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I. INTRODUCTION

This report covers activities undertaken during the third year under the Capacity Building for Electronic Communications in Africa (CABECA) project. It discusses some of the final results (impacts) of the project and outstanding activities for the future. It also discusses the activities and results to date of the sub-project on the Measuring the Impact of electronic networking in Africa.

Emerging full TCP/IP connections to several African countries during 1995 have altered some original plans of CABECA operations during the third year. The activities during the last year of CABECA operations can be grouped into:

- Developing national information infrastructure
- building human resource capacity through training in UNIX based technologies
- Assisting countries with no/minimum connectivity to lay the foundation for full Internet link.

Connectivity to Internet also created needs for information provision to networked community and access to global resources. This in turn introduced needs for publishing information in various formats and its conversion to Hyper Text Mark-up Language (HTML). The needs for data in graphics, video, audio and text formats has in turn altered the original conception about information as structured numerical and non-numerical data bases. During the last quarter the project realized the importance of this new development in information acquisition, storage and dissemination. The first prototype local Web site incorporating this new idea is being built at PADIS. CABECA is also involved in training users how to publish on for the network.

Training in Uucp and Unix systems administration is becoming important all over Africa. Many countries are planning to connect to TCP/IP networks. Unix and LAN environments are crucial to such connections. Demands for Unix training has increased during the third year of CABECA operation.

II. CABECA Activities during the final year

- **Building indigenous human resource**

The main project has continued its efforts to train users during the last year of its operation. Training and sensitization workshops for system managers, operators, and network users were provided to the following countries: Mali, Senegal, Niger, Tanzania, Ethiopia, Eritrea, Chad, Central African Republic, Congo and Gabon. The list indicates that the project has concentrated on West, Central and the Greater Horn of Africa. This is mainly due to

limited connectivity in this region compared to other regions of Africa. Many southern African countries received necessary support from the project during the first two years of CABECA operations. Their closeness to South Africa created conditions for these countries to link to full IP during the last two years. Except in Malawi, CABECA assistance to southern African countries remained minimal during the final year.

Countries in Central Africa remained isolated from the global network. According to a recent survey by CABECA consultant and a group of experts from the World Resource Institute and UNDP[1] this part of the region remained unconnected even to basic store-and-forward Uucp for Fido networks. Training activities in Central Africa therefore, concentrated mainly on sensitizing policy makers and developing national strategic plans for networking.

In collaboration with Enda Tiers Monde in Dakar CABECA organized a workshop in February 1996 for training West African women in NGOs on the basics of Electronic communications technology. The workshop that brought over 20 participants from French speaking African countries to Dakar was first of its kind to introduce women to electronic networking in this region.

In addition to local training the project hosted training and demonstration sessions during the following meetings of the United Nations Economic Commission for Africa.

- Joint Conference of African Planners, Statistician, Demographers, Information and Population Scientist (11-16 March 1996).
- Meeting of the Standing Committee for Harmonization and Standardization of Information Systems in Africa (6-8 March 1996).
- Meetings of various committees organized by divisions of ECA including African regional Coordinating Committee for Women (May 1996).

CABECA was very much involved in the meetings of the High level Working Group on Information and Communication technologies in Africa which produced the African Information Society Initiative (AISI) endorsed by African ministers responsible for economic planning. AISI will be the instrument to continue building networking activities initiated by CABECA and other African projects.

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[1]. Jake Brunner and Derek Ajesam Asoh. Internet in Central Africa: Issues and Opportunities, Draft Report, February 1996.

- **Collaboration with other projects for sustainable resource sharing**

Two project that were proposed during the previous two years were funded during this year. Both these projects specifically acknowledge that they are meant to extend the resources and activities of CABECA. CABECA's approach was incorporated into the design of both. These include:

i. Building Electronic Communications in Africa
ii. Greater Horn of Africa Electronic Communications Networking

The Building Electronic Communications in Africa Project is funded by the Government of Netherlands to link eight selected countries with limited connections. The project aims to continue activities that CABECA started with emphasis on countries with limited connectivity. Countries that are covered under this project include: Eritrea, Sudan, Lesotho, Chad, Central African Republic, Zaire, Cameroon, Togo and Benin.

