

International Development Research Centre
Centre de recherches pour le développement international

INFORMATION FOR DEVELOPMENT:
A STRATEGY FOR SUBSAHARAN AFRICA

Information Sciences Division
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INTERNATIONAL DEVELOPMENT RESEARCH CENTRE
CENTRE DE RECHERCHES POUR LE DÉVELOPPEMENT INTERNATIONAL

MEMORANDUM/NOTE DE SERVICE

TO/A: Information Sciences Working Group
on Africa via S. Akhtar

DATE: 25 April 1988

FROM/DE: The Director, Information Sciences Division

W. B. Stone

SUBJECT/OBJET: Response to the Final Report: Information for
Development: A Strategy for Sub-Saharan Africa

I have read and discussed with you many times during the past year your document **Information for Development: A Strategy for Sub-Saharan Africa**. Indeed, I have commented on the several drafts and, I am pleased to see, that my substantive as well as editorial comments have been positively addressed in the final version. Finally, regarding my personal involvement with this process of strategy formulation, I have just reviewed the publication which documents the process that you followed, and brings together all the inputs which formulated your thinking - correspondences, workshop discussions, and formal papers from African information specialists. This publication, now with the Communications Division, hopefully will soon be available for world-wide distribution.

I believe it was necessary to review my involvement with your work over the past months to underscore my endorsement of the final product. As I have stated in many fora - verbally and in writing, a significant task has been accomplished by the workshop group of Associate Directors and Regional Program Officers in EARO, BRACO, and MERO.

As the Director of the Information Sciences Division, it is extremely important to me that the process has begun to create a framework within which an information science program can be built for a major region of the world, one which suffers from a weak, or practically non-existent, information infrastructure. What is of importance as well, however, is that via this process undertaken by the working group, intersectoral and inter-regional cooperation and understanding has been enhanced to a level not seen before in the Division. Thus, perhaps the process alone can serve as a useful model to other divisions within the Centre.

If the primary purpose of this memo is to convey my response to the working document, then I shall confine my **specific** comments to "Putting the Strategy to Work: Recommendations for Program Delivery". My general comment about the "strategy" is that this section of the report is an excellent record of the dialogue which took place between the African information community and IDRC, ISD Staff. What is exciting

is that as the dialogue is a dynamic process, it is on-going. IDRC's responses to the observations and requests are rational and forward-thinking, yet pragmatic. Pragmatic because, it is clear that all activities must be undertaken within fairly clearly defined parameters of available resources (human and financial), Centre policies and procedures, and in some instances, the Canadian context.

To the issues of "Capturing and Delivering Information by and for Africans"; "Responding to Users' Needs and Behaviours"; "Building National Infrastructures"; "Sharing Resources Across the Region"; "Upgrading Information Personnel"; and "Funding and Sustainability of Services and Systems"; I concur with IDRC's response. My concurrence is reflected in our on-going projects, in the current year's Program of Work and Budget (see relevant sections of PWB 1988/89), and in my comments to the March Board in Nairobi.

What is presented in the "Strategy" section of the report is indeed a strategic framework within which we can hope to deliver a viable and effective information science program. The "what", or as it has been stated elsewhere, the "implementation plan", has yet to be defined. I shall return to this crucial point later.

SPECIFIC COMMENTS

1. Coordination

The report recommends that a coordination mechanism be established to ensure that the "program" achieve its objective. This includes the Committee of Associate Directors and Regional Program Officers in the African continent. Also recommended is the naming of a coordinator for the work of the Committee, based in one of the three regional offices.

Response:

I accept this recommendation with qualifications. It is essential that there be a Division-wide undertaking to implement a viable and responsive regional program. It is logical therefore that this effort should be coordinated to ensure all necessary elements, i.e. program and resources, are present and in place. Thus the continuance of a committee or working group with members identified is important. As implied earlier, the report presents an important framework within which the "what" must now be placed. It is therefore premature to identify a coordinator within the African region who will be responsible for the implementation of the program.

In FY 1989/80 the climate may be appropriate for such a designation. Hopefully, the specifics will be more clearly identified and thus the Terms of Reference of the Coordinator will be more precise. The analogy to the BAIF Coordinator is clearly not correct at this point in time.

I will be meeting with the Associate Directors to discuss the future work plan for the Committee, the modalities for implementation, and the naming of the chairman to take this important process through the next stage.

2. Project Development and Approval

The thrust of this recommendation is that more resources and authority will be given to Regional Program Officers in Africa in order to ensure greater responsiveness.

Response:

This is an issue which must be governed by Centre policies and procedures and therefore is not specific to the African region. The January Executive Committee of the Board approved new authorization levels for the Centre. As a result, approximately 70% of ISD projects will be approved within the Division. The President's Committee also decided to increase the PODA level to \$11,000, and to increase the authorization levels of program officers from \$5,000 to \$10,000, and that of associate directors from \$15,000 to \$75,000. These major changes will impact positively on the Division's ability to respond quickly to recipients' requests.

In addition, one of the tasks of the Working Group on Africa is to determine the implications of the Centre's new financial administration policies on the implementation of an African Strategy.

3. Budget Allocations

The essence of this recommendation is to ensure the full implementation of the strategic framework, 50% of the ISD budget should be dedicated to the African region.

This FY it is estimated that ISD will allocate over 47% of its program resources to Africa. This is based upon pipeline data. I totally support this.

However, I do have difficulty with the statement by program officers responsible for sub-programs: "I cannot support projects in your region this year because I must allocate 50% of my program budget to Africa". This is not acceptable on two grounds. Firstly, it is not the amount of money spent in Africa which will impact on the quality of information services established. Rather, it is the relevance of the information activity to the development process and priorities most often identified by those quite removed from our specific intervention. I wish to have more energy and effort placed on the type of initiative which can play a key role in the transfer of information from source to those who need it in order to initiate change. This may or may not have a bearing on a 50% allocation target. The questions: "what type of project?" and "why?", are much more important than "How much?".

4. Growth of Financial Resources

To ensure that program development is not curtailed in the other regions (LARO, ASRO, and SARO), it is recommended that the Division obtain a 10% increase in the program budget for FY 1988/89.

Response:

I concur with this recommendation. During the budget discussions last year, a request was made to the President's Committee for a 10% increase to the program appropriations, over and above the approved growth level. Although the request and justification remain in the PWB document, the President's Committee's decision did not contain a reference to this request. Before the end of the second quarter of this FY, a submission will be made to reactivate the original request.

5. Staffing Requirements

This recommendation proposes that the staff complement be increased in Africa (Dakar and Nairobi) in order to respond to the new program initiatives resulting from the new strategy. New PY's plus relocations are considered.

Response:

I accept this recommendation in principle. New person-years were not approved for the IS Division for FY 1988/89. Rather, following the recent budget decisions, the relocation of one program officer position from Ottawa to Nairobi was approved. It should be noted that the original request was for a relocation to Dakar, but due to insufficient space in Dakar, Nairobi was chosen for the relocation site. This program officer, with continent-wide responsibility, has yet to be identified. I shall make the final decision regarding who and when by August 1988.

Following the implementation plan of the African Strategy, the profiles of additional program officers to be based in the regional office will be decided.

6. Human Resource Development

An appropriate approach for the Division is to work with Fellowships and Awards Division to develop a joint strategy addressing different types of training.

Response:

I concur. I expect this issue to be fully addressed in the deliberations of the Working Group as it develops the implementation plan.

7. Project Modalities

The essence of this recommendation is that at a Division-wide level various modalities of program delivery will be explored.

Response:

I concur. To the degree possible, i.e. within the context of Centre approved procedures, the most effective mechanism will be identified and applied.

8. Program Plans

The program sections will outline a plan of action describing activities to be undertaken within the framework of the African Strategy. These plans will be incorporated in the PWB for 1988/89.

Response:

I concur. As per the attached paragraphs from the PWB for 1988/89, it can be seen that the first steps have been taken to implement this recommendation.

I shall conclude my comments by restating in part what future course of action I expect to be taken.

- The existing Working Group of Associate Directors and three Regional Program Officers will continue to work toward the objective of a Division-wide implementation plan for the African Strategy.
- By the end of May, 1988, I will be advised of the chairman of the Working Group and the recommended Terms of Reference.
- As one of its activities, the Working Group will consider the reports prepared by Garth Graham on the mission undertaken last fall by Adje Bekoe, Garth Graham, and myself to Eastern and Southern Africa. These reports cover the mission itself and the results of discussions held with ministers, permanent secretaries, vice-chancellors, and directors of regional and national research institutes. In addition, as in Annex F of the strategy document: "Project Ideas Tabled During Workshops", Garth Graham's reports include possible entry points for the ISD program in his region. These entry points have been identified as a result of discussions with policy-makers and senior officials who are responsible for research and development priority setting. It will be useful to compare these issues with those presented by the researchers and information specialists. The points of inter-connection may provide strong indicators of areas where the ISD program can have a meaningful comparative advantage.

Finally, each one of you is to be congratulated on the quality of the work reflected in your report. The high quality will be recognized by many when the official publication is distributed. Shahid Akhtar deserves special acknowledgement for the crucial role he played in managing the many activities of the Working Group, and for seeing this major program initiative to this stage of completion. With high expectations and anticipation I look forward to the concluding results.

EXCERPT FROM THE INFORMATION SCIENCES DIVISION

1988/89 PROGRAM OF WORK AND BUDGET

Geographical Considerations: The estimated distribution of IS appropriations in 1987-88 is 15% in the LARO region, 32% in ASRO/SARO, and 40% in EARO/MERO/WARO, with 13% in Canada/Global. These figures do not differ significantly from the projections made in last year's program of work. However, the amount processed in the three regional offices serving Africa was less than anticipated, primarily due to the lower-than-predicted level of appropriation in the EARO region. A number of the activities expected there in 1987-88 will not now be processed until 1988-89. Early projections based on the current pipeline for the geographical distribution of funds in 1988-89 indicate 20% in LARO, 25% in ASRO/SARO, and 50% in EARO/MERO/WARO, with 5% in Canada/Global.

As anticipated in last year's PWB submission, the Division has formulated a major strategy to guide the development of its program in Africa, particularly South of the Sahara. The **Africa Strategy** was based on discussions and written contributions by African researchers, administrators, and information specialists. The main sources of input were two workshops (in East and West Africa), a survey by mail, and 17 commissioned papers about information issues in Africa. The outcome is a framework that supplies criteria for selection and evaluation of projects consistent with SubSaharan Africa's own priorities and existing infrastructures. The major strategic objectives will be to encourage sharing of information locally, nationally,

and regionally; to support information systems that address problems; to promote standards and compatibility among national and regional information systems; to improve the capacity among African nationals to plan and implement information and informatics policies; to increase the use of local experts in information handling; to ensure the sustainability of information initiatives; to build human resources in information sciences (specifically to impart skills in managing information systems, in acting as agents of change, and in soliciting and sharing knowledge produced within SubSaharan Africa); to promote participation by poor people in decisions affecting their development; and to improve access by development researchers, decision-makers, and practitioners to relevant, local information.

The Division will have to initiate changes within its own operations to respond to all the elements outlined in the strategy. In terms of making financial resources available to Africa, the distribution of funds between regions as noted at the start of this section reveals a degree of volatility. To overcome fluctuations, to protect the availability of resources for Africa, and to improve planning and management of the Africa program, the Division will allocate to Africa a specific percentage of its program funds. This allocation would cover the whole of Africa; it would encompass implementation of the strategy in SubSaharan Africa, promotion of collaboration with northern Africa, and support for other information activities in northern Africa consistent with the objectives identified in the strategy. The target figure will be 50%. Reaching the target will require careful management of the project pipeline. Experience has demonstrated the vast number of opportunities for IS Division to support projects outside Africa, i.e., in Latin America and Asia, where project development appears to be less time-consuming and more predictable. However, to maintain present levels of program activity in Latin America and Asia and to permit expansion of the Africa program, the Division could readily absorb a further 10% increase in its program budget (i.e. \$950,000) in fiscal year 1988-89.

Concerning human resources, the Division believes implementation of the strategy would be strengthened by increasing the number of IS staff based in Africa. The additional staff would have responsibilities in selected subject areas of priority to Africa. In the absence of new person-years, the Division will explore the possibility of relocating two or three of the Ottawa-based positions, including one relocation in 1988-89. The plan for implementing and coordinating the strategy, anticipates that staff within the Centre's three regional offices serving Africa will take on increasing authority as their numbers grow and IDRC policies permit.

In these and other ways, the Division aims to build a foundation that can support projects truly contributing to progress in SubSaharan Africa and to do this within a framework that is in keeping with developmental goals voiced on that continent. Each of the program sectors in this PWB submission provides some specific examples of the initial opportunities available to them in Africa.



INTERNATIONAL DEVELOPMENT RESEARCH CENTRE
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MEMORANDUM/NOTE DE SERVICE

TO/A: Martha Stone
FROM/DE: Shahid Akhtar *Shahid*
SUBJECT/OBJET: Africa Strategy

DATE: September 2, 1987

File: 120-10-1

I take pleasure in submitting to you, on behalf of the Working Group on Africa, the final report on a medium-term strategy for the Information Sciences Division. As you know, the Working Group was made up of Peter Boyle, Kieran Broadbent, Garth Graham, Paul McConnell, Gilbert Ndiaye, Antoine Terjanian, Robert Valantin, and myself. All of my colleagues on this Working Group displayed a deep sense of interest and commitment to the entire exercise, and spent long hours debating and drafting various aspects of the final report. I thank them for this and, in particular, I should like to thank Gilbert and Garth for the tremendous effort they put into organizing the Dakar and Nairobi Workshops respectively.

Unfortunately, due to logistical reasons, it was not possible for everyone on the Working Group to participate in all the discussions and drafting sessions leading up to this report. We were, however, all together far more than a week, both before and immediately after the three-day Nairobi workshop. During this critical period, not only were the outline and format of the present report agreed to, but also, to a very large degree, the content. The sole exception to this is the chapter entitled "Putting the Strategy to Work: Recommendations for Program Delivery", which has not had the benefit of any input from Peter Boyle and Gilbert Ndiaye.

I, of course, take full responsibility for the entire content of the report.

We sincerely hope that the report meets with your expectations. Should you require any clarification, or wish further details, please do not hesitate to call upon me - or any other member of the Working Group.

Finally, I should like to take this opportunity to formally record my appreciation to Adzei Bekoe and Bruce Scott for the personal interest they took in this study and for making the opening statements at the Nairobi and Dakar Workshops respectively; to Bev Chataway and her colleagues for the assistance they provided in carrying out various bibliographic searches; to Jennifer Leckie, who assisted us by

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searching IDRC databases and preparing inventories of ISD's African projects between 1971-1986; to all the Program Officers for their unstinting support, advice and assistance at every stage of this exercise, including feedback following the discussion at the IS Staff Meeting; and last, but not least, to Clo Currie, for coping, always with a smile, with all the administration and word processing associated with this entire exercise.

Thank you.

Encl.

cc: DPMG : With copies of report
RPO's

INFORMATION FOR DEVELOPMENT:
A STRATEGY FOR SUBSAHARAN AFRICA

Prepared by the Information Sciences Working Group on Africa:

Shahid Akhtar, Peter Boyle, Kieran Broadbent, Garth Graham, Paul
McConnell, Gilbert Ndiaye, Antoine Terjanian, and Robert Valantin

International Development Research Centre

August 1987

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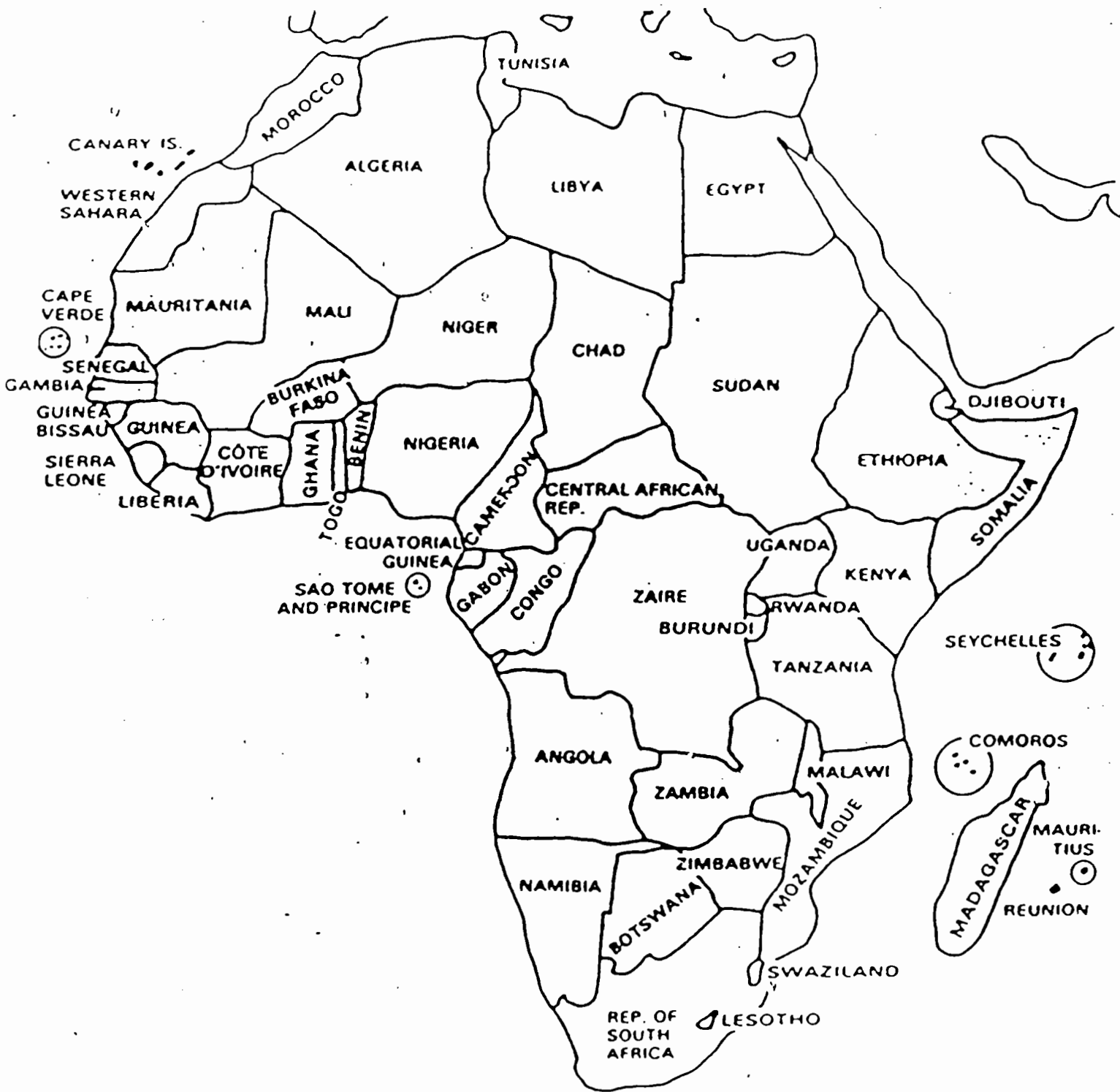
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ACRONYMS

- ACIAR: Australian Centre for International Agricultural Research
- AGRIS: International Information System for the Agricultural Sciences and Technology
- AIDBA: Association internationale pour le developpement de la documentation, des bibliotheques et des archives en Afrique
- ALDOC: Arab League Documentation Centre
- ARCT: African Regional Centre for Technology
- ASEAN: Association of South East Asian Nations
- BOSTID: Board on Scientific and Technical Information for International Development
- CARIS: Current Agricultural Research Information System
- CD-ROM: Compact Disk-Read Only Memory
- CEAO: Communauté économique de l'Afrique de l'Ouest
- CIDA: Canadian International Development Agency
- CODESRIA: Conseil pour le developpement de la recherche économique et sociale en Afrique
- CRAT: Centre regional africain de technologie
- DEVISIS: Development Sciences Information System
- EBAD: Ecole bibliothécaires, archivistes et documentalistes
- ECA: Economic Commission for Africa
- ESI: Ecole des sciences de l'information
- FAO: Food and Agriculture Organization of the United Nations
- GATE: German Appropriate Technology Exchange
- ICIPE: International Centre of Insect Physiology and Ecology
- ICRAF: International Council for Research in Agroforestry
- IDRC: International Development Research Centre
- IDRIS: Interagency Development Research Information System
- IFS: International Foundation for Science

IGADD: Intergovernmental Authority on Drought and Development

IITA: International Institute of Tropical Agriculture

ILCA: International Livestock Centre for Africa

ILRAD: International Laboratory for Research on Animal Diseases

INFOTERRA: International Referral System for Sources of Environmental Information

ISNAR: International Service for National Agricultural Research

LAS: League of Arab States

MINISIS: Interactive Minicomputer System for Information Retrieval and Library Management

NAM: Non Aligned Movement

OAU: Organization of African Unity

PAC: Programme Activity Centre

PADIS: Pan-African Documentation and Information System

PANA: Agence panafricaine d'information

PTA: Preferential Trade Area

RESADOC: Reseau sahelien d'information et de documentation scientifique et technique

SACCAR: Southern African Centre for Cooperation in Agricultural Research

SADCC: Southern African Development Coordination Conference

SAREC: Swedish Agency for Research Cooperation with Developing Countries

SPAAR: Special Program on African Agricultural Research

UNU: United Nations University

USAID: United States Agency for International Development

WHO: World Health Organization

EXECUTIVE SUMMARY

The Information Sciences Division of IDRC recently adopted a strategy for assisting subsaharan Africa in building information systems, networks, and services. The strategy was based on discussions and written contributions by African administrators, researchers, and information specialists. The main sources of input were two workshops (in East and West Africa); a survey by mail from Ottawa, Dakar, and Nairobi; and 17 commissioned papers about information issues in Africa.

