Science, University of Botswana. He has lectured and carried out research using remote sensing and GIS at the Universities of Makerere (Uganda), and Obafemi Awolowo (Nigeria). His current research is focussed on landuse competition using the same techniques. Professor Nkambwe is a member of the Governing Board of EIS-AFRICA, and a co-convenor of that association's Working Group 5 (Education, Training and Capacity Building). He is also the Cordinator of SADC's program code-named SETES (SADC Environmental Information Systems Training and Education Sub-program).

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