- **Greater Horn of Africa Electronic Networking Project**

The Greater Horn of Africa Electronic Networking project was funded in October 1995 by the United States Agency for International Development (USAID) to develop connectivity between policy makers in the Greater Horn of Africa. The countries covered under this project include: Tanzania, Ethiopia, Uganda, Djibouti, Kenya, Rwanda, and Eritrea. The project is planning to improve existing links by supplementing on CABECA activities. PADIS is implementing the project under ECA's programme Harnessing Information Technology for Development. The Inter Governmental Agency for Development (IGAD) is the focal point of the project.

CABECA continued its collaboration with other African connectivity initiatives and projects. One such collaboration during this year was a joint assessment mission with the World Resource Institute to study the networking situation in Central African countries. The collaborative initiative undertook country assessments in Central Africa and proposed to set up low cost store and forward networks in Congo, Zaire and the Central African Republic through a connection to Cameroon. PADIS intends to continue supporting this initiative under its current project "Building Electronic Communication in Africa" funded by the Government of Netherlands.

The World Resources Institute, the United Nations Sustainable Development Network project (SDNP), the United States Agency for International Development and PADIS have teamed up to accomplish the following:

- set up start up store and forward links in Congo, Zaire and Central African republic with link to Cameroon

- provide training to users in those countries

- facilitate the exchange of information, technical documents among collaborators in various projects such as the Regional Environmental Information Management project (REIMP) and Central African regional Project for the Environment (CARPE).

Collaboration with other projects including RINAF, RIO, SDNP and Healthnet has continued during the final year. In Uganda and Tanzania CABECA consultant worked closely with Healthnet. In Zimbabwe, the CABECA consultant attended RINAF Regional coordination meeting. In Ethiopia CABECA assisted the RINAF focal point to expand link to users in the country.

•National Infrastructure building activities in Eastern and Southern Africa

Tanzania:- Activities in Tanzania continued during the final year of CABECA operations. Mr. Michael Jensen, CABECA consultant undertook a mission to Tanzania in March 1996 to strengthen existing COSTECH node and developing national infrastructure plan. A Fido system operated by a private company was upgraded to full UNIX . Mr. Jensen also undertook series of discussions on national food security electronic network and the development of a national information infrastructure master plan. During discussions with high officials it was proposed that PADIS continue training users in network setup and content development. Training and national food security network setup are planned to take place in September under the Greater Horn of Africa Electronic networking project.

Rwanda:- Rwanda has no public, national mail or Internet service provider though there are individuals and institutions using ad hoc arrangements for connecting to service providers in Africa and elsewhere. CABECA undertook a needs assessment mission to Rwanda in January 1996. Mr. Ben Parker, CABECA consultant who visited Rwanda proposed the following options for building connectivity in Rwanda:

- liberalization of communications for conducive networking environment. This would allow commercial service providers to offer full Internet services.

- using existing donor funds such as the Greater Horn of Africa Electronic Networking Project for building start-up networks.

- public sector initiatives such as academic, health or telecommunications.

PADIS is planning to set up a link in Rwanda using the Greater Horn of Africa Electronic Networking Project.

Ethiopia:- CABECA activities in Ethiopia were intensive during the final year. Some of the activities undertaken include:

- Development of a UNIX based bulletin board system.
- Improving PADIS information infrastructure (infostructure) by setting up of Local World Wide Web Server.
- Expansion of Local network by introducing multiple lines.
- Improving links in Ethiopia through provision of training.
- Discussion with the government of Ethiopia on the provision of TCP/IP connectivity in Ethiopia.

The users of the network grew three fold during this year. New subscribers demanding improved software and services were increasing. The CABECA consultant provided a Windows upgrade of the Marimba software to new users. UUCP and Windows version of Marimba were also distributed to advanced users. Local users were able to dial in to PADIS hosts (Web servers, BBS server and email machine) to browse information using standard Internet tools. A Point to Point (PPP) link to Web server using Netscape was also made available to users. This created conditions for users to experiment with standard Internet tools prior to full Internet connectivity.

A great deal of effort was made to bring Internet connectivity to Ethiopia. CABECA staff was very much involved in the set up and activities of a local Internet advocate group called "Bringing Internet To Ethiopia (BITE)". A national action plan and project proposal for bringing Internet to Ethiopia was developed and sent for funding. Meanwhile, the Ethiopian government announced its new initiative for IP link through the national telecom office. PADIS was able to negotiate for continuation of the service until a new service provider is up and running and a commitment for continuous service at a reduced tariff.