The staff of the Division, including project and field representatives in Africa, attempted to digest and distill the wealth of material. The aim was to document the problems faced by countries in subsaharan Africa and identify ways in which IDRC -- given its policies, objectives, and resources -- could support efforts to solve the problems.

The rationale has been that the financial and human resources in Africa and among donor agencies such as IDRC are limited and could most effectively be used within an explicit framework of objectives and programs consistent with subsaharan Africa's own priorities and existing infrastructures for research and information.

The strategy provides a means for selection among projects that are inherently valuable, it supplies criteria against which existing and completed projects can be evaluated, and it opens the way for the Division to redress inequities -- geographic and economic -- in its support.

In the past, the Division's support was concentrated in countries that have relatively good information support systems and that have other projects supported by IDRC. Proposals submitted to the Division were judged on the basis of their inherent quality rather than on the basis of their contribution to a network of information services and systems for and by Africans.

Such an approach, while perhaps justifiable in the short term and in early support programs, is inconsistent with the urgency for development in subsaharan Africa. There was a risk of directing not only the Division's but also the region's resources toward the goals of a few researchers and their organizations rather than toward the overall aims of the region. The approach was also less than appropriate if judged according to the published objectives of IDRC to contribute toward structures that benefit the poorest of the poor. Also, the diffusion of information on research and development linked to national and regional policies provides a better focus for the long term than uncoordinated sectoral concentrations.

The Division has thus attempted to reach a consensus with information users and providers in Africa about a framework for future support so that the assistance can benefit as many people as possible.

The major objectives of the strategy for Africa are to encourage sharing of information locally, nationally, and regionally; to support information systems that address local problems; to promote standards and compatibility among national and regional information systems; to improve the capacity among African nationals to plan and implement information and informatics policies; to increase the use of local experts in information handling; to ensure the sustainability of information initiatives; to build human resources in information sciences (specifically to impart skills in managing information systems, in acting as agents of change, and in soliciting and sharing knowledge produced within subsaharan Africa); to promote participation by poor people; and to improve access of local development researchers, decision-makers, and practitioners to relevant information.

Given these objectives, the Division expects that project proposals will fall within one or more of several major spheres: capturing and delivering information for and by Africans, responding to users' needs and behaviours, building national infrastructures, sharing resources across the region, upgrading information personnel, or funding and sustainability of services and systems.

Key among the spheres of action -- and probably most difficult for effective interventions by donors like IDRC -- is capturing, repackaging, and delivering information produced locally by farmers and other primary producers, scientists, government officials, merchants, and health workers and other service personnel. At present, because of the shortage of networks, personnel, and facilities devoted to recording and redistributing what is known locally, much of the knowledge is disregarded or lost as are the opportunities for South-South sharing of relevant findings.

Africans are painfully aware that expensive expatriates are often brought in as consultants when there are experts within the region who could provide the services if they were called upon to do so. The lack of high-quality indigenous publications is one reason that local experts are often unknown outside a small circle of peers.

Scientists in Africa must compete for space in journals published in developed countries whose first commitment is to producing material by and for their own nationals. A familiar but unresolved question is how donors like IDRC can assist in creating vehicles for publication without committing support permanently.

Experience has shown that even widely read, popular magazines cannot survive without long-term support because more pressing needs must be met from local coffers.

Imaginative suggestions are needed on how to use all types of media -- oral, written, and audiovisual forms -- to disseminate information on health, sanitation, and farming methods. Where possible,

the Division will support indigenous publishing programs, studies of the presentation and marketing of information for specific users, and development of information systems that cater to local communities and governments handling information by and for indigenous groups.

In other words, it will be open to proposals that strengthen information infrastructures from the bottom up -- including imaginative community information services as well as local, district, and national government services -- especially for bibliographical, factual, and statistical data collection and dissemination.

It is also prepared to assist national governments, at their request, to delineate policies covering not only the types of information systems and links that are appropriate for the country but also all other aspects of information and informatics. For example, information policies could deal with import restrictions, incentives for information sharing among different institutions, commitment to South-South cooperation, regulations for material acquisitions, and designation of agencies responsible for coordinating aid from donor agencies; through such statements, governments indicate the political will to apply information to the problems of development.

Only with consistent policies can nations build networks rather than the isolated -- even competing and duplicate -- stores of documents and data that are now operating in the region. Currently, the libraries in government departments, universities, and research institutes often obtain the same materials, sometimes in costly foreign exchange.

By increasing its support for national infrastructures, IDRC hopes also to benefit regional and subregional information systems, enabling member countries to benefit from and contribute more effectively to the services available.

Sharing resources across the region is considered to be a key method of dealing with the shortages of personnel, funds, and facilities. Because of the great disparities among individual countries, considerable scope exists for South-South cooperation in this respect. Much cooperation is already under way in the form of regional and subregional information programs; such systems coordinate information for all member countries.

From the outset, the Division has assisted in the creation of these systems and will continue to support them. In particular, it views favourably systems that collect data that will benefit large numbers of people -- for example early warning of food shortages and for monitoring and action on deforestation and desertification.

Experience has shown that such systems can expand South-South cooperation and can also stimulate the development of national infrastructures. This is particularly true for decentralized regional systems in which each member country takes responsibility for coordinating action and services for a sector deemed by all to be a

priority for development efforts. Each country also takes responsibility for input of all sectoral materials produced inside its borders -- a territorial formula that has been adopted by many of the more centralized regional systems.

Decentralization brings into play national pride and a political will that makes for rapid progress in countries where some networks are already in place. It also makes for major differences in the speed with which the systems develop and, clearly, at least a rudimentary network must be in place at local levels so that countries can deposit and draw useful information in a databank.

The Division will support the development and use of standards, common methods, and tools so that sharing and exchanging information is facilitated. It aims to cooperate with other donors where possible to gain maximum effect from funding and other mechanisms of support.

It encourages regional and subregional organizations to extend training to personnel from member countries. The dearth of training opportunities in information handling is a major obstacle to effective information sharing and was underlined by Africans who participated in the elaboration of the Information Sciences strategy.

Much of the training that has been provided to date is traditional, and, for example, librarians are perceived and perceive themselves as caretakers rather than brokers of information. Front-line information personnel -- from whichever parent discipline and occupation -- including librarians, agricultural extension workers, local statistics officers, documentalists, and community leaders need innovative training that imparts skills in gathering, analyzing, and repackaging information. They are the key links between the majority of the people -- the farmers and other rural inhabitants -- and the researchers, policymakers, etc.

Training opportunities are also needed for information experts and personnel processing data. The Division, therefore, welcomes proposals for projects to upgrade all information workers and can play some role in upgrading human resources. It will encourage advanced training and will support proposals for short courses and seminars aimed at paraprofessionals and those who are holding managerial positions in information services.

It will provide software for the management and exchange of information and will arrange for training on how to use it. Resource centres for the Centre-developed software -- MINISIS -- are planned throughout the developing world and will mean some upgrading of institutions within Africa in conjunction with the transfer of skills.

Also the Division will continue to contribute funds that enable regional information programs to share know-how and skills and will encourage activities involving experimentation, adaptation, and use of information tools and technologies, particularly in the dissemination of information.

Funding for such cooperative services -- and for all information services -- must come from many sources. One source is user charges, which were strongly advocated by the Africans who participated in the elaboration of this strategy. The rationale for the fees is to help defray costs, to underline the value of the information, and to evaluate the success of the service in supplying what users want. Given IDRC's and other donors' requirements for commitment by local participants in projects, a service for which users are willing to pay could be attractive and could attract funds more readily than other services. However, the issue is not a simple one, and, other methods of evaluating the relevance of services should be investigated.

Clearly, too much effort has been concentrated on structuring systems and centres rather than on finding out just what it is that users -- from policymakers to peasants -- want. Judging from the general lack of success in implementing user fees in developed countries, one would have to advocate more direct measures of the utility of an information service. Poor communities need information -- perhaps more than anyone else, and the development of an information elite servicing only those who can afford to pay would be a step backward.

Even with user fees, information services cannot be expected to be self-supporting. They are funded from the public purse in developed and developing countries alike. They are essential to development; yet they are only one of the essentials in short supply in subsaharan Africa.

Some organizations in subsaharan Africa are requesting that donor agencies be willing to commit funds for at least 10 years toward information services, noting that anything short of a decade is insufficient to lay the groundwork, set up the network, begin operation, and make needed adjustments. The Division sees merit in the arguments and agrees that it makes little sense to dedicate resources without allowing realistically for the services to be operating smoothly. In future, it will attempt to commit assistance accordingly.

The Division will have to initiate changes within its own operations to respond to all the elements outlined in its strategy for Africa. For example, the Division is proposing to set aside for the continent of Africa 50% of its total program budget. It is also recommending the immediate increase or transfer of person-years to the regional offices there.

It anticipates that staff within the Centre's three regional offices serving Africa will be the key to implementing the strategy and that they will take on increasing authority, as their numbers grow and IDRC policies permit.

The Information Sciences staff in Ottawa, with their special expertise in sectors that are priorities in subsaharan Africa, will work with regional program staff to ensure a balanced implementation of the strategy for their sectors.

In these and other ways, the Division hopes to build a foundation that can support projects truly contributing to progress in subsaharan Africa and to do this within a framework that is in keeping with developmental goals voiced on that continent.

INTRODUCTION

This publication details a strategy for the International Development Research Centre (IDRC) to follow in its efforts to assist subsaharan Africa in building information systems and networks that fuel development. It is based on discussions and written contributions by African specialists. It draws on:

- o Two workshops (one in Dakar, 24--26 March 1987, for francophone Africa and one in Nairobi, 29--31 March 1987, for anglophone Africa), which were attended by administrators, researchers, and information specialists. Each workshop involved commissioned papers (see Appendices B and C) followed by discussions.
- o A survey, by mail, of about 240 national and international agencies and individuals responsible in the information field; 40 letters were sent from Dakar to Central and West Africa, 100 from Nairobi to East and Southern Africa, and 100 from Ottawa to other regions. Approximately 40% of the letters elicited comments, which are summarized in Annex E.
- o And contributions by IDRC's team for management of information programs and projects in Africa and the field representatives, who met for 3 days in Nairobi immediately following the second workshop.

The aim was to identify subsaharan Africa's information needs and priorities by digesting, distilling, and synthesizing the wealth of material and to prepare a detailed list of information-related problems and some proposals to remedy the problems. This list, which is contained in Annex D, later formed the basis for the present report. Hence, aside from the sections entitled "IDRC's Response", this report represents the Information Sciences Division's interpretation of the contributions made by African and other specialists, whether at the workshops themselves or through the survey conducted by mail.

The strategy is new, and it represents the first time IDRC's Information Sciences Division has elaborated an integrated regional plan.

A major criterion for selection of projects has been the applicants' knowledge that IDRC exists and that it supports projects in information sciences. Among donors, IDRC is young -- not yet 20 years old -- and it is unique in having a division that is devoted to the support of information projects. Thus, in a way, requests for support have tended to reflect the interests and priorities of the established information community. This setup has worked against IDRC objectives to fund activities that benefit particularly disadvantaged groups.

As staff of the Division, we believe selection criteria should include reference to a strategy emphasizing the type of support most

appropriate to the conditions in each region -- the national and regional priorities, the infrastructures for research and information, etc. Then, the funds and other support could contribute to consistent improvements in subregional and regional institutions, systems, and networks.

Until the 1980s, the Division's approach to development assistance was to maintain a complement of staff who traveled from the Centre's headquarters to assess requests for aid and to assist researchers in presenting applications for funds. The focus of assessment was the inherent value of the projects; the geographic and sectoral distribution of projects was not a major consideration.

In the early 1980s, IDRC strengthened its regional offices throughout the world so that it could reach more recipients. Since then, the Information Sciences Division has maintained staff in Asia, South America, and Africa. This decentralization has provided the Division with a better view of what is going on in the developing world and has opened permanent communications channels between the regions and IDRC headquarters.

What has become clear is that the approach to project funding has been somewhat ad hoc and that the Division needs a strategy -- a framework upon which projects can build.

A framework is particularly appropriate for subsaharan Africa because of the urgency for development in the region. Not only the Information Sciences Division but all of IDRC, through its Program and Policy Review, has renewed emphasis on support for Africa. It has also reaffirmed its aim to support projects that directly benefit the general population and that allow for sustainable growth, equity, and participation.

Recently the Organization of African Unity (OAU) drafted a new and comprehensive developmental plan for the continent. This plan, promulgated in July 1985 and entitled the African Priority Program for Economic Recovery (APPER), is a blueprint, stressing, among other things, the role of information, especially in conjunction with economic and resource management and science and technology.

IDRC would like to contribute to Africa's recovery. A look at the current conditions indicates there is much to be done.

The Setting for Development *

Subsaharan Africa includes 47 countries. Each one of these countries is unique: each has its own history and set of social and economic problems and priorities. In common, they have one major developmental issue: as a group, they are economically worse off today than in 1960 (World Bank 1986a, p.9). Most of the people cannot attain basic skills; physical hardship and suffering are the norm; only a small portion of the population is receiving adequate financial compensation, and much of the population is not receiving a secure and regular food supply.

This review is based on the literature and publications of such agencies as the Organization of African Unity, Unesco and The World Bank.

With two exceptions (Ethiopia and Liberia), all the countries in subsaharan Africa have become independent within the past 30 years and several within only the past 15 years (World Bank 1981, p.2). The inherited governmental structures were, in some cases, not appropriate to the tasks of development nor are the economies. In general, the countries depend for their growth on the export of one or a small number of agricultural or resource-based commodities. Other sectors of the economies are not fully developed or linked. Thus, most African economies are dependent on external trade and are extremely vulnerable to forces that they cannot control (OAU 1986, p.5).

Also, the newness of the African countries and the legacy of their colonial rulers are the source of much political instability. While all the countries are obviously geopolitical entities, some are not yet strong nations. Several do not have a cohesive identity, and the political divisions as well as civil strife hamper development. In some of the countries, fighting has become a way of life.

The result is that subsaharan Africa has 5 million refugees, more than any other continent. Absorbing these refugees into other states poses serious adjustment problems and places excessive strain on the recipient country's economy and social services (U.N. Ad Hoc Committee... 1986, p.15).

Most countries receiving immigrants cannot even feed their own populations. For the region, food production increased annually an average 1.5% during 1970-84. Population, however, increased an average 2.7% a year. In other words, on a per-person basis, the food supply decreased by 1.2% a year during the period. From 1970 to 1980, the volume of food imports increased by 8.4%, with 20% of subsaharan Africa now depending on food imports, 25% of which are provided by food aid (OAU 1986, p.5-6).

* This section highlights some of the general development problems affecting subsaharan Africa, in order that African information problems can be seen in their proper light.

Ironically, the agricultural sector has substantial potential; the sector could carry subsaharan Africa forward, decreasing dependence on food imports, increasing export earnings, and providing inputs for the industrial sector and demands for industrial products. It could also strengthen the tax base and domestic savings, contributing thereby to financing education, health, and infrastructure and reducing constraints on development. It is the most important sector in subsaharan Africa's economies. In 1982, it accounted for 41% of the GDP and employed approximately 70% of the population (World Bank 1984b, p.5).

At present, the sector's output is mainly (60-80%) produced by women, who make up only 45% of the agricultural labour force. The women also produce as much as 90% of rural food needs. Yet they remain the most disadvantaged and poorly educated group in Africa. Their effective participation in development is a prerequisite not only to improving agriculture but also to solving health and population problems (OAU 1982, p.109-118).

Although subsaharan Africa is one of the least densely populated regions in the world, its rate of population growth is one of the highest, 3% annually. The population was 270 million in 1970, 359 million in 1980, and is projected to reach 880 million in the year 2000, and 2 billion by 2025 (World Bank 1984b, p.28).

The African economies are having difficulty keeping pace with this rate of population growth; as a result, the per-person domestic product and the quality of life seem to be deteriorating. Funds that might normally be channeled into domestic savings for investments, are not available. The ever-increasing population is growing poorer and less able to provide food, health care, education, and employment for itself.

The age distribution within the population presents another development problem; 45% of the population is younger than 15 years (World Bank 1984b, p.28). Compared with other regions in the world, subsaharan Africa has a high dependency ratio. This ratio is the sum of people younger than 14 years and older than 65 divided by the number of people between ages 15 and 64 -- the age group regarded as productive. In subsaharan Africa the ratio is 92.5; in Europe it is 50.2 (OAU 1986, p.49).

The increasing population has placed heavy pressures on the environment, with land use practices that have caused deforestation, soil erosion, and riverbed siltation. The forest cover that has been depleted may be irretrievable, with serious consequences for household fuel supplies, soil fertility, and water supplies. In some countries, consumption of firewood alone exceeds growth by a factor of 10. The forests and savanna woodlands have been halved since the turn of the century (World Bank 1984b, p.32-33).

Of the total population, 20-25% lives in urban centres where population growth is 5-7% annually (World Bank 1984b, p.32-33). The migration of people from rural areas to the cities places stress on urban social services and disrupts traditional family and social relationships. It deprives the rural areas of young, productive (and, at times, educated) people.

Governments have had to deal with two separate sets of policy issues -- urban and rural -- and to set priorities between them. Governments in Africa, as those elsewhere throughout recent history, have directed much of their attention to the urban setting at the expense of rural development (U.N. Ad Hoc Committee...1986, p.6). The result has been poor agricultural productivity and uneven income distribution in favour of the cities.

One obvious reason that governments have traditionally invested in urban development is the relative ease with which a large number of people can be provided with services -- for example, schooling. So schools are found mainly in cities, even though a prerequisite for overall development is the ability of the entire population to read and write. In subsaharan Africa, 29 million children between ages 6 and 11, as well as another 39 million between ages 12 and 17, are not enrolled in school. Also, 54% of men and 65% of women are illiterate. Although the percentages of illiterate adults have declined since 1970, the numbers have risen (from 139 million in 1970 to 162 million in 1985). (Unesco 1986, p.7).

The picture for health conditions is similarly gloomy. Although it has perhaps improved in the past 10 years, it is still the worst in the world. Estimates in 1985 indicated that immunization levels among African children were the lowest in the world: polio, 32%; measles, 35%; tuberculosis 41%; and diphtheria, pertussis, and tetanus 33%. An immunization level of 80% is considered necessary to control the transmission of these diseases (World Bank 1986a, p.28). The forecast is even worse for viral diseases against which there is no vaccine -- such as AIDS and hepatitis.

Dealing with this litany of problems is possible only if systematic plans can be implemented and sustained. Financing will be difficult. Between 1975 and 1985 subsaharan Africa's debt arrears grew seven times to total \$175 billion dollars. This indebtedness -- in terms of the countries' export earnings and GDP -- represents a doubling of the debt burden for the same period. Although not significant in absolute terms, payments to service the debt do constrain development. During 1986-90, debt-servicing payments for countries eligible to receive international development assistance have been estimated to be 25% of foreign-exchange earnings and for ineligible countries, as much as 35% (World Bank 1986a, p.40).

During 1982-85, 32 financial reschedulings took place, and 20 countries fell into payment arrears. Top managers have to spend valuable

time renegotiating payment schedules, often without support from effective local information systems. Creditors have become hesitant to lend to the countries. Sometimes, the lenders halt new loans, stop disbursements on existing loans, or demand increased interest rates (World Bank 1986a, p.11).

Meanwhile public spending takes an ever-larger share of GDP. By 1981, it had increased to 29.5% from 16.5% in 1966 (World Bank 1986b, p.2). There is little or no coordination of public investment. The central planning and finance ministries do not exercise effective control over the sectoral ministries. Centralized information on aid flows is lacking, and the responsibilities for donor contact and negotiation are unclear. Rather than a coherent program reflecting nationally determined priorities, the development program is often an aggregation of projects. Investment projects that are ultimately selected are often unproductive. Low yield on capital investment is one of sub-Saharan Africa's major economic problems (World Bank 1984b, p.28).

This is but a brief overview of the developmental problems confronting African leaders as they work to realize the plans set out in their priority program for economic recovery, but it does set the context for action. IDRC wants to assist where possible and we in the Information Sciences Division began by asking Africans what they believed was needed. The workshops allowed us to formulate a strategy in line with our definition of information.

Information Sciences: A Definition

The Division's definition of information sciences is operational. The staff are organized into areas of specialization: socioeconomic information systems; scientific and technical information systems; information tools and methods; and the computer systems group, which manages the MINISIS software. A focus is provided through the concept of the information chain: the collection, organization, and accessibility of information.

Information science encompasses concepts in library and computer science but is not limited to either. Tague and Austen (1986) noted some of the distinctions:

Library schools were formed to educate professionals for a specific institutional setting, namely the library. Information science differs from library science in being seen more clearly as a discipline as well as a professional preparation...information scientists focus on information as something being told to someone via some kind of transmission medium or channel. In contrast, computer scientists concentrate on a particular medium in the chain from informant to recipient. Information science is a social rather than a physical science in its primary focus.

This means that in the design of an information system, as much weight should be given to an understanding of the informant and recipient as is given to the content of the message and its means of transmission if it is to support effective communication. As Charles Wareko-Brobby noted in the Nairobi workshop, "If information is the agent of change, the objective of an information system should be to look for the opportunities for change for the group it is intended to serve."



THE STRATEGY

OBJECTIVES

Distilling and interpreting the contributions from Africans and others who participated in workshops and surveys to produce a strategy for subsaharan Africa, the Information Sciences Division drew up a list of objectives that it feels should pervade all its support for information activities in Africa:

- o To improve the effective utilization and sharing of existing knowledge and resources in Africa at the local, national, and regional levels.
- o To design and implement information systems and services that are relevant to the local environment and that address specific needs and problems.
- o To improve information sharing and data transfer at the national and regional levels by promoting standards, compatibility, and use of methodologies, technologies, and tools adapted to the African environment.
- o To improve the indigenous capacity to plan, develop, and implement information and informatics policies.
- o To secure long-term commitment for sustainability of information programs.
- o To stimulate greater use of local technical expertise in information-handling by promoting South-South cooperation within Africa.
- o To build human resources in information sciences through needs-based training at all levels and, particularly, training of managers and trainers to strengthen the multiplier effect.
- o To improve the capacity of people involved in the provision of information to act as agents of change.
- o To promote a two-way flow of communication so that rural (and urban) poor people participate in an interactive dialogue on development issues affecting them.
- o To improve the capacity of local scientists and technologists to obtain relevant information and bring about a more effective transfer of technology at the grass-roots level.