Eritrea:- Two separate missions were undertaken to provide training and system upgrades. In collaboration with the IGAD/GHAI Networking project assessment and training was carried out in March 1996. Following this mission the CABECA consultant visited Asmara to upgrade the system and install Marimba host software. One of the problems that was observed during the initial mission was the need for a better user interface and lack of coordination between multiple networks.

There are four independent nodes in Eritrea. All nodes in Eritrea were unable to benefit from technical assistance due to their small subscribers base and different protocols. The Eritrea Information Systems Agency (EISA) runs the Fido protocol while an NGO known as "Punchdown" uses the UUCP protocol. The second mission tried to resolve these differences to enable local service providers to cooperate in setting up a national full Internet connection.

Djibouti:- During the second year, CABECA installed a Fido link between the PADIS node in Addis Ababa and IGAD host in Djibouti. A mission was undertaken in March 1996 to provide further training to users and set up new links. Djibouti established a full Internet connection in May 1996. This enabled existing links to switch to the local Internet hub.

- **National Infrastructure building activities in Southern Africa**

Malawi:- CABECA continued to assist the national node in Malawi in covering communications costs. The host was unable to generate funds from users to cover the costs of connections between Worknet in South Africa and the Unima node in Malawi. This indicates that a network that should have been sustainable by now was unable to generate funds to continue its operation: The main causes include

- lack of time by the system operator to develop a billing system while running all national networking activities and heading a university Department
- lack of planning for sustainability at the earliest stage
- inability to train additional system operators managing national networks

- **National Infrastructure building activities in Central and Western Africa**

Central Africa Republic:- Following a request by the Union Doumiere et Economique de l'Afrique Centrale (UDEAC) headquarters in Bangui CABECA undertook a mission to provide connection and implement a region wide connection in central Africa. Other countries visited during the mission include: Zaire, Congo, Gabon and Cameroon.

West Africa: Activities in West Africa during the terminal year were intensive. The project involved Mr. Moussa Fall as a full time coordinator of connectivity in the sub-region. Mr. Fall, who also operates a node at Enda-Dakar undertook series of missions to the following countries:

country	visit dates	major activities

Mali	June, July 1996	setting up environmental network, training users, upgrading previous nodes
Niger	June 1996	setting up environmental network, training users, upgrading previous nodes
Cote' D'Ivoire	July 1996	setting up environmental network, training users, upgrading previous nodes
Burkina Faso	Sep. 1995, July 1996	setting up environmental network training users, upgrading previous nodes
Senegal	July 1996	upgrading current network
Gambia	Feb. 1996	training users, upgrading the network and training sysop

- **Project Equipment and communications subsidy to member states during the final year**

The project provided both equipment including modems and computers during the final year as follows:

Institution/ country	equipment	Quantity
Institut Balanzan, Public Fido node in Mali	Micro-computer for the node	1
Office Nationale de la Statsitque, in Mauritania	Micro-computer for the node	1
Eritrea	Zyxel High Speed modems	3
Ethiopia	Zyxel High Speed modems	12
Benin	Zyxel 14.4 modems	1
Chad	Zyxel high speed modems	5
Gambia	Zyxel high speed modems	1
Institution/ country	equipment	Quantity
Ethiopia	Microcomputer for national node	1
Mali	Zyxel high speed modems	3
Niger	Zyxel high speed modems	2

In addition to the Malawi node mentioned above CABECA supported communications costs to the following startup nodes.

Node	Country
ARCIS	Nigeria
Balanzan Institut	Mali
Chadnet	Chad
Chestrad	Nigeria
Eisanet	Eritrea
Hisen	Nigeria
USL	University of Sierra Leone
Camfido	Cameroon

CABECA attended a number of international forums and national workshop. During the terminal year the project participated in the following:

1. Inet 95 Conference held in Hawaii

2. Inet 96 Conference held in Montreal

3. Meetings of the High Level Working Group in Addis Ababa and Cairo

4. Conference of ECA ministers responsible for Economic planning

The project continued to support the IDRC funded impact of electronic communications network in Africa project. It has participated in the second meeting of the project in Addis Ababa. The impact project will provide additional input to project evaluation.

III. Studies of the impact of electronic networking on development

The record of the first year of the undertaking of the four country studies on the impact of electronic networking on development has been documented in the article by "Impact of Electronic Communication on Development" Nancy Hafkin (Project Leader) and Michel Menou (Research Co-ordinator) in the volume by Paul McConnell, *Making a difference: Measuring the Impact of Information on Development* (Ottawa, 1995). Since then two major events have taken place, - the holding of a mid-project workshop in Addis Ababa from 12-15 February 1996 and the completion

of the Phase I studies. This report will focus on the mid-project meeting and the substantive results obtained from Phase I of the project, which has just been completed in Ethiopia, Senegal Uganda and Zambia. It will also examine logistic aspects of the project which have posed difficulty, and to which attempts will be made to solve in the Phase II (beginning as soon as the next deposit of funds is made by IDRC).

Mid-project meeting

The second meeting of country case study researchers and the research co-ordinator of the study of the impact of electronic networking on development in Africa was held in Addis Ababa, Ethiopia from 12-15 February 1996.

At the meeting, a plan was worked out for completion of the first phase of the study by 20 April and ideas discussed for the undertaking of the second phase from 1 May-31 December 1996.

Present at the meeting were: Prof. Michel Menou; country researchers Abebe Rorissa, Ethiopia; Omar Diop, Senegal; Jane Asaba and Bernard Bazirake, Uganda; and Vitalicy Chifwepa, Zambia. PADIS staff attending the meeting were Nancy Hafkin, Makane Faye and Lishan Adam.

During the meeting, each of the case study leaders presented preliminary results of their findings and reported difficulties in following the methodology worked out at the initial meeting held in Addis Ababa one year ago. All the researchers reported difficulty in getting the questionnaire filled out as a result of its length; as a result, the workshop adopted a shorter questionnaire that still captured the essential elements.

To complete the "first" phase of the project, researchers were to complete questionnaire surveys and interviews by 18 March and produce an analysis of the results of the first phase by 20 April. That information technology is a rapidly changing area was well borne out by the studies. When the studies began, all of the countries involved had e-mail only access to the Internet, using dial-up, store and forward systems. Since that time, three of the countries have moved to full access to the Internet, and are seeing a fall away in the users of the original store and forward systems. Thus, at the mid-project meeting held in Addis Ababa, corrections had to be made to the original project data collection and survey instrument design to incorporate the phenomenon of full Internet connectivity in three countries.

The three countries which moved from e-mail only to full Internet access in mid-study were Senegal, Uganda and Zambia. In Ethiopia, the Government announced that the official telecommunications monopoly Ethiopian Telecommunications Authority would introduce Internet

in late 1996, under an agreement with Sprint.[2] Thereto, the format of the system also changed, with a switch from a free Fido electronic mail system to a commercial Internet service provider.

Results of Phase I studies

The studies observed a correlation between usage of electronic communication and level of computer skill. In Zambia a low level of computer skill was found to correlate with a low level of e-mail usage. Similarly, in Ethiopia where there was overall a high level of usage (with two-thirds of users sending one or more messages a day), the correlation was made with experienced and highly experienced computer users. However, this may be related to the nature of the e-mail systems in use during Phase I (see further discussion under techical problems below). While in Senegal, most users were computer beginners, in Ethiopia the majority considered themselves skilled or highly skilled computer users.

On modalities of usage, more users logged in themselves in Zambia (95.6%) and Ethiopia (89%), than in Uganda and Senegal where multiple users per point were the norm. (In Uganda, only half of users were using the computer themselves.) Zambia and Ethiopia also showed the highest degree of enthusiasm for the new medium, indicating perhaps that direct access (to the mail system) is much more satisfying than indirect access.

On the nationality of users sampled, there was a range. (The study was not attempt to gather statistics on the national user population, but rather to gather "impact" data from a random and representative sampling). In Zambia, the rate of nationals was lower than in the samples from the other three countries (43.5 percent, as contrasted with 90% in Uganda). Data on the gender of users produced some interesting results; only 14% of users in Ethiopia and 17% in Senegal were female, indicating a clear gender gap. Some of the findings on level of education were quite striking: in Senegal, where to date most users have been in the academic and research communities, users tended to be highly educated. This was repeated in Ethiopia, where 98 % of users had at least a B.A./B.S. degree, more than one-third held a Ph.D or M.D. degree and 59% were in the academic/research area.