These objectives can be further distilled into a collection of key phrases -- better utilization of existing resources, more user-oriented

services, better coordination, more attention to sustainability, special priority for systems benefiting the poor, increased participation and two-way flow of information, training opportunities, and increased involvement with information systems to bring about change.

Relationship with IDRC Policies

The objectives are very much in tune with IDRC's approved mandate and have much in common with statements adopted by the IDRC Board of Governors and published recently:

IDRC's Mission is to contribute to development change through research and research-supporting activities. The Centre aims to assist in promoting the indigenously determined social and economic advancement of the developing regions of the world, with particular focus on the problems of poverty (IDRC 1986a, p. 31).

The Centre's Objective is to support research of direct relevance to and demonstrable potential for Third World development, with relative emphasis on poverty problems; and in pursuit of that end, to assist developing countries to build and maintain indigenous research and research-supporting capacity, mainly at the national, but also at the regional level, and mainly in terms of human resources (IDRC 1986a, p. 31-32).

The Centre must endeavour constantly to ensure that the activities it supports reflect three essential elements for development as viewed from the perspective of the beneficiaries: sustainable growth, equity, and participation...in the decision-making which determines development (IDRC 1986b, p. 4-5).

For the sake of clarity, it is worthwhile to take a look at how the Africa-specific objectives relate to the broader objectives of the Information Sciences Division. What, if anything, is special about the proposed response to African needs?

The objectives of the Africa strategy do not require any radical departure from the areas of activity or the methods of the Division. They do require a more focused and coordinated program. The directions to be pursued by the Division in Africa must include:

- o Development of human resources in the information field by providing education and training at all levels, from short seminars for upgrading of skills to postgraduate research.
- o Improved use of existing knowledge, systems, services, and resources by means of several different techniques,

including South-South cooperation, better interaction with users, adaptation of information tools and methods, increased use of some of the known information technologies, strengthening of national information systems, etc.

- o Careful design of sustainable information systems tailored to serve the needs of specific groups and oriented toward specific development issues.
- o Support for information systems and services designed to benefit poor populations more directly, including the active participation of these populations in a two-way flow of information affecting development decisions.

Users and Beneficiaries

The last point brings into focus the users and beneficiaries of activities to be supported by the Division. Although an oversimplification, information users could be split into three target groups:

- o Those needing information for research;
- o Those needing information for policy and planning decisions; and
- o Those needing information to implement developmental change at the local level -- this last group encompassing extension workers, community action groups, farmers, etc.

"To date, emphasis has been placed primarily on the needs of the research community, followed by the needs of policymakers. However, it is expected that increased attention will be paid in future to supporting those information activities designed to have a more direct impact on the ultimate beneficiaries of the Centre's work" (IDRC 1986b, p. 57).

The strategy still envisages the same range of target groups but promotes a shift in emphasis toward those needing information to implement developmental change. Under the new strategy, two components will be emphasized:

- o Information tools, systems, and services designed to improve the flow of scientific, technical, and other information to be applied by the intended beneficiaries, and
- o Activities that enable the people to participate in the flow of information leading to research and decision-making that affect their own development.

Associated with these foci is the involvement of information workers acting as agents of change. Specific measures to accomplish

these tasks will be determined through experimentation, but the objectives are consistent both with the needs as stated by Africans and with the declared mission of IDRC.

There is an operational shift implicit in the Africa strategy because meeting some of the needs expressed by Africans during the workshops will require surveys of existing resources, identification of African consultants and troubleshooters, organization of training sessions and similar activities -- a more extensive role than in the past for the Division. The information community and others in Africa have made it clear that this is the role they would like the Division to play.

For an organization such as IDRC, which is essentially responsive, any strategy is an expression of orientation and emphasis rather than a statement of clearcut rules. In executing its program in Africa, the Division will seek to concentrate its support on activities that reinforce each other and, hence, progress in meeting Africa's information needs.

Given the objectives of its strategy, the Division expects that project proposals will contribute to developments in the following major spheres:

- o Capturing and delivering information by and for Africans,
- o Responding to users' needs and behaviours,
- o Building national infrastructures,
- o Sharing resources across the region,
- o Upgrading information personnel, or
- o Funding and sustainability of services and systems.

The rationale for these focuses and some of the ways the Division expects to provide support deserve mention.

CAPTURING AND DELIVERING INFORMATION BY AND FOR AFRICANS

Setting up mechanisms to capture and share information produced within Africa is perhaps the most pressing of the problems to be tackled. The lack of such mechanisms affects virtually every segment of society. At present, Africans -- farmers, researchers, scientists, government workers, extension personnel alike -- have few fora to share their knowledge.

African information practitioners are painfully aware that expensive expatriate consultants are often brought in because no one knows the competent consultants in the region. Priority must be given to improving the utilization and coordination of existing knowledge and resources in Africa. The advantages of using African personnel rather than consultants from developed countries include familiarity with local conditions, constraints, cultural factors, contacts, and language; proximity for follow-up; and (usually) lower fees, payable in local currency. There is considerable scope for encouraging South-South cooperation to mobilize the experiences and expertise available within the region -- perhaps supported by local, regional, and sectoral registers and directories of researchers, research institutes, and consultants.

Drawing on consultants from the region is one desirable way of tapping local expertise, but there is also a need to capture and record local knowledge and to make it more readily available to a larger audience. Groups must be willing to provide effective, long-term support to the endeavour. Given the concern expressed by African practitioners about the loss of potential benefits because local knowledge is sometimes difficult to obtain, agencies need imaginative measures designed to tackle this problem.

Sometimes information has to be repackaged or consolidated before delivery to specific target audiences. For example, published results of scientific and technological research on agriculture, health, the environment, economics, etc. have to be repackaged to be understood by administrators, policymakers, extension workers and other intermediaries, or farmers. Repackaging of written materials may be in audiovisual or other nonprint forms. Oral traditions are a strong link in the information chain in Africa, and they have potential for the dissemination of information on health, sanitation, and farming methods. The goal is to use all types of media in innovative and appropriate ways to reach end users.

Consolidation denotes the merging and condensing of information, often from many sources; it involves selection, analysis, synthesis, transformation, and repackaging, followed by dissemination of the output to end users. For example, at the International Livestock Centre for Africa (ILCA) in Addis Ababa information about animal husbandry is brought together, transformed, and repackaged as abstracts, bibliographies, monographs, and manuals, newsletters, etc. for a range of different users.

For such outputs, the service requires a setting that in Africa is currently available in institutes like IITA, ICRAF, ILRAD (International Laboratory for Research on Animal Diseases), and ICIPE (International Centre of Insect Physiology and Ecology). They could serve the demand regionally, producing information in the official languages of the nations and, where possible, work with other services to ensure appropriate packaging locally.

Repackaging requires special skills, which may include science and journalism. Staff with such expertise, as well as the institutional support for such activities, are generally in short supply in Africa.

Likewise, the training and experience of most of the extension workers in Africa are inadequate for their tasks of information delivery at the community level. Many of them are poorly motivated because the incentives are meagre. They are in a prime position to interact effectively with both literate and illiterate farmers, but they are unlikely to do so unless they understand the value of what they are doing and the key role of farmers -- particularly women -- in the future of the country.

Extension workers could be offered training in community development to support their agricultural activities, and at the least, they should be given guidance in developing information packages that farmers can use without having to learn complex new skills. Indices to evaluate the efficiency and impact of extension would be valuable, and one form of index is the numbers who adopt innovations -- an index that is also a measure of the quality of innovations. The flow of information must be two way from research, through extension, to farmers and back again. It must travel along a route that includes global, regional, national, and specialized information analysis centres.

To inform extension workers, literate farmers, and others, publications are the most commonly used medium -- largely, newsletters, circulars, handouts, etc. One instructional aid for extension workers is the audiotutorial. For example, teaching extension workers and their clientele how to use technologies developed or adapted by the Botswana Technology Centre (BTC) is the aim of audiovisual materials and radio programs produced by BTC. The key is to choose media to suit the message and the audience.

Choosing the appropriate methods demands a range of skills in preparing and presenting material. It means surveying needs and setting priorities, promoting and marketing the information services, and helping users learn how to find the information themselves.

Further experimentation is required with pilot village information services to search for innovative ways of using indigenous knowledge and for delivering information, integrating oral communications with print-based messages and testing different organizational principles, practices, and objectives. At the village level, such services should

collaborate closely with extension agencies, literacy programs, and rural development projects. Some characteristics of the users of these services will influence the demand and the design. Key among these are illiteracy, which means not only an inability to read but also a lack of the accompanying approach to problem solving; long hours of manual work, which affects the users' time and interest; conservatism, which stems from the high cost of mistakes in a subsistence economy; and a static iron-age (hoe and machete) technology, particularly in agricultural activities.

Information services could aim at, for example, imparting literacy, detailing appropriate technology, assisting with formulation of government policies, improving crop production and animal husbandry, preventing spread of diseases, reporting heritage and culture, spreading indigenous knowledge, or supporting exchange of information by the village with external agencies, and other villages.

All people seek input and information from others when they make decisions, consulting channels that have worked for them in the past.

Indigenous Information

One underutilized and vast source of information is the people living in subsistence or marginal economic circumstances. The people are the source of information about what is happening. Currently, 85% of the people in subsaharan Africa are involved in subsistence economies. One must ask whether the worldwide emphasis on economic development and the move toward a cash economy mean that these people are simply written off. An alternative may be to look inward for self-sustaining approaches, even though these are not growth-based. The record of achieving the objectives of economic development in subsaharan Africa over the last 20 years has been dismal, even retrogressive. Rethinking the long-term consequences of current objectives brings a different perspective to considerations about the value of indigenous knowledge.

In all the communities, the production systems that are in place work most of the time. External systems proposed (or imposed) to replace them usually do not work because they are not as comprehensive as what was already there.

Putting indigenous as well as outside knowledge within reach of the people would allow them to fit the information into their systems to address their particular problems. Attempts to tap indigenous knowledge are thwarted by fixed perceptions of development objectives; negative attitudes toward people in marginal or disadvantaged circumstances; and fragmentation of services. Another constraint derives from the fact that farmers and marginal peoples explain what they do in cultural terms that seldom correspond to the Western scientific world view or to the standard methods for paradigm changes, as currently understood. Local community knowledge is too often disregarded by others, especially

scientists and administrators, and its pragmatic basis in experience is overlooked. This knowledge and experience would effectively enhance any adaptation of new methods and systems.

The rural farmer knows that survival depends on his or her own decisions. The government is seen, at best, as well meaning. Planners and decision-makers often express negative or paternalistic attitudes toward rural dwellers. The concern to maintain political control as a first priority often goes so far as to interfere with the use of local languages as a vehicle for education and for dialogue on development issues. Discussions of rural development include such distancing phrases as "mobilization of the masses" or the need to "wait until literacy campaigns make it possible to involve people directly," or "the peasants must move from subsistence to wage earning before development begins." Giving a stronger voice to indigenous knowledge would help to diminish the isolation between planners and the people being planned for.

One step taken recently to capture the indigenous knowledge of local farmers and to put new information within their grasp is farming-systems research. This involves the identification of domains with similar ecologic conditions and production systems, in-depth analysis of the farming activities within those domains, introduction of field-level experiments, with gradual adjustments as an innovation moves from being researcher controlled to being farmer controlled. This approach makes research practical for the farming conditions and operations and brings to light constraints not apparent on research stations -- for example, in the distribution of labour and resources. On-farm adaptive testing and final recommendations then become the product for extension activities.

Working closely with the producers/users during the design of information systems is the only way to find out what information they need and how it can be provided effectively. Only with direct input from potential users can systems be designed to deliver relevant and timely information. Similarly, the only way to keep systems relevant is to monitor them, with regular input from users. Clearly, the information worker must move from custodian to provider, and information services must emphasize outreach rather than storage. Through this approach, information workers not only can improve service to current users but can expand the numbers of users and, hence, the chances for continued allocations of funds.

Some of the approaches that information intermediaries and extension workers can use to give a voice to indigenous knowledge are:

- o View the rural and urban poor as generators of information as well as users. Observe and record. Design services to make what is recorded locally accessible and exchangeable.
- o Adopt the role of information broker regardless of where the information is or who has it. This involves setting up information systems that point to the person who has the information -- not books.

- o Provide feedback to communication programs and services on their effectiveness.
- o Work to integrate the efforts made by community information providers -- partnerships involving information workers, field extension workers, adult literacy workers, and the community.
- o Produce needed information only, carrying out dialogue with the members of a community to find out what they need and what their priorities are.
- o Provide wider access to the results of community meetings.
- o Assess the socioeconomic impact of changes, using and adapting standard techniques as well as developing new ones.
- o Consider the appropriateness of the communications channels used.
- o Design programs to repackage and discuss the analyses of research projects so that their results can be communicated back to the local level where the data were collected. Then, local people will have more capacity to express their difficulties and influence official responses.

Channels for information must run between people and databases if the content of the databases -- whether scientific, socioeconomic, statistic -- is to be accurate, relevant, and used.

Information for Management

Managers, administrators, and policymakers need good quality and appropriate input to make informed and rational decisions. In Africa, at the top levels of policy formulation and decision-making, it is often unclear just how decisions are taken. These personnel, at the apex of their institutional structures, should be the target for consolidated information collected and transmitted from lower levels. In practice, they may have little formal input of information, they may manage their ministries, departments, etc., by crisis and frequently shift policies. They appear unable to identify their information needs and are unaware of the value of information input.

The decision-makers consult people they view as knowledgeable intermediaries able to supply information, often of a nonformal type; they could benefit from input by professionally trained intermediaries able to translate economic, scientific, sociologic, and other data into forms acceptable and usable at ministerial, permanent secretary, or similar levels. In short, decision-makers should have access to specialized information analysis, similar to what has been recommended

for scientific communities. This entails increased concentration on sectoral information rather than on information on and about development.

**Sectoral Information Services:
Scientific, Technologic, and
Socioeconomic Information Issues**

Supporting sectoral information services is the direction that Africans at the workshops advocated and is the way that the Information Sciences Division of IDRC has been moving.

The rationale is that the focus of sectoral information is appropriate for researchers who are attempting to create a foundation for the sectors. By drawing from what is known locally and adding what has been discovered elsewhere in their discipline, researchers can develop and test hypotheses -- the crux of information on science and technology, applied to natural and social sciences alike. In the information context, the first step is to find out whether local groups have had experience with the same or a similar problem. Since little local experience has been recorded, the value of such consultations is largely determined by how near (in time and characteristics) the earlier problem was to the current one. The next step is to find out whether current national or international activities have dealt with similar problems. Quite often, a problem can be solved by the adaptation and application of innovations developed and used elsewhere. Even when there are no practical applications, other approaches and technological innovations can assist researchers in addressing problems.

In Africa, because of the lack of information services and a scarcity of journals and books, many researchers operate with no information sources. The result is needlessly repeated (and costly) research, lack of awareness of relevant developments elsewhere, and isolation of the researchers. Another result is the loss of credibility for information services, libraries, and information centres, with a matching lack of communication between researchers and librarians -- a vicious circle.

The solution involves action on a number of levels, starting with government support for better information resources, better trained information professionals, and reorientation of libraries and information centres toward active rather than passive services. These activities are dependent on a sensitization of the research community and government personnel to information as an essential requirement for research.

Research teams have to be sure that they have the resources to carry out their tasks. They, and their governments and managements, will, therefore, benefit from information on research in progress, donor activities, and individuals and institutions engaged in research and development nationally. They also benefit from comparative data on their resources and efforts. Sharing such information depends on the priority that national governments give science, technology, and socioeconomic development -- as reflected in national scientific and socioeconomic objectives embodied in information policies. Without broad policy

support, researchers have few prospects for successful programs no matter how practical their investigations.

However, national policies are not enough to ensure success. They must be backed by practical, financial, and institutional support as well as sufficient commitment to allow time to execute and implement a program or project of research and development. Mechanisms to facilitate investigation and testing of relevant hypotheses and exploration of methods used by other research groups are equally important. These mechanisms include the provision of information services that enable researchers to examine critically their proposed methods, compare them with studies in the literature, and make use of the latest concepts and technologies applicable to their work.

Heretofore, African information systems, including those supported by IDRC, largely focused their attention on documentary information services. Today, practitioners realize that users' needs are rarely restricted to any single type of information. This is particularly true of managers, national planners, and policymakers as well as of development workers at the lower echelons who require statistical and numerical information to carry out their functions adequately. The shortcomings of prevailing statistical systems are numerous. Existing statistical systems are highly centralized. Information flow is unidirectional, with little or no feedback to local levels. Use of statistical data collected at the local level for problem-solving at the local level is unheard of. District- and community-level development workers have no access to the data on their constituencies. Published statistics are aggregated and are not useful for particular needs. Furthermore, as socioeconomic realities shift, governments have been confronted with the task of developing indicators that will help them monitor the changes. The building of statistical and other numeric information systems, therefore, has become a pressing priority, as has the development of tools and methods associated with them.

Few journals are published in Africa. Most Africans must compete for space in Western academic journals to publish the results of their research. A few Western journals accept articles about problems in tropical environments but focus predominantly on issues affecting their own regional audiences or addressed by their own national authors. Thus, the results of research in Africa largely go unpublished or are reproduced for a small number of local individuals -- while Western research on Africa may find a wider audience in developed countries.

At present, efforts may be recorded in several forms:

- o Research reports to sponsors, with copies available to selected groups designated by the sponsor and researchers;
- o Scientific papers in books or technical journals, which are usually produced for the benefit of peer information and review;

- o Patents, which are usually the result of a technological innovation from research programs ;
- o Product guides, which include design manuals for the expected users or target groups; the content is for technology transfer rather than reporting of scientific research, and the style is adapted to the perceived target group;
- o Popular features, which appear in the popular media -- newspapers, television programs, radio announcements;
- o Annual reports of the sponsoring organization; and
- o Seminars, workshops, etc.

The documentation on research results should be collected by a national information service, catalogued in an easily accessible form, and made available to those who can benefit from it. The formats and outputs of such a service are dictated by the resources and coverage of products and services in each country. Such a service provides continuity in the investigations of problems and enables investigations that build on one another.

In Africa generally, scientific publication is at a low ebb for lack of resources, official support, skilled personnel, and efficient printing facilities. Journals of international repute are few. Emphasis in Africa is on applied and adaptive research, offering the potential for an intermediate level publication.

An unknown but appreciable amount of research fails to be written up and its results are thus largely wasted. Other research is buried in annual reports, workshop reports, and other nonconventional media that are inadequately covered by secondary information services. The publication requirements of different linguistic regions simply go unrecognized, and the optimal mix of national and regional serials is not known.

High standards need to be promoted in African publications -- with official support and quality scientific editing, proofreading, graphics and print for both journals and books. Researchers need means of developing skills in writing and editing, and there is a need to develop cadres of editors and proofreaders who can maintain high standards. Better refereeing standards for scientific papers must also be established, with attention also being given to the task of persuading administrators, policymakers, and research directors to foster publication and dissemination of the products of research.

The relevance of local bibliographic information systems and access to international databases for scientific and technological information is beyond dispute. For the former, the primary literature is often

locally produced and available and is not protected by copyright. These materials could be reproduced if, as is seldom the case, the equipment (microfiche, photocopiers) and supplies were available.

In contrast, the primary literature for international databases usually must be obtained from foreign sources. If local libraries and documentation centres have not purchased the literature, then users must make arrangements to obtain copies from international clearinghouses, rendering payment in foreign currency and usually having to wait for weeks or months.

What is clear is that the delivery of primary documents to users is difficult whether the materials are produced locally or internationally. The inability to deliver has a direct bearing on the relevance of the databases and on the users' satisfaction. It also threatens the utility of modern technologies such as CD-ROMs and online links.

The decline in financial resources being made available for the purchase of books and periodicals and the rising prices for publications are exacerbating the problems.

The solution lies partly in testing and provision of the requisite materiel and equipment for document delivery and partly in coordinated acquisition of foreign literature and increased outlays of foreign exchange to libraries and other information services.

The Division's Science and Technology information group is well placed to respond to the concerns expressed about agriculture, health, sanitation, industrial technologies, climatology, and energy and water-related issues. Services should focus on providing access to local, regional, and international scientific and technical information to support basic human needs, the sustainability of food supplies, the growth of staple crops, especially in dry and semi-arid areas, and on enabling countries such as Kenya and Zimbabwe to use their experience to help other African nations.

The Socioeconomic information group responds to social, political, economic, and cultural development of national and local communities, and tends to be mission-oriented, multidisciplinary, and specific to individual societies, cultures and communities. The scope is wide, and the boundaries between subjects are nebulous and fuzzy. Issues of economics, labour, trade, marketing, women in development, refugees, rural residents, urban dwellers, housing, health care, and education are all linked. Yet it is particularly important that the forms and foci of information services on these issues be tailored to specific audiences.

Information Systems and Services: Tools and Methods

Information workers, as well as their clientele (the producers and consumers of information), require information to carry out their work. Some tools of the trade provide access to information sources that help them cater to their clients; these include directories, union catalogues, and inventories of databases.

The tools, methods, and technologies used by the information profession directly influence the effectiveness with which information workers do their jobs. Unfortunately, for Africa, no appropriate, well-organized information on them exists.