As to what uses the new medium was put, the bulk of users were using it for general correspondence. In Uganda, nearly 80% had not tried to use it to access formal information sources. This seemed to be because information access (e.g. getting copies of documents, searching archives) using e-mail is not easy. It takes training and a specialists' knowledge of the medium. Since there are so few trained system operators in Africa, they spend most of their time with system maintenance and have little time to train users, especially beyond the rudimentary skills needed for

[2]As of this writing, no independent Internet service providers (ISPs) will be allowed, although there is rumour that the new telecommunications policy to be unveiled in October 1996 will provide some measure of liberalization.

sending and receiving messages and, perhaps, attaching files. Trainers other than systems' operators are few. With full Internet access, there is no doubt that information access will become the major use. Besides messaging, most common uses of the medium throughout the four countries were exchanging document, receiving (and sending) technical advice, managing projects, arranging meetings and exchanging research ideas.

In all the countries surveyed, most messages went outside Africa, followed by messages sent to other African countries. Fewest messages were exchanged within the country. This seems to mean that for local communication, alternate means were available; for intra-African and external communication, e-mail was superior to the alternate means in cost and speed.

In discussing the problems introduced by this new means of communication, a number of users (17% in Zambia) were already complaining of information overload! This underlines the leapfrogging aspect of this information technology: prior to e-mail and Internet, the countries/users would have characterized their situation as one of extreme information deprivation and poverty. Only 1 1/2 years later, they were beginning to experience the information overload that pervades North America in particular. Other problems mentioned in this category included "spending too much time playing on computers". High cost was a deterrent to further use of the medium, although in many places (for 97% of users in Senegal and 78.6% in Ethiopia) the costs of communication were borne by the users' organization).

The technical problems elucidated by the studies centred on the users having insufficient computer skills, not knowing how to decode/encode messages, and the difficulty of incorporating signatures into e-mail. Inadequate technical support was frequently cited as a reason users were not using e-mail more. The technical problems evoked, however, also relate to the systems being used: at the beginning of the study, most users were using store-and-forward, DOS-based FIDO e-mail programmes, which are notoriously user unfriendly and difficult. In Ethiopia, where the users were the most computer sophisticated among the countries studied, they were well aware of what they were missing: their complaints included limitations in address length and inability to receive receipts for message sent. Many of these technical problems would disappear with Windows-based mail systems, context-specific help and increased technical support. Thus, the finding that the mode and frequency of sending electronic messages depends on the computer skills of users might be modified as new mail programmes (and Internet) are introduced. Other constraints to full use of the possibilities of electronic communication included: lack of full access to the Internet (in Ethiopia, where even though it was not yet accessible, users were aware of it and wanted it), that they were not networked on LAN's and that it was hard to attach files.

Although the internet phenomenon was still new in three of the countries and had not yet reached Ethiopia, users were still aware of negative aspects of the Internet, from its global publicity. They were also fearful that with full Internet, they might have to rearrange their schedules to give more time for computer activities and information searching. They also felt that with the arrival of Internet and its accompanying information overflow, decreased attention might be given to the development of local resources.

Universally users said that information facilities were inadequate in their organizations (this was cited by 87.1% of those surveyed in Ethiopia).

The studies unearthed a number of success stories attributed to electronic communication (mostly relating to new opportunities, meeting deadlines, communication with donors/sponsors outside the country) as well as to failures that would be no more once electronic communication fully penetrated (articles requested on inter-library loan arriving after a student had already graduated, missed opportunities because of delayed communications and inability to afford the cost of fax and telephone responses).

On advantages of the new medium, there was universal agreement that e-mail led to efficient communication and reduced phone costs. This was particularly important to users who had a home/external office abroad, as it made daily communication feasible and cut short isolation. Some said that it had replaced travel; that it brought a larger world view to problems they were confronting. Regarding the technology in particular, they cited the ease of sending mail to multiple recipients. Although it seems an obvious advantage of the new medium in hierarchal societies, few users mentioned its democratic aspects: that access to e-mail allows the users to go beyond archives, registries and signatures of department heads. One of the researchers also mentioned that the advantages were not being fully exploited due to limited user awareness of what the new medium could do, again pointing up the need for increased documentation and training.