Tools include card catalogues, optical coincidence systems, thesauri, and software to access computerized databases. Methods and systems approaches include village-level information centres, integrated district-level systems, decentralized and centralized networks, information repackaging and consolidation, and agricultural extension. Technologies include manual methods, computers, micrographics, telecommunications systems, and remote sensing. The gap in what is available is especially wide for information about modern technologies.

Information workers require information on the state of the art in information handling; on technologies adapted for use in particular circumstances or working conditions; case studies of both successful and unsuccessful information systems and approaches; local availability, cost, and experiences with techniques; local policies and regulatory conditions (especially on telecommunications); and local sources of expertise. Without such information, they cannot make informed choices about tools and techniques. Likewise they cannot effectively share experience and expertise, nor can they readily develop realistic user-oriented applications.

The selection of tools and technologies, especially at the design stage of an information system or service, usually has a major impact on the funding, outputs, personnel, infrastructure, connections with other systems, and, hence, the effectiveness of the activity. However, choosing appropriate tools or technologies is often difficult, depending on local infrastructure; available information; experience with and availability of adapted and documented alternatives; local expertise; and standards.

An "appropriate" tool or technology is one suited to the training and skills of the personnel who will use it today and tomorrow and to the clientele for whom it will be used. It is one adapted also to the institutional environment, local infrastructure, physical requirements, local support and maintenance, financial resources, functional requirements, volume and type of information to be handled, regulatory constraints, current practices of related information services, standards, changing conditions, etc.

This is the ideal, and, at times in Africa, modern electronics-based technologies -- microcomputers, telecommunications, micrographics, optical storage systems, remote sensing -- fit the bill. For example, remote sensing satellites and digital image analysis systems have proved valuable for African countries attempting to identify and manage their resources.

The "high-tech" field abounds with jargon, great promise, and -- sometimes -- great disappointments. The feeling among African information professionals is that such technologies are inevitable and useful in many domains. Yet there is also confusion, fear, and misinformation, underlining not only the need for programs in human resources development but also the value of presenting the pros and cons to policymakers, offering general computer literacy programs as part of the public education system, and researching the impacts of the technologies.

The "high-tech" methods can be combined with other technologies and applied in innovative ways to reach out to meet the needs of the ultimate beneficiary of research in a village. Intermediate and traditional methods include telex, radio, print and nonprint media, information repackaging, agricultural extension, or village-level services.

Adapting tools and technologies to make them more appropriate to users or applications is a continual process, and to the extent that it involves major changes, novel approaches, innovative uses of techniques or development of new tools, it is applied research.

IDRC's Response

The most effective means for the Information Sciences Division of IDRC to contribute is to strengthen national and local systems to enable them to comply with the priorities of users through the collection, organization, repackaging, and dissemination of information generated locally. Also the Division should contribute to the establishment of links with other local, national, regional, and international systems.

One starting point is to gather and disseminate information already available. Where possible, it will support:

- o Surveys and inventories within sectors, among user groups, and for resource provision, etc., particularly those assessing what is and what is not working within Africa.
- o Two-way, reciprocal exchanges of information up and down the levels of local, national, and regional information systems rather than unidirectional, hierarchical flows.

- o Studies of information users and uses, with special attention to government and public sector establishments, educators, legislators, and the mass media.
- o Surveys and strengthening of existing centres, institutions, and services (on a long-term basis), one aim being to facilitate coordination and networking.
- o Indigenous publication programs.
- o Studies of the presentation and marketing of information for specific users and interpretations, particularly for change agents, extension workers, and intermediaries.
- o Nonbibliographic information services, following, for example, the philosophy of DEVSIS level II, especially statistical systems at local levels, and their use in developing socioeconomic indicators from the local level upwards.
- o Information on different methods of handling information and on local experience with different tools, methods, and technologies.
- o Assessments of priorities in information delivery nationally to deal with real and persisting developmental problems (as exemplified by debt, imbalances in trade, unemployment, etc.) as well as national emergencies (refugees, desertification, famine, etc.) and major national, political, social, economic, and security goals.
- o Development of information systems that cater to local governments to enable the institutional, infrastructural, and legal framework to be built up to handle information for and by indigenous groups.
- o Clarification of the scope of socioeconomic information for use in development planning and development indicators.
- o Surveys on the organization, management, coordination, and use of existing information systems and services.
- o Case studies of successful information activities.
- o Preparation of inventories, union catalogues, lists of databases, directories of consultants.
- o Imaginative approaches to improving document delivery.
- o Increased use of African languages such as Arabic, Swahili, etc., in information handling.

Projects to be supported by the Division must be able to demonstrate close interaction between the information workers and their clients, and effective promotion of services to different categories of users.

A distinction can be made between rural information systems that serve the needs of rural people directly and rural development information systems that operate for planners to anticipate rural needs. The information intermediary (extension worker) who can communicate between these two systems is in short supply.

The Division will respond to projects that give emphasis to the emergence of information in and to projects that increase the accessibility and utilization of indigenous knowledge at both levels.

Finding ways of increasing the accessibility and utilization of local knowledge would directly address five of the objectives in the Division's Africa strategy:

- o Improving the effective utilization and sharing of existing knowledge;
- o Designing and implementing information systems that are relevant to the local environment and that address specific needs and problems;
- o Improving the capacity of providers of information to act as agents of change;
- o Allowing for greater participation of rural and urban poor in dialogue on development issues by encouraging a two-way flow of information; and
- o Improving the capacity of local scientists and technologists to obtain relevant information and bring about a more effective transfer of technology at the grass-roots level.

The Information Sciences Division recognizes the difficulties that African researchers face in trying to publish their results. It acknowledges that much scientific, technical, and socioeconomic documentation appears solely in annual reports of organizations or in mimeographed reports filed in research or government institutions.

New publications, despite apparent interest, have come and gone as financial failures. Consequently, although this topic has been identified as one of the most important by participants in the Africa strategy workshops, and emphasis will be placed on this objective in the Division's program, progress will depend to some extent on tasks being initiated by IDRC, combined with innovative project proposals.

The Division will help in the delivery of information by supporting efforts to establish centres for repackaging extension information in local languages and nonprint media for use in assisting farmers.

At present, farmers in Africa still obtain most of their information from each other; the numbers of extension workers are few when compared with the numbers of farmers, and the support services for extension workers are seriously lacking. All governments must focus on improving this basic component of their national infrastructures. This is only one of the priorities they must face in the diverse task of building national infrastructures.

RESPONDING TO USERS' NEEDS AND BEHAVIOURS

Most information projects and programs in Africa, including those supported by IDRC, have been based on the assumptions that information is needed across and in all development sectors and that their products and services will be readily used. Because of these assumptions, information scientists have had little concern, if any, for undertaking surveys of users' needs, discerning users' preferences, or stimulating demand. In other words, insufficient attention was given to use of services during the design of information systems.

Today, African practitioners emphatically point out that the African users are ill understood, that there is a big difference between the potential and actual users, and that the products and services are highly underutilized.

The users that the information sources have been created to serve do not frequent formal channels of information, the products of the information systems are not attractive enough or are inappropriate to the users' needs and preferences, and not much is being done to bridge the gap -- the systems personnel are not trying to understand the users' needs and the users are not communicating their needs to the staff in information services.

Because the rate of utilization of a service ultimately justifies continued financing, the sustainability of information projects is strongly linked to their ability to generate products that are suited to the needs and preferences of users -- manifested, perhaps, in the users' willingness to pay for the services.

IDRC's Response

To help bridge the gap between what is provided by information systems and what is wanted and sought by users, the Information Sciences Division of IDRC will support efforts to design and test methods for surveying users, promotional materials to stimulate demand, surveys of patterns of use and decision-making; model products and services.

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BUILDING NATIONAL INFRASTRUCTURES

Despite wide variations in human, technical, and financial resources and states of development of the national infrastructures in African countries, certain patterns emerge. These are:

- o A lack of awareness among policymakers and managers of the role of information in development;
- o The absence of national policies on information;
- o The dispersion and lack of coherence of documentary resources;
- o Lack of qualified information personnel;
- o Insufficient financial resources for information activities; and
- o Duplication of services.

National Policies on Information and Informatics

Clear information policies, the integration of information elements in national development perspectives, and definition of institutional responsibilities are required on the part of national governments. External help must be accompanied by a will on the part of governments to create the conditions for development of the information sector and to integrate information into national planning.

The coordination of donors' support is one of the objectives of national information policies, which -- among other tasks -- also designate responsibility for the activity and formalize governments' commitment to disseminating information. These are some reasons African practitioners as well as decision-makers and policymakers cognizant of information issues are demanding that their governments formulate policies.

First, it has become the practice for governments to allocate resources on the basis of principles and directions laid down by policies. Policies have become, by and large, declarations by governments of intent to take developmental action.

Second, policies establish governance over the national information activity. African practitioners have come to realize that coordination, resource sharing, and information exchange are futile in the absence of regulatory policies.

And third, new dimensions in information delivery have emerged, as the scope and definition of "information" and "information systems" have changed. The change is largely a result of the application of modern technologies, which increase the potential but also the demands for statistical, numerical, and specialized information systems.

A national information policy resolves confusion over who is responsible at the national level for taking stock of proliferating developments as well as of any adverse effects. Judging from the experience in women's affairs, population, energy, and environmental issues (that were nebulous as recently as a decade ago), one can say that policies improve the chances for locating accountability and for spearheading change.

Lastly, an information policy can open the way for the emergence of an informatics policy that lays out guidelines for the application of information technologies, computers, telecommunications, etc., to information systems and services. The development and application of informatics in the African context, including manufacturing, depends on political direction, which clearly emerges in:

- o Import restrictions as they affect informatics products;
- o Priorities in allocation of foreign exchange to acquire informatics products;
- o Appropriate and, to the extent possible, locally generated technologies;
- o The use of local informatics capacities to assist in resolving problems in priority areas of development such as food and desertification;
- o The role of informatics in reducing the dependence of the South on the North;
- o Development of human resources for informatics applications, adaptation, and development; and
- o The most logical "entry point" for manufacturers of informatics products.

Many governments in Africa already have regulations that have an impact on informatics; the lack of a policy on information means that seldom are the regulations consistent. Without policies, governments cannot hope to stimulate an integrated approach to information or to motivate coordination and cooperation among existing information agencies or effective use of available professional capabilities.

At present, information handling in subsaharan Africa is generally not a planned activity, and governments do not have inventories of the facilities available. On the basis of good will -- not policies -- individuals cooperate with each other, but the structures do not encourage coordination. Library and documentation units have been set up in large numbers in government ministries and departments, and in some cases they compete.

In general, training of information personnel remains traditional, with insufficient emphasis on new technologies, networking, and document analysis for regional information systems. Professionals with adequate training often cannot act because of inadequate financial resources. Equipment is insufficient and the sophisticated machines are broken down because of the lack of spare parts and local know-how to maintain them. Despite rapid expansion of computer setups in Africa, bibliographic applications are relatively isolated and do not generally interest African computer scientists.

The governments have put significant resources into the development of libraries, documentation centres, and statistical offices. Despite this, the existing infrastructure for information is not adequate to provide the input needed for development. The social and economic crises that have beset the region and that have forced governments to make shifts in priorities have consumed resource allocations that might have otherwise gone into information; the level of resources available to information services has generally declined.

External funding from multilateral and bilateral sources has contributed to the creation of information infrastructures. However, governments have been unable, and in some cases unwilling, to absorb recurrent and capital expenditures following the termination of external assistance. Time limits on aid projects produce constraints on recipients, especially in countries where budgets do not include allocations for information activities. Often, the result has been the collapse of the capacity the projects helped to build.

Where the capacity has survived, it is often underused, as are the documents, books, journals, and data accumulated. Documentation centres are usually located in capital cities, out of reach of many potential users. Some centres cannot afford to obtain many of the materials they consider essential, but commonly two centres acquire identical materials at considerable cost.

Some centres possess qualified staff as well as the requisite facilities, whereas others have high-level staff without corresponding financial support and equipment that would permit optimal use of the professional capacity. Most centres barely manage with the skills, equipment, and other facilities available to them.

Types of Information Systems

The information systems installed in countries can be analyzed according to whether the nation has taken a "mission" oriented or "diffusion" oriented approach to technological and industrial development. Countries that have adopted a diffusion approach such as those in the Association of South East Asian Nations (ASEAN) have put resources into a broad range of disciplines supporting technology -- education, information services, technical training, standardization and

compatibility in mechanization, and multidisciplinary research. These countries have tended to be successful and have moved in a fairly short time into the category of so-called newly industrialized countries. In mission-oriented countries, major resources have tended to be allocated to single schemes or programs deemed to be particularly promising (e.g., defence, heavy industry such as aluminum smelters, hydrocarbons, etc.), to achieve a breakthrough in economic growth. Countries such as Brazil, India, and Nigeria have taken this approach.

Implicit in this observation is that diffusion of information on research and development linked to national priorities is a better focus in the long term than production from a sector or sectors.

To accomplish diffusion, governments need to support an information structure with components at local, district, and national levels, fully supporting scientists, extension workers, technologists, policymakers, and the general public.

The national information centres feed information into, as well as draw information from, district-level services set up to assist in the planning and implementation of development. At present, very little or nothing exists by way of infrastructures for statistical data collection or documentation systems at the district level, but the ability to generate development data and document activities on which to base decisions would be valuable. Some of the functions such a service could provide are:

- o To establish and maintain baseline data for socioeconomic indicators as support for a bottom-up approach to rural development planning;
- o To find out what information the rural people and extension agencies need;
- o To explore alternative modes of information gathering and delivery at the local level;
- o To evaluate communications programs and indigenous knowledge networks;
- o To repackage information for local audiences;
- o To study relationships between information use and decision-making in the rural context;
- o To provide backup and coordination for village information services;
- o To provide information links to the national rural development agency, the research and development system, and rural development-oriented training institutions; and

- o To provide documentation systems services for the agencies operating from district planning centres.

Local government information systems could provide the link for statistical and nonstatistical information about local (rural) people and their national governments. The local statistical units would take charge of collecting and regularly updating basic statistics (population numbers, crops, land use, industry, prices, meteorologic conditions, health, etc.), following standards and tools developed at the national (or international) level.

The use of microcomputers would facilitate storage and updating as well as the transmission of data to the higher levels of government. The quality of statistical data would be improved because the local people (if they wish to do so) could be recruited to validate data.

Whenever feasible, data gathered through normal administrative functions of government should be incorporated. The integration of data files to permit the creation of new information and synthetic data sets can be considered. Data integration between surveys and administrative records can make possible early warning and forecasting systems (trade, debt, drought, famine, etc.), ensuring an up-to-date picture. Integration of statistical information systems with other types of information systems can improve the validation of the data and define the context from which the statistics are derived.

At present, in general, the statistical information available in Africa is inadequate, out of date, and inaccurate. Those who use the information make plans and promises that can never be fulfilled. The introduction of local government information systems could improve the accuracy and timeliness of what is collected in future, serving governments, academics, legislative bodies, the mass media, the private sector, extension workers, and the general public.

While users sometimes need statistical data from sources outside their national boundaries (for comparison purposes and in the case of migrant workers and trade opportunities), they mainly need statistics collected nationally.

Unfortunately, international agencies and donors often satisfy their own needs at the expense of national objectives. Expensive frameworks (e.g., systems of national accounts) are being pushed on governments who do not yet have the infrastructure in place to collect and disseminate basic statistics (Commonwealth Statisticians 1985). The costly collection of national aggregates at the pan-African level mainly serves the needs of users in pan-African and other international agencies; it does little for the national statistical users.

Too much effort has been concentrated on structuring systems and centres rather than on evaluating the relevance of services to the users -- policymakers to peasant groups.

Administrators need statistical data and information synopses; development workers require extension materials (repackaged) and teaching materials; rural peoples need special products and services, including nonwritten materials, community-run mini or micro libraries, news media; and all the groups need information on development projects.

Within this general outline of infrastructural shortcomings, IDRC and other donor agencies can act to strengthen the structures by establishing criteria to guide decisions on areas of concentration. These could relate to:

- o The level of economic development of a nation;
- o National development priorities and needs of user groups; and
- o Characteristics of information projects.

IDRC's Response

IDRC's Information Sciences Division would like to contribute to the building of local networks for collecting and distributing statistics, the strengthening of community documentation centres, and the setting up of district-level capabilities. It sees particular merit in pilot services for information gathering and dispersal at the village level. The types of support it can give vary with the infrastructure already in place in the countries.

For countries that have a relatively developed information infrastructure, the Division will give priority to improvement of the mechanisms to coordinate and implement a national information system. Activities it will support include identification of all information centres and services; harmonization of methods and procedures; production of national bibliographies, directories of services, etc.; training of high-level personnel; and implementation of computerized documentation. The national centres that participate in PADIS are appropriate to this type of approach.

The Division will assist countries with weak infrastructures to create operational documentation centres in priority sectors (such as agriculture) and to develop human resources. The objectives of projects must be consistent with the areas of greatest need and with the socioeconomic environment. One of the offshoots of IDRC's links with SADCC initiatives is contacts with countries in Portuguese-speaking Africa. The countries in this group have few trained specialists in information handling, so the Division's role is to provide training for personnel and strengthening of documentation services in a few sectors.

One criterion for selection of projects is the inclusion of methods that satisfy the needs of users -- and particularly needs of rural populations and of marginal urban groups -- and that support sectors such as education, agriculture, and health.

The Division sees merit in community documentation centres, at least on an experimental basis in cooperation with self-help organizations and groups working at the grass-roots level. It encourages projects with long-term goals that fit into a broad national strategy. In all cases, it will seek better integration of existing structures and resource sharing. An example is in assistance to national centres participating in RESADOC. Also, it will seek to coordinate its work with other aid agencies and explore joint funding of projects. As members of the Division, we believe representatives of donor agencies should meet periodically to engage in multilateral, formal programming, the aim being to complement activities and improve comprehensiveness.

The Division favours proposals that diversify and promote factual databases as well as statistical and bibliographic systems. Examples include information systems for early warnings of food shortages, preparations to handle health emergencies, procedures for debt management, control of national accounts, monitors for external trade, and indicators of structural adjustment and reforms in policy.

The Division will help as much as possible to open the way for formal participation in resource sharing by different information services within and between countries. During the design of projects, institutions expected to be participants and users are the major focus. At IDRC, Information Sciences staff look for activities, tools, and methods that facilitate resource sharing and favour funding projects that contain mechanisms to promote coordination.

In future, the Division will give more emphasis to national-level projects than has been the case in the past. Traditionally, IDRC's Information Sciences Division has favoured the "top-down" approach to development of information infrastructures in sub-Saharan Africa. The idea has been that regional setups can provide the impetus for the development of structures at lower levels. The consensus now is that a more balanced distribution in IDRC intervention at regional, national, and subnational levels is desirable. This will not compromise the emergence of regional and subregional systems and networks where warranted. In fact, the Division's national-level interventions will, where appropriate, introduce and strengthen links with broader information systems.

Also, without prejudice against new applications, the Division will concentrate assistance on strengthening existing infrastructures and systems. Currently, information systems and services are emerging more rapidly than they can be meaningfully supported by IDRC and its partners who fund information programs.

IDRC is ready to aid in the evolution of policies both on information and on informatics. The form of intervention differs because of the contexts. A national policy on information could and should be formulated by local personnel with advisory assistance (e.g., from PADIS) where appropriate. IDRC's Information Sciences Division plans to

help make it possible to implement these policies and to guarantee the availability of the techniques and mechanisms for coordination and resource sharing that should induce governments to consider establishing national policies.

In informatics, the Division can support activities to build know-how and can enhance the capability of institutions to conduct research. In many developed countries, the information sector is recognized as important for the economy, especially if one includes activities that produce or integrate the technologies, tools, and services to support it (including, for example, computers, software, and data communications). In Africa, this sector is small and often virtually unrecognized, even as a potential vehicle for economic development. The reasons include lack of appropriate policies and shortages of skilled personnel, training and research facilities, telecommunications, industrial infrastructure, and professional bodies. Furthermore, it is unrealistic to expect a major shift in the short term. In Africa, information is not viewed as a commodity of value that must be paid for. The attitude inhibits the financing of the sector both commercially and publicly.

The ability to offer information services and to develop skills in information technology is enhanced by a local capacity to produce, adapt, and maintain the technologies and tools; conversely, any local industry depends on a market and a supply of skilled personnel.

In some of the more technologically advanced African countries, the information sector is being viewed as one client of a potential informatics industry -- one involving computer hardware, software, and applications for public and private administration, resource management, planning, and, of course, information. To be successful, the industry will have to be based on regional strategies and cooperation because of the training, capital, and market needed. Also, the emphasis should be on producing software and other information-intensive activities that are not capital-intensive. The entry point for most effective action at present appears to be applications involving microcomputers.

Within this realm, a research-supporting organization like IDRC can help:

- o Sensitize policymakers to information as a tool for development;
- o Promote national policies in information and information technologies;
- o Support the development and use of appropriate technologies in information projects in the region;
- o Support information services on the relevant technologies to promote awareness of existing gaps and, hence, opportunities for the development of products and services;

- o Train local staff; and
- o Undertake studies into, for example, the types of software required by disciplines regarded as priorities for development.

Processing, storage, and dissemination of information are long-term activities; they must be woven into a nation's political fabric, perhaps from threads of well-designed projects supported by donors like IDRC.

SHARING RESOURCES ACROSS THE REGION

Sharing is part of the solution to the shortage of resources now and in the future. But it presupposes a network: well-defined institutional arrangements among cooperating information services; tools and methods that facilitate the exchange of resources (e.g., directories, union catalogues, and common methods); and a willingness among the leaders of the participating centres to work together.

Several attempts at coordination and resource sharing have failed because these prerequisites have not been provided for. Unhealthy competition between agents of information delivery (e.g., the university versus the public and national libraries) has disrupted a number of coordination attempts.

Because of the drain on resources in the acquisition of foreign documents, a priority is national coordinating structures to ensure against duplication in acquisitions, to protect against competition among centres, and to implement national policies on information. The coordinators' role is separate from information handling, which should be decentralized and undertaken in the documentation centres.