The finding that the level of e-mail usage correlated with level of computer skill may have implications for projects such as the Africa-Canada partnership which attempt to introduce new information technologies, in areas where they haven't been used before, to transform society. It seems to indicate that although the carrot (the increased information and communication from which people would benefit) is very sweet, they may not eat it if they don't feel comfortable with it. That is not to say that such projects will not work, but that they will require intermediaries to stand between the end users and the computer.

There will be additional impact on the workplace once Internet fully arrives in Africa. There are few computers in the home in most of Africa (excluding South Africa and the wealthier north African countries), and so "surfing" the 'Net will be largely limited to the workplace. Will this reduce productivity, or will it increase it as users have access to enormous amounts of information hitherto unavailable.

Contributions from Regional Symposium, April 1995

The impact study also surveyed participants at the Regional Symposium on Telematics for Development, held in Addis Ababa from 3-7 April 1995. Although this was a more professional telematics' user group than the total population of users surveyed, this group made a number of

interesting observations about obstacles to effective use of electronic communications in Africa. Obstacles they cited were insufficient or poor infrastructure, lack of awareness of the benefits at the high levels, lack of technical base; limited number of people with access to computers and electronic communication facilities and high cost of access; religious fundamentalism; absence of liberalized national telecommunications systems; resistance from existing communication service providers; high tariffs on communication technology, and lack of clear policy on electronic communications in African countries. They felt that given the expansion of electronic communication, there would be enhancement of the following aspects of information and communication in the region: access to and exchange of information, business communication and trade links, extended adult/distance education, rapid delivery of information and development of "Africanized" databases. Participants also gave their views on what was required to make electronic communication in Africa sustainable. Here they listed (in rank order of importance): privatization, free use of e-mail without government interference, skills upgrading for both users and systems operators, affordable costs, effective management and aggressive marketing of systems.

Second phase of the study, to end 1996

The second phase will attempt to correct logistical problems which arose in the first phase. The researcher for Ethiopia, Mr. Abebe Rorissa, has taken up employment at the University of Lesotho. However, he will be returning to Ethiopia for vacations. It was decided that he would engage assistants in Ethiopia, Addis Ababa University faculty members, to do the research under his guidance by e-mail and in person during his visits. The gaps in researchers' connectivity - both to e-mail and membership on the inimcas-l listserv, which were reported at the February 1996 meeting, have been corrected.

Problems were described with securing return of questionnaires, in getting people to agree to and show up for interviews, stemming from lack of interview culture. It was decided to simplify the questionnaire and vary the data collection methodology in order to increase response and participation rates. It was only reported that it was hard to get people to respond to questionnaires which were sent by e-mail because of their lack of computer skills and limited time for computer access in the office. An attempt will be made to correct this by distributing questionnaires in traditional printed form as well.

On the substantive aspect, in addition to revisiting those interviewed during the first phase to verify results, the second phase will attempt to assess what consequences the arrival of full Internet access has had on the conduct of the study. To study the phenomenon of full Internet arrival, a marketing approach will be adopted. Cooperation of service providers will be invited. The second phase will also concentrate on moving more from an analysis of the technology to an analysis of the application of the information gained, i.e. the crucial element of impact which remains elusive and difficult to capture. What difference is the phenomenon making to the conduct of people's business?

In order to widen the reply base, a copy of an abbreviated version of the questionnaire will be distributed to listserv's which target the user population under study. This questionnaire follows:

We are interested in hearing what communication difficulties have been hindering the professional activities which you feel are most critical for the success of your organization/company.

How electronic communication may be alleviating these difficulties. In what way and to what extent are your professional essential/professional activities carried out more effectively.

What, if any, burdens/problems are you experiencing from electronic communication. What technical or other obstacles prevent you from taking full advantage of electronic communications.

We would also be interested in hearing of particular success stories as a result of electronic communications, or conversely, stories of failures due to ineffective electronic communications.