Effective coordination is possible only if national information networks or coordinating agencies are set up and are regarded as a prerequisite to participating in regional information systems. In the meantime, regional agencies can work together to harmonize their techniques and procedures (from subject coverage to intersystem compatibility).

Cooperation among regional and national institutions could extend to the use of new technologies and the training of staff and upgrading of their skills. For example, educational institutions (such as EBAD in Senegal) could work with regional centres that have expertise in information handling (such as RESADOC for computerized documentation activities). Training institutions should include courses on information-gathering and repackaging techniques for all professionals -- not only those who work in the field of information.

Sharing resources -- locally, nationally, regionally, and globally -- is essential to the application of information sciences; in fact, when viewed as a resource, information can be regarded as a valuable commodity for South-South cooperation. The benefits are obvious, although they do not flow evenly to all the participants in information systems or even in a manner proportionate to input. Cooperation and coordination are key ingredients -- not easy to achieve, particularly when more than one country is involved.

Despite the difficulties, sharing is under way on many fronts in Africa and represents an answer to some of the shortages of personnel,

facilities, and funds on the continent. The groupings of countries differ according to the aims of the organizations. For example, international research agencies like the International Council for Research in Agroforestry (ICRAF), the International Livestock Centre for Africa (ILCA), and the International Institute of Tropical Agriculture (IITA) divide programs on the basis of ecologic zones because of the environment's pervasive effects on crops and animals. Some donor agencies, such as the US Agency for International Development, have adopted similar groupings.

Other agencies are based on major geographic groupings, and still others focus on official languages as the common element. In Southern Africa, SADCC unites countries that have a common political aim: to offset the negative effects of South Africa's political system. SADCC is a subregional organization with a strong emphasis on sectoral information services. It has greater political will for action than do organizations with other ties. Its member states appear ready to cooperate in developing intersectoral links to reduce their economic and logistic dependence on South Africa and generally to improve their infrastructures and research capabilities.

The rationale behind some groupings of countries is not always apparent to a casual observer. The groupings of countries for the purposes of aid from the World Bank are based on economic indicators, although the main tables do not include data for countries with populations of fewer than a million:

- o Poorer countries in semi-arid regions: these six countries represent 8% of the total population of the region. Their average 1982 GNP was US\$218 and, between 1960 and 1982, their average growth annually was -0.1%.
- o Other poorer countries: the 17 countries in this group account for 48% of the population. The average 1982 GNP was US\$254 and the average annual growth rate between 1960 and 1982 was 0.9%.
- o Intermediate income petroleum importers: the 11 countries in this group have 15% of the total population. The average GNP was US\$634 and the growth rate the same as that of the second group.
- o Intermediate income petroleum exporters: the five countries of this last group total 29% of the population of the region. The average GNP was US\$889 and the growth rate about 3.2%.

The common elements that link the nations into groups that can appropriately share resources bring into sharp focus the tremendous disparities among the countries that constitute sub-Saharan Africa. The differences show up clearly in their infrastructures for information.

For example, in West Africa, Senegal has a strong potential impact regionally despite its difficult economic position; it has national policies that promote information sharing and many trained information scientists, documentalists, etc. Likewise, Mali, Burkina Faso, Cote d'Ivoire, Togo, Nigeria, Cameroon, Zaire, and Congo can effect change throughout the region and have strong human resources. In contrast are countries like Mauritania, Sierra Leone, Guinea Bissau, and Chad whose economies are in dire straits and, even though some have a strong political commitment to information structures, the regional impact of support to them is likely to be minimal.

In East Africa, Kenya, Ethiopia, Zimbabwe, Rwanda, Malawi, Seychelles, Botswana, and Swaziland have indicated a national capacity or willingness to establish information services and policies and priorities for information systems.

Among themselves, the subsaharan countries agree that national activities are the building blocks for regional sharing of resources, but the pace toward the creation of regional institutions has been slow and frustrating for many.

Building the regional information infrastructure, as well as the services, products and other outputs that emanate from it, can be justified on a number of grounds.

First, regional information programs provide opportunities for cost-effective information delivery, and they can optimize the use of scarce resources. In this connection, the PADIS statistical databank and the methods being developed for its operation are a good example; the tools will be useful and could be replicated at minimal cost in member states. Thus, regional information programs have a cost-effective, catalytic, and multiplier effect in the transfer of know-how, skills, and technologies.

Second, regional information services can play central roles as network intermediaries in the receipt of user requests, providing replies or directing users to appropriate sources. Given the difficulties users in subsaharan Africa encounter in accessing information available in the rest of the world and given the fact that computerized database hosts supported with remote access capabilities will take a long time to materialize, it is reasonable to expect that centralized regional networking will be the order of the day for some time to come. In addition, regional centres such as PADIS, RESADOC and ARCT (African Regional Centre for Technology) are well placed to produce services and products with regional perspectives.

Lastly, regional (multinational) cooperative arrangements (e.g., customs unions, river basin organizations, environmental monitoring groups) are bringing to light not only requirements for new types of services but also new dimensions to cooperation in information

work where accuracy of data, timeliness in reporting information as well as the speed of disseminating (transmitting) data and information happen to be of a higher order. Regional information infrastructure building gives renewed importance to specialized tools, methods, and standards.

As an example of emerging cooperative arrangements, the work of the Intergovernmental Authority on Drought and Development (IGADD) is noteworthy. IGADD, with headquarters in Djibouti, represents the interest of six East African countries in coordination of development policies and mobilization of assistance to alleviate the effects of drought and desertification. It is mission-oriented and works to coordinate aid for three time frames: emergencies, short term, and long term. Its major fields of activity are food security and early-warning systems; desertification control; water management; interregional communication; agricultural research and training; animal resources.

Its current priorities for information systems include:

- o Subregional early-warning and food-information systems.
- o A documentation centre and information databank on East African agricultural sciences.
- o National drought-monitoring and climatological data centre.

In regional systems, each country takes responsibility for contributing its own documentation. This territorial formula eliminates much duplication, although overlap in the subject scopes of regional information systems at times creates confusion. For example, some national members have been asked by AGRIS (International Information System for the Agricultural Sciences and Technology) and by RESADOC to contribute the same documents and, thus, have requested the systems to define their subject scope clearly and take advantage of each other's holdings by downloading information. The potential for information exchange extends not only to serving specific subject needs but also to satisfying the needs of countries who have common geopolitical, climatic, and linguistic ties. Several countries are now regularly obtaining bibliographies from PADIS, AGRIS, etc., and RESADOC has set up similar arrangements.

Obviously, the quality of a regional information system is closely linked to that of its country sources. One way in which national information centres can improve their input is to take advantage of contacts with specialized information analysis centres, which have been set up at institutes of excellence such as the international agricultural research centres. Personnel at these centres (or at the request of the centres) review the literature and analyze the findings, discriminating among documents in a way not normally possible with the level of expertise in national information centres.

The specialized information analysis centres can, thus, provide valuable support to the development of national information centres. However, they must adopt the role of providing a service and assistance, not competing with national efforts. They could offer national personnel training opportunities and charge fees to offset a portion of the costs.

In this way, national programs gain strength from regional systems; national flows of information seem to be particularly enhanced when the management of regional centres is decentralized, as is the case with the information systems under the umbrella of SADCC.

Decentralized Information Handling: the SADCC Model

SADCC provides an example of how information systems can be decentralized for regional input in sub-Saharan Africa. It is developing information systems in agriculture, food, industry, energy, and fisheries and is developing a network to ensure standardization and computer hardware coordination. These systems are evolving in parallel with SADCC itself, which is a decentralized organization of nine Southern African countries.

Each country has responsibility for coordinating action in a particular sector and acts as host for the coordinating centre. The activities in each sector are decentralized, with each state being relatively free to determine its priorities for programs and content, to negotiate the resources needed for implementation, and to ensure the objectives are met.

Most of the states are concerned with developing capital infrastructures that will form integrated regional systems and facilities or with the exploitation of natural resources. They are planning or undertaking inventories that will be maintained by the sectoral centres. The data will be available to all SADCC countries and be linked by sectoral networks. Facilities are being established to collect documents and to provide access to collected materials.

The plans for one sector -- Agriculture and Natural Resources -- include development of a substantial capacity for research. The sector is divided into subsectors, and the responsibility for development is allocated among the member countries. Inventories for the subsectors already exist, but the information is not comprehensive enough to support good research. The libraries are generally inadequate, as are the setups to provide access to primary and secondary literature. As a result, the researchers feel isolated, criticize the information services, see little value in contributing their findings, and abandon what has been a fruitless search for relevant information.

To improve their services, the sectoral centres are attempting to establish links with international databases. The expansion is desirable from the viewpoint of the users, but because the international

interconnections are made at the sectoral level rather than at SADCC, the activities jeopardize the compatibility between the systems for different sectors. Also, staff at sectoral centres are committed to collecting and supplying information for all the national members but have less interest in sharing information with other sectoral centres. Nevertheless, there is a political commitment to share at the SADCC superstructure level that can be built upon.

At the sectoral level, the mechanisms for coordinating efforts at present are too weak to ensure continued compatibility among systems, hardware, and software, especially if donors tie their funding to specific equipment or know-how. Without assistance, the information services are not sustainable.

Concern for these issues has already surfaced at SADCC; two studies were commissioned by the secretariat as a basis for recommendations about computer systems in the region. Neither study, however, fully addresses the question of how to enhance the sharing of information.

Clearly, the information systems in SADCC are a case study on how a decentralized structure works for different sectors and nations in various stages of development.

It is now essential to ensure some coordination of the information systems within SADCC -- the parent organization assuming a major role in liaison, collaboration, and influence to ensure information is shared among sectors as well as nations. The best route for consolidation of services appears to be support for standard methods of exchange leaving the sectoral centres to determine the content and services.

In human resources development, SADCC could support the training of information brokers who concentrate on breaking down the isolation of researchers and systems and encourage information seeking by users. As only a part of the information would be shared among sectors and nations, the focus should be to develop protocols for exchange of information.

Standards, Common Methods, and Coordination

Inherent in all cooperative information systems and activities is standardization of methods and content to make efforts compatible and complementary. The participants have to agree on the criteria for selecting data (e.g., data reliability in statistical systems), the means of describing information (e.g., bibliographic formats, standard character sets), the means of classifying information (e.g., indexing systems, thesauri), the media used to store information (e.g., standard microfiche sizes), the tools and technologies used to process information (e.g., common software packages for microcomputers, hardware standards), analytic tools (e.g., socioeconomic indicators), and outputs.

This coordination does not imply complete uniformity in the selection of tools and methods -- in addition to being impractical, this can be undesirable. Rather, it implies careful consultation about systems, interfaces, information exchange formats, and overall compatibility at the time that systems are designed. Certainly, cooperative information systems in Africa, such as PADIS and RESADOC, have been fostering a common approach to information problems for some time.

In Africa, language differences are a major obstacle to the full sharing of information. The main official languages are English, French, Arabic, and Portuguese, but these are second languages for many of the people. Although secondary information services in agriculture, medicine, etc. provide abstracts and indexing of literature published in different languages, unpublished materials and texts from the popular media are usually not treated in this way. Some journals and newsletters publish summaries in languages other than the one in which the document was written, and these approaches are to be encouraged, as is familiarity with several languages on the part of information intermediaries.

At national and local levels, the many languages and dialects create communication problems that may impair the acceptability of information imparted by extension workers. Sociological and cultural differences also create barriers. Information intended for grass-roots users must be available in the local language and must be supported by information intermediaries who have skills in the use of local dialects.

At times, definitions of terms differ by locale, so information services at the national level should develop glossaries that can be used in the production of texts in local languages. Differences in definitions of data are also likely to occur at the regional level so standard terms, definitions, specifications, and methods need to be developed.

Contributions by Donors

Standardization, cooperation, and coordination could be encouraged by donor agencies, but because many donor-supported information activities emerge from requests by country representatives, the impact of these projects on regional cooperation in information sharing is often minimal. Although each government is responsible for coordinating donor activities within its country, donor agencies could aid the process by supporting programs with a component for information sharing. This is one way to strengthen regional institutions and links.

Several donors have set up mechanisms by which they provide information about their activities. For example, IDRC operates the Interagency Development Research Information System (IDRIS) on behalf of the U.S. Board on Scientific and Technical Information for International

Development (BOSTID), German Appropriate Technology Exchange (GATE), International Foundation for Science (IFS), Swedish Agency for Research Cooperation with Developing Countries (SAREC), and IDRC. The system contains information on research projects supported by these agencies. The Australian Center for International Agricultural Research (ACIAR), Canadian International Development Agency (CIDA), United Nations University (UNU) and the United States Agency for International Development (USAID) are expected to join the system shortly.

In addition, there are sectoral systems such as the Current Agricultural Research Information System (CARIS), which is operated by the Food and Agriculture Organization of the United Nations (FAO) for the agricultural sector, as is the initiative by the International Service for National Agricultural Research (ISNAR) to work with directors of international agricultural research centres to collect information on their activities in Africa.

The UN's register of development projects and the World Bank's Special Program on African Agricultural Research (SPAAR) are proposed systems for coordinating information on research activities supported by the UN system and other donors. Such systems contain much information needed by African institutions. If the links were set up, the two-way flow could help eliminate duplication of research. Subsets of stored information could be downloaded by local or regional groups so that they could be searched by scientists in Africa.

At present, donor agencies act in isolation and could improve the impact of assistance if they had some mechanism to minimize duplication. One positive sign is that increasing numbers of donors are meeting informally to discuss support, but formal links are needed.

IDRC's Response

In addition to supporting the development of information standards, common methods, and mechanisms for coordination in Africa, the Information Sciences Division of IDRC will encourage research into new methods and approaches to facilitate information sharing. For subsaharan Africa, with major information needs and limited resources, cooperation in this field is essential.

IDRC has been supportive of, and at times instrumental in, the emergence of regional information programs (PADIS, RESADOC, etc.) that have now started giving results. IDRC can justifiably shift its assistance from the institutional core to specific projects and networking. Assistance will continue because the agenda of work has barely been concluded; the regional programs will be progressing and therefore encountering new challenges.

It will also view favourably proposals from several regional organizations that have plans to implement specialized information services -- some conventional (bibliographies), others original by subsaharan standards. Most of the latter amount to experiments (customs clearing house at the Economic Community of West African States, the trade information system at PTA, early warning systems at IGADD, desertification monitoring at SADCC, etc.).

By supporting regional information sharing, IDRC is well placed to promote links and cooperation between existing and emerging information systems. Common methods, regular exchange of information databases, sharing of expertise and capacities (training, equipment, and technologies, etc.) should not be left to the discretion of individual proposals; rather, they should be conditions that recipients undertake to fulfill.

Because of the opportunities that regional and subregional organizations present for multiplier effects, the Information Sciences Division will continue to work closely with them. At the same time, it recognizes that the member countries have their own priorities; they must be treated individually because benefits from such groupings do not flow equally to all members. All groupings, based on common elements among the countries, nonetheless incorporate very different lands and peoples.

The Division will consider increased support for decentralized regional and subregional systems and will help ensure that regional systems benefit national users. For example, it expects to assist SADCC to coordinate development of its information systems and to standardize exchange methods. It also will consider SADCC's preference for 10-year funding to enable proper and self-sustaining development.

It will encourage rationalization of responsibility for organizing the literature among existing systems.

It will urge specialized information analysis centres to cooperate with each other and with national research programs and perhaps to install outreach information services run by local personnel to benefit national research efforts. Outreach services could handle many of the current requests from local centres who need help in software, management of seed and gene banks, organization of field-trial results and socioeconomic indicators, bibliographic records management, etc.

The Division's strategy in considering national projects is to concentrate on countries ready to cooperate with each other; it is also to expand on information services of countries taking the lead in a discipline for which an information system is being proposed. Because of limited resources, the Division must favour projects that build on what is available in the states rather than funding new systems.

The Division is currently exploring ways in which it can provide assistance to research in and on South Africa and to Southern African groups located in countries bordering South Africa.

Other measures of support will be aimed at strengthening networks in sharing of resources, for example:

- o Assessing the impact of PADIS to determine desirable directions for development;
- o Improving the compatibility between information systems and methods at national and regional levels;
- o Introducing referral services (rather than duplicating existing specialized services);
- o Enabling strong groups in the region to undertake special consultative and trouble-shooting missions;
- o Fostering South-South cooperation (e.g., between groups in subsaharan and in North Africa) by, among others, strengthening formal mechanisms and umbrella organizations that exist to institutionalize such cooperation (e.g., OAU, NAM -- Non Aligned Movement, LAS -- League of Arab States); and
- o Looking favourably at case studies and experimentation with the twinning of selected African institutions such as ESI (Ecole des sciences de l'information) and EBAD (Ecole de bibliothecaires, archivistes et documentalistes), national documentation centres; and AGRIS centres.

UPGRADING INFORMATION PERSONNEL

One sphere in which regional information systems and specialized information analysis centres can make inroads is in the development of human resources in the field. The scope for training and instructional support is wide, as all of sub-Saharan Africa is characterized by:

- o Poor human resource utilization. The information specialists are not considered part of the "development community," and the profession is accorded low status, with the result being poor use of available personnel.
- o Lack of appropriate teaching materials. The education programs cannot respond to changing needs, and the professionals are not kept abreast of recent advances in the use of computers.
- o Lack of information on information tools, technologies, and methods.
- o Lack of tracking materials and the absence of mechanisms to regulate and promote the elaboration of such materials.

The role attributed to information workers by the user community and the one they identify with is custodians and preservers of information. This attitude limits the use of the information available and eliminates the potential action by information personnel as development workers.

To overcome this requires marketing and promotion of services, increased public relations, increased remuneration for information practitioners, etc. Whether more effective communications can lead to better remuneration or, conversely, improved salaries can motivate such activities is uncertain, but clearly the injection of opportunities for improved training and education is a first step.

The upgrading of the skills of professionals teaching and practicing information sciences could be accomplished through short courses, exchanges of faculty, joint research and various programs. The focuses for continuing education include management techniques, computer applications, research methods, production and use of teaching materials, marketing, financial management, systems analysis and design. Information personnel need an understanding of how their skills can benefit business, public administration, agricultural extension workers, etc. They also require technical knowledge of library documentation and information sciences.

The availability of computer systems to support information services requires more technical proficiency in the analysis and design

of applications for information processing that will be useful to administrative and managerial functions in modern organizations. On this issue the consensus is that universities should recognize the needs and develop appropriate curricula.

A consolidated plan of action would include:

- o Advanced training programs;
- o Training programs for paraprofessionals as well as those already in service;
- o Training in the area of information technologies, tools, and methods; and
- o Appropriate training materials.

Advanced Training Programs

The objective of advanced training programs is to create a nucleus of technically qualified people for a broad multiplier effect. This includes both the training of information professionals to conduct research and teach at postgraduate levels and the training of people for library and information system management and information careers other than traditional librarianship. Advanced training improves management of organizations and institutions as well as broadening the employment opportunities of the trainees.

Activities to achieve the objectives are:

- o Optimizing the use of national and subregional institutions by upgrading the expertise of information personnel (provision of fellowships for the training of trainers, establishment of faculty and student exchange programs, study tours, design and promotion of internship schemes, research projects);
- o Designing curricula responsive to the environment to be served; and
- o Providing a part-time continuing route to higher educational status.

Establishing criteria to attract strong candidates and setting up occupational classifications with commensurate salaries should be considered in parallel with the training possibilities.

Training for Paraprofessionals and for Those in Service

The training of paraprofessionals should be at specialized institutions geared to the demands of the tasks expected. In contrast,

the training for information personnel who have extensive experience should be to upgrade their technical quality and managerial skills. Individuals who are at high levels may have little academic background but have developed expertise on the job.

Seminars, workshops, and short courses can be offered to these personnel, for example, to introduce them to ideas about serving rural populations, managing services and staff, problem solving, etc.

A new emphasis is needed in the training of information specialists so that they can effectively disseminate relevant information at the grass roots and can help village level intermediaries obtain relevant information. These are not easy tasks for several reasons: there are too few intermediaries and extension offices to serve the communities and current opportunities for training are not geared to their needs. Attention needs to be given to methods of recruitment of paraprofessionals and to development of curricula for intermediaries at the village level.

Training on Information Technologies, Tools, and Methods

Almost all information professionals in Africa need training on how to use the technologies, tools, and methods by which they can do their jobs. Information workers should have access to courses (including continuing education) and to relevant information services for their field because new information technologies are emerging and the existing ones are rapidly changing.

The curriculum needs to be tailored to the level, needs, and likely working environment of the individual. Not all African information workers need to learn how to use microcomputers, but some general introductory material to computer literacy (even without "hands-on" training) could be of value in future. For advanced-level information professionals (e.g., at the postgraduate level), training in the conception, design, and use of systems involving a variety of information technologies is important. The key element is to teach enough so that information professionals can make informed choices or can effectively use technical expertise in these areas.

In addition, there is the issue of providing technical training to produce the ensemble of technical skills needed to support the information technologies themselves so that one can build up local information and information technology industries and infrastructure. A regional and cooperative approach is needed here.

The work of PADIS and RESADOC in the development, testing, and replication of tools and methods for processing development literature has been rewarding. Efforts to develop competent personnel in subsaharan Africa on the use of MINISIS and computerized documentation techniques have started paying off as PADIS has been able to provide training and to serve as a site for attachment training sponsored by other agencies.

(The experience of ALDOC in the Arab world has been similar.) Thus, regional information programs have a cost-effective, catalytic role in multiplying the know-how, skills, and technologies needed by information workers.

Information professionals need enough knowledge to communicate effectively with those involved with the supporting technologies, for example, documentalists, computer systems analysts, and computer programmers. Similarly, computer professionals need to be exposed to information applications (including, for example, documentary databases, text-based systems, and statistical databanks).

Appropriate Training Materials

If adequate training is to be provided, then the trainers must have suitable teaching materials. The objective is to find ways of providing materials that relate to the professional problems and experience of the trainees as well as to the environment in which they work.

IDRC's Response

Within this plan of action, IDRC's Information Sciences Division will contribute to the training of advanced personnel by establishing relevant programs and offering fellowships and seminars where possible.

It will continue to support regional efforts to upgrade and develop computer applications and to share know-how and skills through seminars and innovative methods. Similarly, it will work for the strengthening of the education, research, and practice of library and information science and for the establishment and harmonizing of professional norms, standards, and methods.

It will also encourage African consultants and educators to produce materials that ensure full application of the concept of information sciences at postgraduate as well as other levels. Likewise, it will support curriculum development and training related to information tools and technologies.

The Information Sciences Division will work with other divisions within IDRC to promote multidisciplinary investigations of the impact of information tools and technologies.

It will support services, newsletters, networks that contribute to the sharing of information about information tools, technologies, and methods. These activities will be closely linked with the training of information personnel, both initial and continuing education.

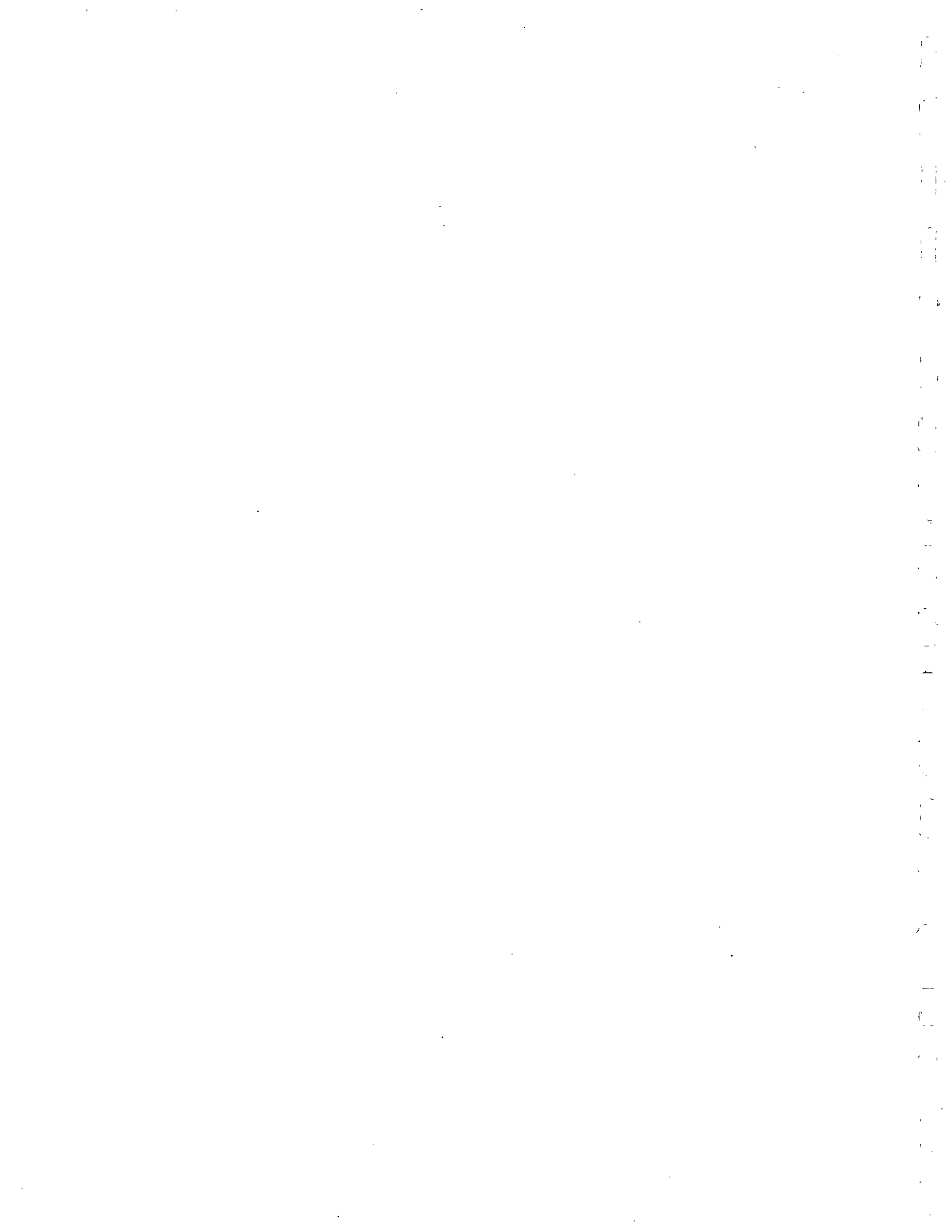
It will also encourage and support activities involving experimentation, adaptation, and use of information tools and technologies, particularly in the dissemination of information. The

Division recognizes that experience with information tools is a prerequisite to creation of local expertise. Experience is gained either through experimentation or through regular use within an information system or service. However, even when experimentation is the object of the exercise, the tests should be fashioned to serve real applications, with feedback and evaluation from users.

One specific service the Division can offer is software -- MINISIS -- for managing and exchanging information and the know-how to make use of it. The training of computer technicians in the use and application of MINISIS has been offered for some time now. Several organizations in developing countries now participate in conducting the 3-week introductory course as well as the 2-week advanced course. They also provide technical advice and maintain specialized components of the MINISIS software.

IDRC's computer systems group will enhance the dissemination, support, and development of MINISIS through the establishment of MINISIS resource centres. For Africa, this will mean some strengthening of institutions in conjunction with transfer of technical skills to enable organizations to meet the criteria.

Once established, the resource centres can conduct training for new and experienced users of MINISIS and provide them with technical assistance in the development of applications.



FUNDING AND SUSTAINABILITY OF SERVICES AND SYSTEMS

For the purposes of funding, projects can be divided into:

- o A preliminary phase, during which donor agencies and developing-country organizations form a commitment. For information projects, this phase includes, for example, a review of national information policies; end-use analysis; design of a strategy to provide information to the sectors of national priority; a careful look at the institutional, financial, and human resources available and required for the startup phase; and an attempt to isolate major weaknesses. Although national governments themselves must ensure the projects contribute to their overall goals in information and development, the donor is obliged to clarify the long-term consequences in funding -- i.e., that donor support is temporary -- perhaps encouraging pilot or preliminary projects that clarify needs.
- o A project development phase, during which the framework and managerial procedures are designed, consistent with local conditions. This phase is a customizing period, linking goals and objectives with a realistic plan of work. It includes confirmation and commitment of all participating institutions, detailed assessment of needs and constraints, preparation of operational procedures, introductory workshops for decision-makers and users, and training for project staff.
- o An implementation phase, during which the focus is finding practical applications, operating efficiently, and tailoring outputs. This phase is funded principally by governments, with some input by donors. Monitoring and evaluation are crucial.
- o A donor disengagement phase, during which the donor provides some financial backup to cover foreign-exchange crises but transfers to local authorities any project responsibility remaining in its hands. The aim is to ensure that all components are operating efficiently at the lowest cost possible. This phase involves mechanisms designed to assist sustainability, including fees and other means of self-financing, accountability, and performance evaluations.

Given that information services are open-ended, the design and implementation of information projects cannot be tied to a schedule from inception to completion. The question of how long an information centre should be funded by a donor or government is difficult to answer.

The design of projects must include mechanisms to reevaluate the facilities and services and to update them in line with national priorities; both the products and the tools must change accordingly to reach users and contribute to national development. An information service that has outlived its usefulness should be terminated, but new development-oriented services have an expected lifetime in excess of 10 years. Unfortunately, grants of only 2-3 years tend to be offered, and longer-term financial commitments are rare. African practitioners have found the donors' approach to be a serious impediment to progress and sustainability of information systems, because planning becomes piecemeal, staff of the right calibre are difficult to attract, and some activities never get off the ground.

Under such circumstances, it is easy to find successful information services in Africa that are in jeopardy. Donors must be aware of the problem and be more favourably disposed to long-term funding. The common practice of setting up teams and then depriving them of adequate time and support to consolidate and adapt their services is irresponsible. It has led some organizations, such as SADCC, to stipulate 10 years as the norm for external funding of development projects.

Financing and Evaluating Information Services

Various sources for financing have to be envisaged for information services, including, as suggested by African practitioners, experimentation with fees for service and membership where appropriate. Recovery of all costs for all services, or even some costs for some services, is unrealistic, and some form of subsidization must be expected. A large proportion of information services, including public and academic libraries and statistical offices support the public good. Worldwide, such services rely to a large extent on the national treasury, although they generate some income.

Users in Africa have been willing to pay for information where services provide what they need. In fact, the revenues can be a measure of the value or success of certain services and permit the information managers to evaluate their system's response to users, as well as satisfying donors and government administrators.

Other methods of evaluating performance and the usefulness of objectives include keeping and regularly reviewing records of the services. Useful data to collect include numbers of requests filled, documents distributed, categories of users, days spent on particular activities, revenues, and parameter changes. By keeping track of such activities, one can quantify, for example, the cash outlay for each user and each item of information. Like revenues from users, such information is a tool for management and helps donors and governments plan long-term support.

IDRC's Response

IDRC is unique among donor organizations in having brought support for information services under the management of one division. This has enabled a coherent approach to be developed. However, IDRC, like other donors, tends to view its supporting role as limited to providing seed money for a set duration.

The grant period worked out with the recipient institution is supposed to give the grantee time to plan for incorporation of the information activity into its core budget. The underlying assumption is that startup costs are necessarily higher than operational costs. In theory, this is a sound basis for action, but in practice it rarely works.

Managers of research institutions have competing demands for their funds, and, unfortunately, few are able to discern the underlying value of information programs when faced with setting priorities to meet the demands for hard-core research. It is extremely difficult to demonstrate the dollar value of information. Even the most successful information centres experience budget problems because of the lack of available funding within their institutions. Thus, the issue becomes whether to provide core institutional support where information is to be part of the plan of action and not merely, as is often the case, a special project or appendage that the donor finances.

The Division recognizes that some countries have greater difficulty than others in providing counterpart contributions. Other problem areas include maintenance of materials purchased with project funds, capabilities in project administration, and integration of project staff into the institution's payroll. Finally, financial assistance should be viewed as a long-term endeavour, preferably with regular evaluations to correct problems and build upon improvements.

Given this reality, the Information Sciences Division of IDRC will be more favourably disposed to institutional funding than it has been in the past and, where necessary, will view 10 years as the norm for external funding of new services.

Over the long term, recipients must assume financial responsibilities, perhaps covering part of the costs through a user-pay system. This type of system encourages responsible use and can be treated as collective ownership even if the contributions do not cover all costs. It also promotes understanding of the value of information.

The key phrase is financial stability. To help projects achieve stability, the Division will explore methods such as endowments, multiagency approaches, and private-public enterprise systems.

Endowment funding provides stability, but donors such as IDRC have not favoured it because the initial outlay is substantial. It can cover operating costs -- something donors do not normally like to fund because of the careful monitoring needed to avoid misuse.

Collecting funds from a group of donors is an attractive alternative because the benefits from cooperation among donors are not limited to the increases in dollars. A disadvantage, however, is the loss of contact between donor and recipient. IDRC has fostered close relationships with its contacts and will probably have some difficulty adjusting to the distancing that is inherent in arrangements with multiple donors.

The Division agrees to support African practitioners in their efforts to improve revenues from information services through advertising and perhaps joint ventures with private industry, for example, in dissemination of information on fertilizer and trade. These are ways in which the services can justify continued and increased financing by the national purse as governments move to accept responsibility for the creation and maintenance of information services. IDRC support is to complement government outlays and will be contingent upon commitments by governments.

Nevertheless, the message that must be conveyed to donors is that information activities are an aid activity and should be as much a priority as, for example, research projects. Although IDRC's Information Sciences Division can promote partial cost-recovery ventures and encourage self-sufficiency, it must be prepared to support information activities over a longer period than at present, given the poor state of information infrastructures in Africa and the equally poor record of governments in finding the money to sustain them.

**PUTTING THE STRATEGY TO WORK:
RECOMMENDATIONS FOR PROGRAM DELIVERY**

The Information Sciences Division must face some operational issues when implementing the Africa strategy. The method employed to establish the comprehensive set of objectives and tasks for the Division was based on a coordinated, divisional approach that seems equally appropriate for the implementation phase. The framework is now in place for an integrated geographical program. Its impact can be reinforced by the plan designed for implementation. Without a coordinated effort, some of the connections and some of the momentum could be lost.

Coordination

The Division needs to set up a mechanism for coordination to ensure that its program proceeds purposefully toward the declared objectives. To be effective, the mechanism must be designed to direct human and fiscal resources to avoid duplication of effort, encourage sharing of experiences between program staff, and facilitate intersectoral activities. It must be efficient, and it must not introduce additional bureaucratic controls within the Division.

The design for the coordination mechanism depends on the number and qualifications of Divisional staff based in Africa and the level of authority delegated to them. This report contains recommendations that would change the staffing pattern for Africa over the next 2 years and beyond. Staff in the Information Sciences Division believe that the rationale for changes is clear, and we note that delegation of authority to program officers and regional directors is also currently under review by IDRC governors and senior management.

The plan for coordination and implementation of the Africa strategy, therefore, must be flexible enough to accommodate increased responsibility and accountability in the regional offices. For practical purposes, the recommendations contained in this report envisage a phased approach that evolves, as resources and authority levels permit, toward African-based control of the program. This would enable Divisional staff to respond positively and promptly to the Winegard Parliamentary Committee's recommendation (7.5) that, in IDRC, "substantial decision-making authority be transferred from headquarters to its well-established system of field offices."

Regardless of specific changes, the Africa strategy presumes interaction between Ottawa and the three regional offices serving Africa. The Division will set up regular communications between a group of associate directors based in Ottawa and the program staff based in Africa. The two groups will use modern conferencing techniques where feasible.

The Ottawa team will have a core comprising the associate directors of the computer systems group, the information tools and methods group,

the socioeconomic information group, and the science and technology information group, plus the deputy director. It will call upon other Ottawa-based staff as required. Its main functions will be to maintain an overview of the priorities and parameters of the program in Africa, to review the global contributions of the Divisional program (including interregional issues), and to decide Division-wide allocations of resources.

The Africa-based team will consist of all the Division's program staff located in the three regional offices. Its main functions will be to coordinate the program locally -- identifying, developing, and monitoring projects; evaluating programs and policies; and providing input to sectoral and divisional plans for the Program of Work and Budget. The tasks will include sharing program information, managing the pipeline for research proposals, and planning tactics to realize the objectives outlined in the Africa strategy. These activities demand good channels for communication between the three regional offices.

One of the regional program staff will be appointed as coordinator. The role will be reviewed and modified periodically in the light of experience as will the staffing pattern and levels of authorization. In the initial 12-18 months of implementing the strategy, the role will be similar to the one proposed for coordination of the Centre's major program with Bhartiya Agro-Industries Foundation (BAIF) in India. The duties will be added to the job description of one of the members of the regional staff, being expected initially to occupy about 30% of the individual's time. The small number of staff in Africa at present precludes greater allocation, and the tasks should not jeopardize project development and monitoring. The coordinator will be responsible for monitoring progress in implementing the Division's program in Africa, acting as catalyst for interregional discussions, and initiating periodic reviews of the project pipeline and its budgetary implications, and convening meetings every 6 months to underpin the coordination (one of the meetings to take place in Ottawa before the Divisional staff meeting).

These mechanisms for coordination must demonstrate a favourable impact on the effectiveness of delivery of the Division's program without adding to the bureaucracy. The objective is to increase local control over program development and management in Africa. The role of the coordinator is expected to evolve in this direction when delegation of signing authority to regional staff is increased and when the Division's presence in the field is strengthened. The opportunity for local budget management would be increased, as would the volume of local activities by staff based in Africa. Coordination, therefore, will become more complex, especially when associated with the authority for decision-making about program appropriations.

The coordinator is expected to take on an expanded role; for example, he or she could assume a more active role in sectoral strategic planning; could participate in the Division's discussions on the Program

of Work and Budget and the Program and Policy Review; contribute to overall strategic planning that is expected to be done in the regional offices; represent the Division in efforts to develop cooperative projects with other donors and regional or subregional institutions; identify opportunities for collaboration; document and reporting activities to inform and guide the Division's program staff; evaluate progress in implementing the Africa strategy; develop mechanisms for updating the objectives in relation to changes in the region; monitor the project pipeline for compliance with the objectives of the strategy; and coordinate a geographical allocation of funds drawn from the program sectors. The coordinator ultimately will occupy a pivotal role in the development and execution of the Division's program in Africa.

Project Development and Approval

Linked to coordination is project development and approval, the authority for which is also expected to move out to the regional offices. Even initially, regional program staff will have increased accountability, using project identification memos (PIMs) to provide enough information about preliminary proposals for an associate director to give them a quick review and approval for inclusion in the pipeline. The regional program officer would then proceed to develop the project proposal in final form and submit it to the associate director.

The Division will consider tentatively allocating resources for projects to each regional program officer in a way that gives more flexibility than does the present system, which is tied rigidly to the status of the pipeline at the start of the fiscal year.

Changes anticipated in the signing authority delegated to regional directors and program staff could lead to a revision of the activities outlined. If the governors and senior managers of IDRC decide that projects can be approved in the regional offices without detailed review in Ottawa, the coordinator in Africa, collaborating with staff in Ottawa, could be called upon to take over responsibility for managing the funds allocated to Africa, reviewing all PIMs for project proposals in Africa, and recommending their inclusion in the Divisional pipeline. This type of procedure could be phased in only when the requisite Centre policies and authorization levels are modified.

Meanwhile, within present limits, steps can be taken to increase the ability of the Division's staff in Africa to respond promptly to local events and needs. In fiscal year 1988-89, regional program officers located in Africa will be allocated increased funds to direct toward divisional activities (PODA DAPs). Authority for project administration will also be decentralized to the Divisional program staff in the three regional offices serving Africa. A status consistent with a high-level of decentralization -- phase C -- was obtained for the Division in the regional office for Eastern and Southern Africa on 1 September 1987, and efforts are under way to secure similar status for the other two offices.

Most of the operational issues mentioned so far have been for the Division's program staff located in Africa. The majority of program staff, however, are based in Ottawa, and they, too, will participate actively in putting the Africa strategy to work. They will retain their sectoral specializations, which are global, and will be responsible for strategic planning and evaluation of projects in their sector. Consulting with regional program staff, they will develop sectoral plans that are consistent with the objectives of the Africa strategy. They will also be involved in project identification, development, and monitoring and will be active on the ground in Africa as well in the other regions.

The idea is to maximize the contribution of specialist staff in implementing the Africa program while maintaining their global responsibilities. Interaction with the regional program staff is expected to evolve from an administrative exchange (which is frequently the case at present) to a substantive discussion of sectoral and geographical opportunities.

Budget Allocations

IDRC is a responsive organization in that it responds to individual proposals submitted to it rather than going out and initiating project requests. However, this responsive stance does not eliminate the need for planning. For example, IDRC plans the sectors in which it is prepared to be responsive: it recruits staff competent in selected fields and allocates funds available in those fields. The concept of using sectoral allocations to improve program management is well accepted. What is proposed here is the logical next step: introduction of geographical allocations.

The limited geographical allocation that does take place at present is based on the distribution of projects in the pipeline, i.e., it is essentially an after-the-fact allocation. Shifts in geographical expenditures in the Division usually happen by chance rather than by plan. Examination of the regional distribution of appropriations in recent years confirms the volatility. To overcome fluctuations, to protect the availability of resources for Africa, and to improve planning and management of the Africa program, the Division should allocate to Africa a specific percentage of its program funds. This allocation would cover the whole of Africa; it would encompass implementation of the strategy in subsaharan Africa, promotion of collaboration with northern Africa, and support for other information activities in northern Africa consistent with the objectives identified in the strategy.

Of the least developed countries, 70% are located in Africa. While the numbers of people in the countries are relatively small, the problems are major and the infrastructures weak. The percentage of appropriations that the Information Sciences Division invested in Africa through its three regional offices has fluctuated over the last 3 fiscal

years between 30% and 50%. The recommendation is to stabilize the allocation, identifying in advance a realistic figure for appropriations to Africa in fiscal year 1988-89. For planning purposes, this allocation would be 50% of the total Information Sciences program budget. Achieving such a target could be accomplished through careful management of the project pipeline and through tentative allocations to the three regional offices. These allocations would constitute the funding envelope for the Division in Africa, representing the total appropriations to be made in Africa for computer systems, information tools and methods, socioeconomic information, science and technology information, and cooperative programs. It does not automatically mean that each sector must dedicate 50% of its resources to Africa; the actual distribution between sectors would be a topic for review by the two coordinating teams from their global and local perspectives.

Growth of Financial Resources

Experience has demonstrated the vast numbers of opportunities for the Division to support projects outside Africa. Project development in Africa appears to be more time-consuming and less predictable than equivalent work in Latin America or Asia. Introduction of a funding envelope for Africa would ensure resources are protected for use in Africa. However, to maintain present levels of program activity in Latin America and Asia and permit expansion of the Africa program, the Division will need an increase in its program budget -- a recommended 10% in fiscal year 1988-89 in addition to the currently projected growth.

Staffing Requirements

To strengthen implementation of the Africa strategy, the staff based in Africa will need personnel support. Their numbers should be increased. The additional program staff would have responsibilities in subject areas of priority to Africa. These specialist staff would not be confined to their particular region but would operate across the continent. This mixture of specialists and generalists would increase the Division's ability to respond in selected fields; release some time for the generalist program staff to focus their portfolios; and permit the Division to accommodate increased project activity.

Additional person-years would be requested to fill these new positions. If new person years are not available in fiscal year 1988-89, the Division will consider transferring one or two positions from Ottawa as an interim measure. These sectoral specialists would be located within the regional offices in Dakar and Nairobi and play a role similar in some ways to the Information Sciences statistics specialist at the regional office in Cairo.