IV. Achievements and Evaluation of the CABECA networking activities in Africa

The Capacity Building for Electronic Communication for Africa (CABECA) project is a result of IDRC initiatives in electronic communication between 1989 - 1992 in Africa. The implementation of five different projects (PADISnet, ARSOnet, NGOnet-Africa, ESAnet and Healthnet) between 1989-1992 stimulated new approaches to connectivity in Africa. The global low cost networking workshop sponsored by IDRC in 1992 brought togather network managers and players from Africa and other parts of the world and Mr. David Balson of IDRC. After discussion of all problems concerning connectivity it endorsed two directions: development of user friendly software and Capacity Building for Electronic Communication for Africa.

The project at its inception was planned to cover a wide variety of users through out the region. It brought previous IDRC projects together, changing the focus from setting up small islands to a full capacity building at national level. Some of the activities were not undertaken as envisaged during the workshop that initiated the project, for the following reasons.

Financial resources requested to cover the initial project was over US $4,800,000. CABECA was able to secure around US$480,000 for three years. This was one-tenth of the originally envisaged amount. This created difficulty in covering all countries under the original plan. The sub regional approach was later replaced by a strategy that grouped countries together based on their existing national telecommunication and networking infrastructure. Four regions were selected during the original setup. The first year focused mainly on the Southern African countries, second year on Greater Horn of Africa and third year on West, Central and Eastern Africa.

Besides shortage of financial resources to execute the project as planned, there were some other significant problems that were encountered during the project life cycle. These included:

- other commitments of project communication experts (consultants who could not be hired full-time), thereby their non-availability on regular basis. There were few consultants with solid background of local problems and networking technologies. These experts were under tight schedules and were not always available to the project on a regular basis.

- shortage of experts understanding the expectation from the countries and the project. Some of the experts were unable to produce impact on the countries they visited due to limited experience in handling local situations, complex national networking conditions and inability to stimulate local users.

- un-reliable modems over extremely noisy lines. Some of the original modems that were received via Healthnet did not work over extremely bad telecommunication lines.

- bureaucratic steps to be followed in UNECA for hiring consultants, preparing travel, etc. Tight control and sometimes absurd bureaucratic steps have blocked efficient execution of the project. UNECA is undertaking new restructuring and changes in management to address these problems.

In conjunction with other initiatives CABECA has had the following impact in Africa.

- grassroot institutions were able to emerge to serve full national networks.

- conflict between national telecommunications regulatory frameworks and emerging low cost networks was intensified. This created pressure on African governments to revise their restrictive and/or monopoly policies.

- recognition of the impact of electronic communication networks on cultural exchange, research, health, education and poverty alleviation has improved. This spurred needs for forums that bring collaborative institutions in Internet service provision (service providers) to discuss their role in information society.

- improved recognition of the complex socio-economic and political situation in the region needing specific, planning, policy and resource mobilization to join the global information society.

- increase in numbers of persons who understand the underlying technology of electronic communication in Africa.

The project was able to meet its desired objective, despite complex socio-economic, infrastructural problems. Further capacity building activities are required to enable Africa to participate fully in the global information infrastructure. National content creation and training in advanced Unix environment are very critical.

The generation of knowledge and information through local participation is one of the key areas for getting the best out of connectivity and for spurring economic growth in Africa. Knowledge economy and information capitalization underline the new information-driven economy and business at the global level. Africa's participation in content creation (the generation of human centered knowledge and information) is fundamental for the sustainability of connectivity and for its own competitive advantage in the global economy.

There is an urgent need to support African countries to improve teaching and research in the fields of communication and computing technologies. This would improve local capacity, access to networks and multiply connectivity using students that leave colleges. Focus should be made on key areas such as software development and Unix systems administration. Africa still faces the largest gap in qualitative software development and Unix system administration. This is the area that most countries can leapfrog if they are assisted in developing their capacities. Other areas for capacity building include:

- sensitization workshops for policy makers directed towards impact of technology in their community
- development of policies for national information infrastructure
- development of national strategic information systems that assist countries to compete in global setting.

All African countries still need capacity building in these areas to harness information and communication technologies. Internet connectivity is not an end by itself. It is the supportive infrastructure that reaches the development community and bridges the gap between urban the elite and rural farmers that makes changes to development. Information and communication still remain major areas for capacity development.

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