This approach would be part of a coordinated Divisional plan for staffing of regional offices. The plan would address the value of having staff gain experience in a regional office and in head office. Planned rotation of program personnel could be introduced for both specialists

and generalists. In addition to promoting an organized succession of staffing within the regional offices, the plan would provide staff with an excellent opportunity for professional development.

Whether additional person-years become available or transfers are made from Ottawa, the plan has implications for the Division's operational budget for fiscal year 1988-89.

The initial fields of specialization for the new positions in Africa would be informatics, trade and industry, and health and environment. Consideration was given to a specialist in agriculture, but this topic is already receiving attention throughout the continent. Also, a strengthening of communications within information systems and services in Africa is clearly needed. Additional attention must be given to ways of conveying relevant information more effectively to primary audiences, including, for example, populations in rural communities. Information Sciences Division, therefore, intends to work closely with Communications Division to explore ways of applying available IDRC expertise in this field.

The place of MINISIS must not be overlooked in the effort to provide support for informatics. Interaction between Divisional staff from the regular and the MINISIS program will be encouraged. Within limits, the MINISIS outreach officer would be a source of specialized advice to the program staff across the continent and would be encouraged to participate in selected project development.

Another staffing issue that will be pursued is the possibility of using project advisers and network coordinators among groups of projects. This cadre, financed by project funds, would assist network administration and communications; it would also provide specialized input to the Division's planning.

Human Resources Development

The need for strengthening of human resources in Africa in the information field was stressed by Africans participating in the Division's review. It has, thus, become one of the principal objectives of the strategy. Given the importance of the subject, the possibility of placing an educator in the region was considered. However, all program staff of the Information Sciences Division have a responsibility to be aware of opportunities for development of human resources, and the current thinking in the Division is that an appropriate approach would be to work with the Fellowships and Awards Division to develop a joint strategy addressing different types of training.

Project Modalities

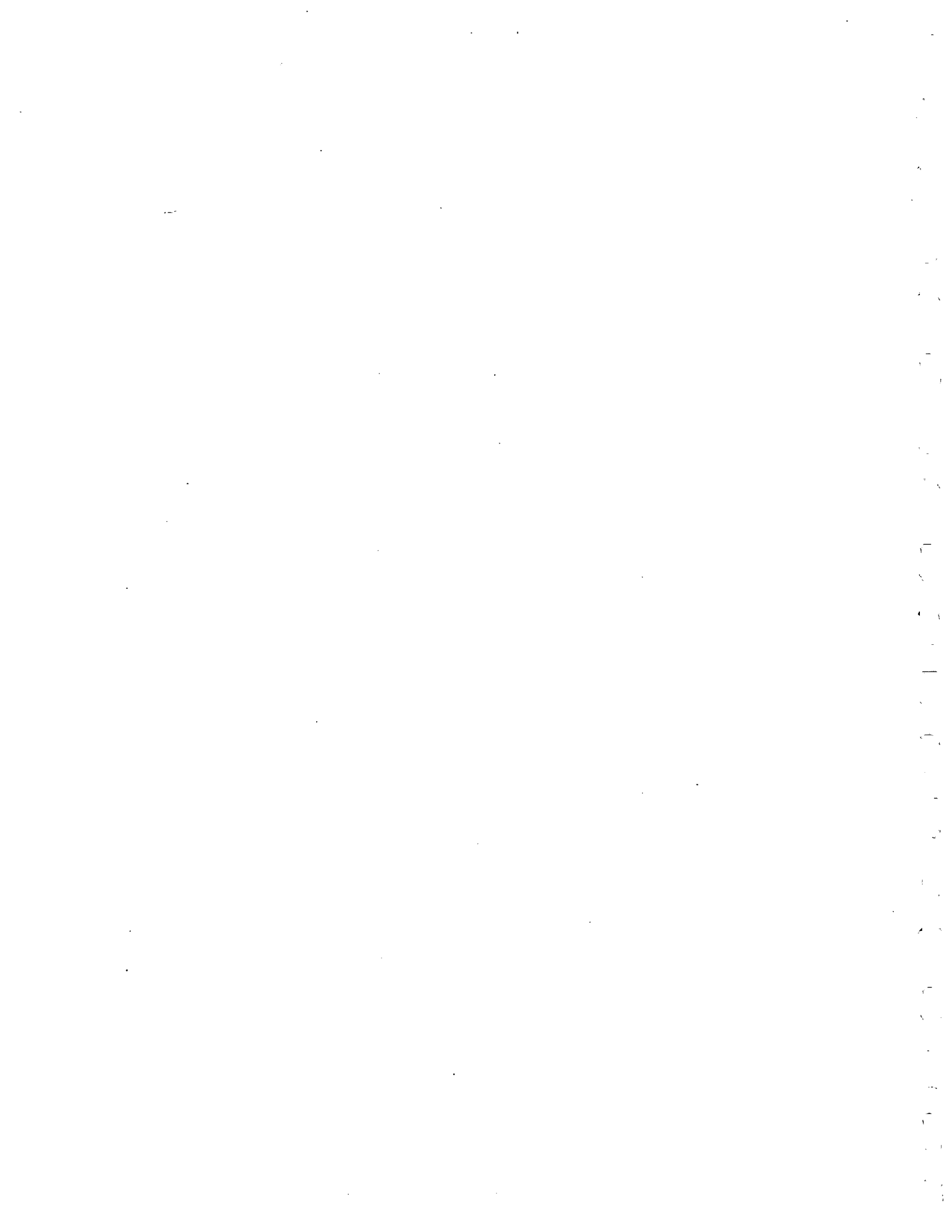
A number of issues raised during the workshops, such as strengthening of existing systems, increasing the training opportunities, providing long-term financial support, increasing the

information flows at the community level, etc. will require that the Division undertake studies to decide an effective operational approach. Many of the studies will be Division-wide and will be coordinated by the two teams. For example, the Division will examine how best to achieve its objective of promoting South-South cooperation in Africa. This could involve surveys of the expertise available in selected fields, workshops for project leaders, troubleshooting trips by local consultants, and other techniques; the initial activity will be an exploration of the potential for promoting access by subsaharan Africa to the expertise already residing in North Africa. To effect an impact, the Division will have to pursue these operational approaches in a logical and integrated way.

In addition to carrying out such analyses, the Division will tap the accumulated experience within IDRC. The result should be an expansion of the traditional approach to projects, including institutional support, program support, multiphased project support, use of network advisers, and small grants projects. By approaching the work in a coordinated way, staff of the Division believe that benefits will accrue to the whole program. It will be the responsibility of the coordinating teams to keep track of the activities, but all staff within the Division are expected to contribute to identification and application.

Program Plans

Each of the three regular programs plus the MINISIS group will outline a plan of action describing activities to be undertaken in Africa by its program in accordance with the principal objectives. This will include, for example, workshops intended for project identification, seminars for strengthening sectoral information systems and services, utilization and evaluation studies, and other special measures being taken to enhance implementation of the Africa strategy. Elements of these plans will be incorporated in the Program of Work and Budget for fiscal year 1988-89.



REFERENCES

- IDRC (International Development Research Centre). 1986a. Program and policy review: VII, 1986/87--1989/90. Ottawa, Canada, IDRC (mimeo).
- IDRC. 1986b. Program and policy review: VIII, 1987/88--1990/91. Ottawa, Canada, IDRC (mimeo).
- OAU (Organization of African Unity). 1982. Lagos Plan of Action for the Economic Development of Africa 1980-2000. Geneva: International Institute for Labour Studies, revised edition. 130p.
- OAU (Organization of African Unity) and Economic Commission for Africa. 1986. Africa's Submission to the Special Session of the United Nations General Assembly on Africa's Economic and Social Crisis. Addis-Ababa. 211p.
- Tague, J., and Austen, J. 1986. Librarian to information scientist: educational direction for a changing profession. Canadian Journal of Information Science, 11(1), 24-70.
- The World Bank. 1982. Accelerated Development in Sub-Saharan Africa, An Agenda for Action. The World Bank, Washington, D.C. 198p.
- The World Bank. 1984a. Sub-Saharan Africa: Progress Report on Development. Prospects and Programs. The World Bank, Washington, D.C. 32p.
- The World Bank. 1984b. Towards Sustained Development in Sub-Saharan Africa. The World Bank, Washington, D.C. 102p.
- The World Bank. 1986a. Financing Adjustment with Growth in Sub-Saharan Africa, 1986-1990. The World Bank, Washington, D.C. 120p.
- The World Bank. 1986b. What can be done in Africa - Research News, 6(4), 1-2, 12.
- UN (United Nations) Ad Hoc Committee on the Critical Economic Situation in Africa. 1986. Consideration of the critical economic situation in Africa...UN, New York, 22p.
- Unesco. 1986. The Critical Economic Situation in Africa, Getting to the Roots of the Problem. Unesco, 35p.



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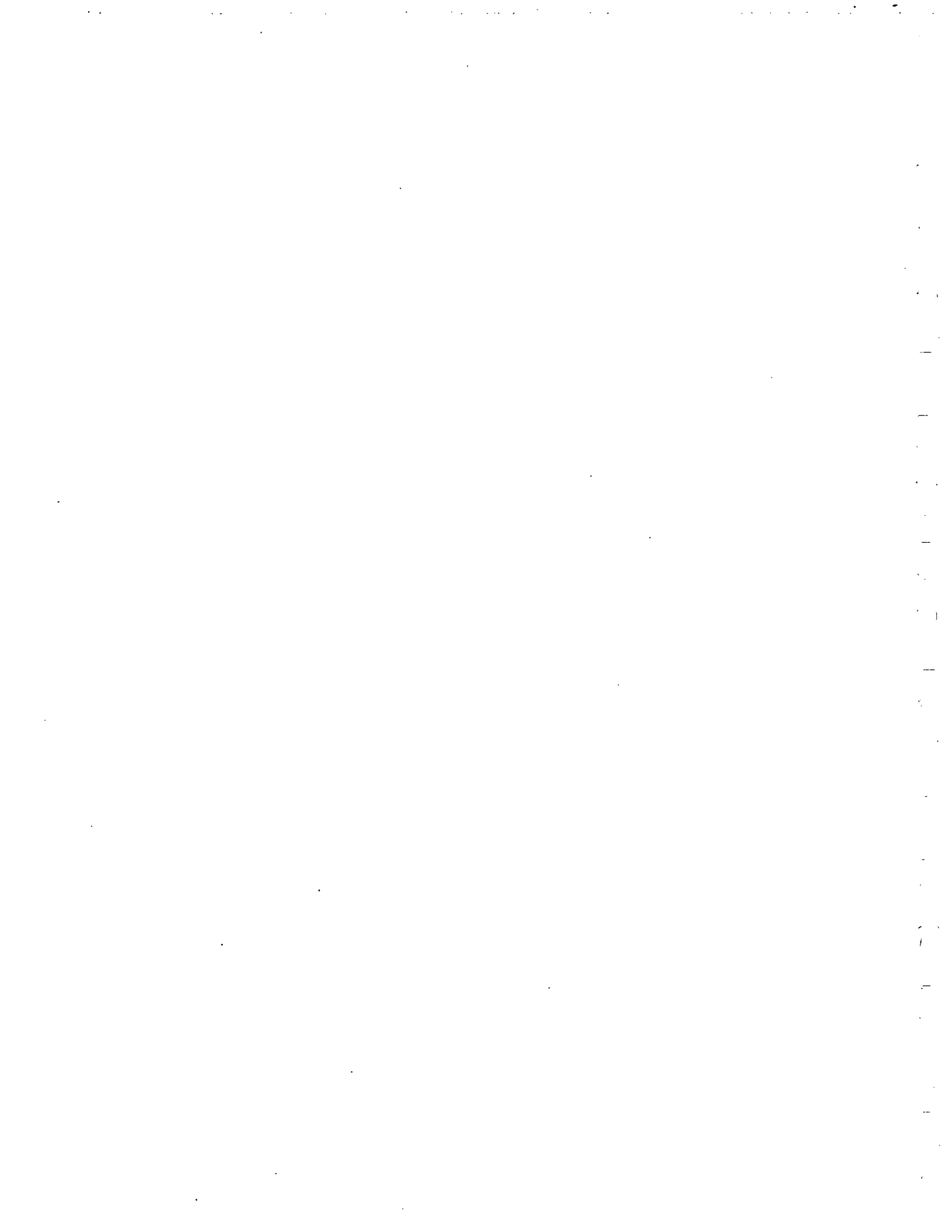
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* Papers presented by these individuals are described in Annexes B and C.

Information Sciences: An African Strategy for IDRC

Terms of Reference and Notes for Background Papers and Agenda for

Workshop 1 - Dakar, 24-26 March, 1987 inclusive.

Workshop 2 - Nairobi, 29-31 March, 1987 inclusive.

Primary Goal: To provide input to the Information Sciences Division (ISD) of IDRC so that it can formulate a medium-term (5-7 years), need-based strategy for **sub-Saharan Africa**, based on its own unique mandate and available resources.

Methodology: ISD will commission seven studies each from Anglophone and Francophone sub-Saharan African countries respectively, to obtain first-hand input from African specialists - a mix of administrators, researchers and information specialists - who, based on their own personal contacts, experiences and knowledge, will be asked to prepare a paper of no more than 25 typewritten pages on the topic assigned to them. To the extent possible, all the papers should be subregional in focus, i.e. they should include a critical examination of the nature of the problem, background information, draw examples, highlight priorities, needs and gaps, etc. from the subregion as a whole and not only from the country of the author. The selected Francophone specialists will **speak to (not read)** their papers at the Dakar workshop and the Anglophones at the workshop in Nairobi.

In addition, a specialist from North Africa will prepare a paper on North African experiences in the field of information science that may have a bearing on, or serve as lessons for, sub-Saharan countries. This paper will pay particular attention to the use of information technologies (Topic 5) in the North African environment and to possibilities of South South cooperation between North African and sub-Saharan African countries.

Finally, a paper by the Pan African Documentation and Information System (PADIS) of the UN Economic Commission of Africa (ECA) will deal with Africa's information needs during the coming 5-10 years.

Participants at the Workshops

Participants at each workshop will include the seven invited speakers from each sub-region (Anglophone and Francophone sub-Saharan Africa), one or two other invited speakers (e.g. from North Africa and PADIS/ECA), and representatives of each one of the three major sub programs (Information Tools and Methods; Scientific and Technical Information; and Social and Economic Information) of IDRC's Africa-based staff, especially ISD's Regional Program Officers. In all, 14-16 participants are expected at each workshop.

Given the overall goal or objective of this study, the workshops will be organized as a "brainstorming" session, thereby permitting maximum interaction between all those present, especially the staff of IDRC and the African specialists. A rapporteur will keep notes of all the discussions, which will eventually be used by ISD Staff to formulate an African strategy in information sciences for IDRC.

Discussants: In order to facilitate discussion, "Discussants" will be identified for each topic. They will be provided with an advance copy of the paper and asked to provide an initial commentary on the issues raised. And, they may add to the subject matter under discussion from their own perspective.

Topics: Rather than take the traditional approach of looking solely at sectoral information needs in information systems development, it was felt necessary to look as well at issues, procedures and modalities in the African context; hence, the following seven topics have been selected:

- i) The need for Scientific and Technical Information in sub-Saharan Africa
- ii) The need for Social and Economic Information in sub-Saharan Africa
- iii) Information Systems in Support of Rural Development
- iv) Human Resource Development
- v) Information Tools and Technologies
- vi) Information Infrastructure Development and Institutional Support
- vii) Funding and Sustainability of Projects/Programs

Because of the multi-disciplinary nature of most activities, as well as the mix of inputs (funding, human resources, technologies, etc.) needed, it is recognized that the discussion on a number of the abovenoted topics could potentially overlap. In order to keep this overlap to a minimum, detailed terms of reference (TOR) are attached for each topic. Each author/specialist is being provided this entire package, so that he/she knows exactly what is expected of him/her - and of the others. In each case, the invited specialists should deal with the topic at hand, thereby ensuring that any overlap with the other topics is kept to the bare minimum.

**Workshop
Agenda:**

The tentative agenda for both the Dakar and Nairobi workshops are attached.

**Background
Reading:**

Attached are the following papers and reports that may prove useful as background information.

- (i) "Development Issues in Sub-Saharan Africa: A Review of the Literature" (Draft) by B. Brickell, November 1986.
- (ii) "Information Systems and Services to Support the World Community" by M.B. Stone, August 1985.
- (iii) Extracts from "Documentary Information Services in West and Central Africa: Functional Analysis of Future Prospects" by G. Ndiaye, March 1986.
- (iv) Extracts from "Regional Profile for Information Sciences (Eastern and Southern Africa)" by Garth Graham, June 1984.
- (v) IDRC's Information Science Projects in Africa - A Listing, November 1986.
- (vi) Brochure on IDRC.
- (vii) Brochure on the Information Sciences program of IDRC.

TERMS OF REFERENCE

Topic 1 The Need for Scientific and Technical Information (STI) in
sub-Saharan Africa

Speaker (Francophone): M. Souleymane COULIBALY, Chef du Centre de Documentation du Centre Ivoirien de Recherche Technologique (CIRT), Abidjan.

Discussant: M. Ousmane KANE, Directeur, Exécutif Adjoint, Centre Regional Africain de Technologie (CRAT), Dakar.

Speaker (Anglophone): Mr. Edward LUMANDE, Research Branch, Mount Makulu Research Station, Private Bag 7, Chilanga.

Discussant: Dr. Charles Y. WEREKO-BROBBY, (Ghana), Project Officer, Office of the Science Advisor, Commonwealth Science Council, London.

I. Preamble: To determine the subject scope and form of information delivery of science and technology for the broad mass of African users.

II. General: Provide a prognosis of the STI situation in sub-Saharan (Anglophone/Francophone) Africa. In particular, comment on:

- 1) The major issues affecting STI in Africa;
- 2) The perceived needs/gaps;
- 3) Criteria that may be used in prioritizing and selecting proposed activities/sectors for support;
- 4) Modalities for delivery/action;
- 5) Opportunities for South South cooperation, "twinning" or networking arrangements.

III. Specific: 1) Determine, insofar as it is possible, what are the main information needs of African users for science and technology giving firm indication of the sectors or types of subjects that must be covered and those that do not have first priorities relevant to Africa's current development needs;

Topic 1 (Continued)

- 2) Identify the problems that may impede the full realisation of information services in science and technology (e.g. human resources, information infrastructure, capital investment) and give some indication as to how these problems can best be resolved. (In so doing, please bear in mind Topics 4, 6, and 7.);
- 3) Provide information on user characteristics, penetration, coverage, speed and user acceptance of any existing services, (e.g. AGRIS, RESADOC), and on any other effectiveness indicators considered relevant;
- 4) Examine the most appropriate type of information, e.g. bibliographic, extension type, consolidated and repackaged, statistical or other data forms or media;
- 5) Identify optimal implementation strategies (e.g. sub-national, national, sub-regional or regional systems);
- 6) Assess the nature of the problem as it stands at present and provide indicators for improvement, make recommendations about future modalities for action to improve the development of information services in science and technology for African development (See II above).

IV. General Notes to Assist in the Study

The following issues should be isolated and given particular consideration:

1. The extent, scope and success of any existing services anywhere in Africa that may be used as a yardstick.
2. Given the need for improving the developmental situation, it is important to define a broad subject scope for STI as it applies to most (Anglophone/Francophone) sub-Saharan African countries. The subject scope is really what defines the size of a job in hand. Definition of subject scope also enables budgets to be planned effectively and infrastructures to be built in a rational way.

3. Does sub-Saharan Africa need broad STI infrastructure or should we concentrate on specific topics, e.g. agriculture, health, industry, water?
4. Skills required and the available technologies, e.g. does Africa require computerization or alternative methods of information handling (see also Topic 5)?
5. Human resources. We recognize that information work is a human activity and the quality of services offered depends very much on the people it can call on to operate it. STI requires a solid background in subjects related to it. Needless to say, developing countries are woefully short of scientists engaged in problem-oriented research. How, then, can the information scientists cope? (See also Topic 2).
6. Please feel free to include within the terms of this topic any critical elements that you believe are missing from your own perspective. And, whenever possible, please cite examples of the types of national/subregional project activities that could be considered for support by IDRC.
(p. 5)

TERMS OF REFERENCE

Topic 2 **The Need for Social and Economic Information (SEI) in
sub-Saharan Africa**

Speaker (Francophone): **Mme. Mambui MAGASHA, CODESRIA, Dakar.**

Discussant: **M. Momar DIOP, Professeur/Sociologue, Faculté
des Lettres, Université Cheikh Anta Diop,
Dakar.**

Speaker (Anglophone): **Dr. N.M. ADEYEMI, National Institute for Policy
& Strategic Studies, Kuru PMB 2024, Bukuru
Plateau State, Nigeria.**

Discussant: **Mr. Noah NSUBUGA, Senior Librarian,
International Centre for Insect Physiology and
Ecology, Nairobi.**

I. Preamble: To determine the subject scope and form of information delivery of innovations in the social and economic sectors, for the broad mass of African users.

II. General: Provide a prognosis of the SEI situation in Africa. In particular, please comment on:

- 1) The major issues affecting SEI in Africa;
- 2) The perceived needs/gaps;
- 3) Criteria that may be used in prioritizing and selecting proposed activities/sectors for foreign support;
- 4) Modalities for delivery/action;
- 5) Opportunities for South South cooperation, "twinning" or networking arrangements.

III. Specific: 1) Determine, insofar as it is possible, what are the main information needs of African users in the social and economic sectors and give firm indication of the sectors or types of subjects that must be covered and those which do not have first priorities relevant to Africa's current development needs;

Topic 2 (Continued)

- 2) Identify the problems that may impede the full realisation of information services in the socio-economic sector (e.g. human resources, information infrastructure, capital investment) and give some indication as to how these problems can best be resolved. (In so doing, please bear in mind Topics 4, 6, and 7);
- 3) Provide information on user characteristics, penetration, coverage, speed and user acceptance of any existing services (e.g. DEVSIS, PADIS, POPIN-AFRICA), and on any other effectiveness indicators considered relevant;
- 4) Examine the most appropriate type of information, e.g. bibliographic, extension type, consolidated and repackaged, statistical or other data forms or media;
- 5) Identify optimal implementation strategies (e.g. sub-national, national, sub-regional or regional);
- 6) Assess the nature of the problem as it stands at present and provide indicators for improvement, especially to make recommendations about future modalities for action to improve the development of social and economic information services for African development (see II above).

IV. General Notes to Assist in the Study

The following issues should be isolated and given particular consideration:

1. The extent, scope and success of any existing services anywhere in Africa that may be used as a yardstick.
2. Given the need for improving the developmental situation, it is important to define a broad subject scope for SEI as it applies to most African countries. The subject scope is what defines the size of a job in hand. Definition of subject scope also enables budgets to be planned effectively and infrastructures to be built in a rational way.

- 3) Does sub-Saharan Africa need broad SEI infrastructure or should we concentrate on specific topics, e.g. education, law, labor, trade, external debt?
4. Skills required and the available technologies, e.g. does Africa require computerization or alternative methods of information handling (see also Topic 5)?
5. Human resources. We recognize that information work is a human activity and the quality of services offered depends very much on the people it can call on to operate it. SEI requires a solid background in subjects related to it. Needless to say, developing countries are woefully short of scientists engaged in problem-oriented research. How, then, can the information scientist cope? (See also Topic 4).
6. Please feel free to include within the terms of this topic any critical elements that you believe are missing from your own perspective. And, whenever possible, please cite examples of the types of national/subregional project activities that could be considered for support by IDRC.

TERMS OF REFERENCE

Topic 3 Information Systems in Support of Rural Development

Speaker (Francophone): M. Raphael NDIAYE, Directeur, Bibliothèques Publiques du SÉNÉGAL, Dakar.

Discussant: **Mme. Rokiatou TALL, Secrétaire Exécutive, Service International d'Appuis à la Formation et aux Technologies en Afrique de l'Ouest/Sahel (AFOTEC), Dakar.**

Speaker (Anglophone): Mr. Kingo MCHOMBU, Department of Library Studies, University of Botswana, Gaborone.

Discussant: **Mrs. Anne M. KINARA, Librarian, United States International University, Nairobi.**

What action is required to:

- 1) Assist developing countries in determining the information needs of people who live in poverty and of the organizations established to serve them?
- 2) Determine the critical issues and their relative importance in the delivery of information relevant to rural and community development?

Possible issues include:

- i) the types of information systems and processes;
 - ii) subjects which are currently seen to be a priority;
 - iii) technology and the means of communication and information transfer.
- 3) Identify those information systems already in operation which respond to the information needs of people who live in poverty and which purposefully allow for a greater degree of community involvement in control of development decision-making?
 - 4) Enhance the utility of information systems to facilitate community participation in development issues, and to facilitate dialogue with all levels of actors in the development process?
 - 5) Make explicit an information systems perspective on human and organizational behaviour in seeking, exchanging, and utilizing information and knowledge at the community level?

Notes to Assist in the Study

Please feel free to include within the terms of this topic any critical elements that you believe are missing from your own perspective. And, whenever possible, please cite examples of the type of national/subregional project activities that could be considered for support by IDRC.

TERMS OF REFERENCE

Topic 4: Human Resource Development (HRD)

Speaker (Francophone): M. Henri SENE, Directeur de l'Ecole des Bibliothécaires, Archivistes et Documentalistes (EBAD), de l'Université Cheikh Anta Diop, Dakar.

Discussant: M. Théodore NDIAYE, Directeur de la Bibliothèque Centrale de l'Université Cheikh Anta Diop, Dakar.

Speaker (Anglophone): Dr. Wilson Aiyepaku, Professor, Dept. of Library Studies, University of Ibadan, Nigeria.

Discussant: Mr. James M. NG'ANG'A, Librarian, Kenyatta University, Moi Library, Nairobi.

I. Preamble: Scarcity of trained personnel, the lack of adequate refresher courses for continuing education and the dearth of instructional materials are some of the constraints that have inhibited the development of information systems and programs in Africa.

II. General: Provide a prognosis of the human resource situation in the fields of library, documentation and information science in sub-Saharan (Anglophone/Francophone) Africa. In particular, please comment on:

- 1) The major issues affecting human resource development (HRD) in Africa at the paraprofessional, graduate and postgraduate levels;
- 2) The perceived needs/gaps;
- 3) The programs needed to meet the identified needs.

III Specific: Issues that should be addressed include:

- 1) The relevance of existing, African-based training programs and schemes to current African needs;
- 2) The role of the formal and informal sectors in HRD; possibilities for joint public/private sector initiatives;
- 3) The need for programs dealing with the development of management training that result in the production of "Information Managers" who integrate the roles of information planner, manager, organizer and communicator, and who are "top managements" partners in problem-solving;

Topic 4 (Continued)

- 4) Cultural and job-specific training; tailor-made programs;
- 5) Short-term, mid-career training;
- 6) Regional versus national programs;
- 7) Regional resource sharing;
- 8) Availability of appropriate teaching materials and other teaching aids.

IV. Notes to Assist in the Study

1. While important, it is not the intention of this study to address professional issues such as job classification, performance, salary structures, career paths, etc.
2. Please feel free to include within the terms of this topic any critical elements that you believe are missing from your own perspective. And, whenever possible, please cite examples of the types of national/subregional project activities that could be considered for support by IDRC.

TERMS OF REFERENCE

Topic 5 **Information Tools and Technologies**

Speaker (Francophone): M. Grégoire OMONA, Directeur, BERIAC, Douala.

Discussant: M. Alassane SECK, Ancien Directeur du Centre Regional pour les pays francophones d'Afrique du Bureau Intergouvernemental pour l'Information, Dakar.

Speaker (Anglophone): Dr. Elliot ZWANGOBANI, Director, Scientific Computing Centre, Postal Bag 7757, Causeway, Harare.

Discussant: Dr. A.J. RODRIGUES, Director, Institute of Computer Studies, University of Nairobi.

I. Background: See attached extract from ATAS paper (1 page).

II. Preamble: In establishing and operating information systems and services, African countries make use of a variety of information tools, technologies and methods - both manual and automated. It has become clear in the last decade that it is the latter - based on electronic technologies - which are generating the greatest interest currently, because of their potential to manage and provide access to the ever-increasing information store in an effective and efficient manner. However, developing countries, including those in Africa, are faced with many questions and choices regarding these technologies. Research funding agencies such as IDRC are also faced with many questions and choices in selecting activities for support. This paper should provide guidance to IDRC's Information Sciences Division for developing a strategy which takes into account African needs, experiences, and current capacities - while remembering that IDRC views the tools and technologies primarily as a means to an end: delivering information to researchers, decisionmakers, and planners to facilitate their development-related work.

III. Subject Parameters:

The paper should focus on modern "electronics-based" information technologies involving informatics, telematics, and remote sensing. These categories are, of course, very broad and cover a range of topics: computer software (with emphasis on microcomputer use), specialized hardware, expert systems, computer-based messaging and conferencing techniques, packet radio and satellite communications, computer-assisted instruction, geographic information systems, digital image processing, automated cartography, statistical databanks, optical storage technologies, and so on. The paper should also comment on the balance between these and more traditional (manually-based) methods.

Topic 5 (Continued)

IV. Detailed Terms
of Reference:

The paper could cover a selection of the following issues and questions:

1. Is the progression to electronic information tools inevitable for Africa? If so, given present limitations of financial resources, skilled manpower, and infrastructure, and the likely socio-economic impact of these tools, how can they be most effectively introduced?
2. How can IDRC most effectively assist with overcoming the above limitations (financial resources, skilled manpower, infrastructure) and others, given its own very limited resources? Give special consideration to the question of manpower development.
3. Do key decision-makers/managers/researchers, who might propose projects to IDRC, have realistic expectations of both the benefits and the costs of introducing information technology into their activities? If not, should IDRC endeavour to make them better informed, and, if so, how?
4. How important is it to emphasize the need for national planning in the introduction and development of information technologies?
5. There has been much talk of technological "leapfrogging". Are there any cases in the African experience which can be cited? Is this realistic? If so, how can it best be supported?
6. Is there really a potential "information industry" in Africa in the near future? Would it include, for example:
 - (a) production of software packages;
 - (b) production of specialized hardware or general purpose microcomputers;
 - (c) adaptation of software or hardware to local needs;
 - (d) commercial database and information services;
 - (e) information access and facilitation services;?
 - (f) value-added communications services?

If so, what research support could IDRC provide? Should it be to assess the commercial environment and the resource base? Is there a role for entrepreneurial activity in these sectors in Africa? What is the role of transnational corporations?

Topic 5 (Continued)

7. To what extent do tools produced in developed countries really need adaptation? Would it be best to emphasize widespread introduction of many types of technologies and tools or limited adaptation of fewer? Is local technology development desirable and feasible? If yes, what could IDRC do to assist?
8. Are "sub-national" applications important in Africa? These are information systems at the provincial or district levels, for example, as opposed to national systems. If so, where and for which sectors? Is there a particular need for tools to support these?
9. Given the variety of types of technologies and possible applications areas, which should receive priority? Are there any for which a small investment now is likely to have a more immediate multiplier effect?
10. Which modalities of support should receive priority? Several currently being used by IDRC are:
 - (a) information systems, networks, and services on specific technologies and methods;
 - (b) technology assessment, selection, evaluation, and testing;
 - (c) feasibility studies and technology demonstrations;
 - (d) pilot projects and experiments;
 - (e) technology introduction and transfer;
 - (f) technology adaptation and development;
 - (g) education and training;
 - (h) documentation and exchange of experience.
11. Briefly describe the current institutional environment for research, development, adaptation and use of information technologies in Africa. Which types of institutions should play a key role? How can they be identified? Which modalities (see 9) are most appropriate for each type?

Topic 5 (Continued)

12. Is it most effective or efficient in the African context to support national, sub-regional, or regional initiatives in the areas of tools and technologies? Are there geographic, linguistic, or cultural considerations? What are particular groups of countries or institutions which are most likely to want cooperative activities amongst themselves? In which sectors are these likely to occur?
13. In what is essentially a "high technology" field, what kind of activities could IDRC support in the technologically least developed African countries? Which institutions here would be best candidates for support?
14. Although this exercise focuses on information applications (in the context of the work of the Information Sciences Division at IDRC), the technologies involved have application in many sectors outside our current program. For example, computers can be used in public education (CAI), industrial processes (CAD/CAM), government (automation of administrative applications), public communications (telephony), etc. Our program has tried to limit its involvement to activities which would facilitate access to existing information for researchers - e.g. repackaging of existing (for example, administrative) data for researchers rather than collecting data or automating an administrative function. But in Africa, are there key technology applications outside the formal "information" sphere which would lead to better information applications in the future? If so, which are these and how can they selectively be supported?
15. Can you propose a concise set of criteria which could be used for selecting activities IDRC could support, to have the greatest impact in the next 5 years?

V. Notes to Assist in the Study

Please feel free to include within the terms of this topic any critical elements that you believe are missing from your own perspective. And, whenever possible, please cite examples of the types of national/subregional project activities that could be considered for support by IDRC.

Choosing information technologies: case-studies in computer-based communications

Robert Valantin and David Balson

Introduction

Over the past decade, information has been gaining recognition as a key element in the development process. Certainly, researchers know that information is crucial to their work. Good research is based first on collecting and organizing information about the field or problem under study, developing and carrying out the research programme in question, and then ensuring that the results of this work are made available to the information world. Information systems which support research activities, both commercial and public-sector, are designed to facilitate this information flow. The concept of information as a resource has been rapidly expanding into many other sectors besides research: government, policy-making, management, industrial development and so on. The basic lessons learned in information science, principally through experiences with bibliographic information production and processing, have spread to many other applications and sectors. The concepts of "knowledge industries" and "knowledge workers" are gaining rapid acceptance in developed countries, where statistics show that an increasing proportion of the population is involved with these activities. Developing countries are recognizing the advantages and necessity of an

adequate information base for their development. In fact some developing countries are hoping, at least in limited sectors, to pass over the industrialization stage and go directly to information-based industries.

Some developing countries are hoping, at least in limited sectors, to pass over the industrialization stage and go directly to information-based industries.

Technological developments, especially through the tools which they have engendered, have facilitated and popularized all aspects of the information cycle. These tools are a necessary response to the "information explosion" which has threatened to overwhelm potential information users at the same time as it has held forth the promise of so many answers to so many questions. In most cases, it is the tool built out of the technology, rather than the inherent technology itself, which is of interest and relevance to information workers and users.

Technology is relative. For example, writing is a technology although it is so prevalent, at least within developed-country cultures, that it is scarcely considered as such. To this extent, a book may be considered an information tool; it acts to store information. The index at the back of the book is also a tool; it facilitates information retrieval. Although one scarcely thinks of cataloguing rules, thesauri or information standards as technology-based, they are essential ingredients in both automated and manual systems, and they are based on a technology of information organization. Seen from the perspective of an information user in the decades to come, the telecommunications services or computers, with which everyone is so fascinated these days, will appear as commonplace and basic an element of technology as writing does today.

For most purposes, however, when one talks of new information technologies, one is referring to a particular class of technology-based tools. These are the electronic tools which manipulate and communicate digital information. These tools collect, process, store, retrieve and transmit the bits and bytes which represent information. In fact these days information technology and computer technology are sometimes taken to be synonymous. Data processing systems are now information systems. Communications is telecommunications. When one talks of information technologies, one is really talking about computer-based tools. And even if one is not directly referring to computers, they are quickly becoming an integral part of the attendant technological systems. The technologies which are relevant to information systems are, for the most part, those which interface with computers.

Is this progression to electronic information tools inevitable? Although the tools are essentially neutral in and of themselves, their application can lead to both positive and negative consequences. Some tools are better than others; how does one select? Developing countries are especially interested in issues such as: who developed the tools; who exercises control over them; can the technologies be transferred; in which sectors can and should they be applied; what are the economics of the introduction of such tools; what are the social consequences?

However, even before those questions are raised and debated, the following question is usually raised first: is the particular tool or technology in some sense appropriate for developing countries? The danger here is that because of circumstances in force at the moment, a particular technology or tool may be prejudged as inappropriate and hence rejected. There is a need for informed choice, based on sufficient research, experimentation and analysis—especially since often some sort of implicit pre-selection process is carried out by the developed countries or by agencies involved in the transfer of technology, although they may not do so deliberately.

A number of case studies selected from the International Development Research Centre (IDRC) telecommunications programme are presented in the

Robert Valantin is Associate Director, Communication Sciences Division, International Development Research Centre (IDRC), P. O. Box 8500, Ottawa, Ontario, Canada, K1G 3H8. He is responsible for the Information Tools and Methods, an IDRC programme which emphasizes the development and adaptation of appropriate tools to improve access to and use of information by developing countries. In particular, in support of research. The programme currently focuses on information technologies such as computers, telecommunications and remote sensing.

David Balson is Programme Officer, Telecommunication Systems, Information Sciences Division, IDRC. Within the Information Tools and Methods group at IDRC, he is responsible for Telecommunication Systems Programme activities involving research for the promotion, testing and use of telecommunications techniques in the area of networks in developing countries.

TERMS OF REFERENCE

Topic 6

Information Infrastructure Development and Institutional Support

Speaker (Francophone): M. Alioune Badara CAMARA, Coordinateur du RESADOC, Institut du Sahel, Bamako.

Discussant: M. André EHIMBA, Chef du Centre de Documentation de la Présidence de la République, Dakar.

Speaker (Anglophone): Dr. C. NAPONYA, Southern African Centre for Cooperation in Agricultural Research (SACCAR), Gabarone, Botswana

Discussant: Mr. WO Yen Lee, Director, INFOTERRA, UNEP, Nairobi.

I. Preamble: Infrastructure may be defined as the organization of a closed system. In the context of national and regional development, it summarises the institutional structures and facilities needed to support governance and the provision of services to meet such basic human needs as food, health, clothing, shelter, and participation in the development process. Information is needed to support activities aimed at meeting all of these needs, and may also be considered a basic need.

II. General: Provide a prognosis vis-a-vis information infrastructures in sub-Saharan (Anglophone/Francophone) Africa. In particular, please comment on:

- 1) The major issues affecting information infrastructures in Africa;
- 2) The perceived needs;
- 3) Opportunities for South South cooperation and networking arrangements.

III. Specific: Issues that should be addressed include:

- 1) The need for support to national and provincial institutions, that is, the relative effectiveness of centralized and decentralized support;
- 2) Basic information needs - user groups, sectoral interests, materials, books, equipment, training (but not in detail, as in Topic 4), and information policies;
- 3) Relative benefits of concentrating support to individual countries or to various groups of countries (such as the least developed groups, land-locked countries, countries with certain levels of information infrastructure, etc.);

Topic 6 (Continued)

- 4) The value of seed money for starting information activities, and the need for persistence in supporting established systems (or institutions);
- 5) The effective linking of country and regional information systems for resource sharing and mutual support.

IV. General Notes to Assist in the Study

1. Although related to Topic 7, the issues here should not deal directly with donor coordination, levels of assistance, or recurring costs - more properly related to the funding and sustainability topic.
2. Please feel free to include within the terms of this topic any critical elements that you believe are missing from your own perspective. And, whenever possible, please cite examples of the types of national/subregional project activities that could be considered for support by IDRC.

TERMS OF REFERENCE

Topic 7 Funding and Sustainability of Projects/Programs

Speaker (Francophone): M. Amadou Moustapha SOUGOUFARA, Ministère du Développement Rural, Dakar.

1st Discussant: M. Pathé NDIAYE, Directeur du Bureau Organisation et Méthodes, Présidence de la République, Dakar.

2nd Discussant: Mme. Sally NJIE, Directrice, Bibliothèque Nationale de Gambie, Banjul.

Speaker (Anglophone): Mrs. Edith MUTHIGANI, Science Secretary, National Council for Science and Technology, Nairobi, Kenya

Discussant:

1. General: Provide a prognosis of the funding situation in sub-Saharan Africa. In particular, please comment on:
- 1) The major issues affecting funding - whether national or foreign - in Africa;
 - 2) The perceived needs/gaps in funding;
 - 3) Criteria for selection of activities/programs requiring new funding;
 - 4) Opportunities for cost effective, sub-regional and regional networking arrangements that could potentially result in savings.

II. Funding:

Information programs and activities, especially in the start-up phase, is painfully slow and expensive. It needs to be well planned over a period of years. Start-up costs can be substantially higher than subsequent operating costs, but the whole activity must be viewed as a long term process that is costly. In the light of this, please comment on:

- 1) The relative merits of short-term (2-3 years) project financing versus long-term (5-10 years) program financing;

Topic 7 (Continued)

- 2) The relative merits of providing core support versus providing "seed monies" to start-up specific, new programs versus providing project funding earmarked for concrete activities;
- 3) Any other novel or unorthodox approaches to funding (e.g. endowment-type funding) one might consider;
- 4) Donor coordination in information science, i.e. the proliferation of donor financed, overlapping programs and activities in the information sector;
- 5) How can the problem of funding in an environment of severe cash shortages be approached?
- 6) How should donors be advised from an African point of view on this major issue?

III. Sustainability:

The question of long-term operations should be addressed. It is recognized that most countries do not have the necessary means to start up, let alone sustain the high level and type of operations existing in the industrialized countries to run information services effectively. Please comment on:

- 1) How can this problem be approached in the African context?
- 2) Should donors be putting emphasis on institution or capacity building (see also Topics 4 and 6) to ensure continuity?
- 3) What would be the optimum size of donor financed activities?
- 4) What would be the optimum duration (say, an average of 2, 5, or 10 years?) of projects financed by donors and why? Should projects/financing be phased?

IV. Notes to Assist in the Study

Please feel free to include within the terms of this topic any critical elements that you believe are missing from your own perspective. And, whenever possible, please cite examples of the types of national/subregional project activities that could be considered for support by IDRC.

Ordre du jour

Atelier sur l'élaboration d'une stratégie africaine
pour la Division des sciences de l'information

Hotel Teranga, Rue Colbert, Dakar, 24-26 mars 1987

Rapporteur: M. Dejan ABATE
M. Kebour GHENNA

Mardi 24 mars 1987

9h00-9h30 Bruce Scott, directeur régional, Bureau régional pour l'Afrique
centrale et occidentale, CRDI, Dakar

Mot de bienvenue

Le CRDI: - Son mandat)
- Approche de la planification des programmes) ce qui a
et de leur élaboration) et n'a pas
- Type d'aide et mécanismes de diffusion) bien
- Expérience africaine) fonctionné
- Survol de l'environnement de la recherche)

Le rôle de l'information dans la planification de la recherche et du développement: Quel est le problème? Le point de vue d'un utilisateur.

Ordre du jour à Dakar (suite)

Mardi 24 mars 1987

9h30-10h15 Gilbert N'Diaye, agent de programme régional, Division des sciences de l'information (DSI), CRDI, BRACO, Dakar (président) et Shahid Akhtar, co-président, CRDI, Ottawa

- Objectifs de l'atelier
- Organisation de l'atelier et procédures en vigueur
- BRACO: - Sa couverture géographique
 - Son environnement socioculturel et linguistique
 - Son environnement institutionnel
 - La dimension nationale
 - La dimension sous-régionale
- La DSI et le BRACO: - Les courants principaux
 - Les lacunes
 - Les succès
 - Les échecs
 - Les difficultés

10h15-10h30 Pause café

10h30-12h00 **Sujet 1: Le besoin d'une information scientifique et technique en Afrique subsaharienne**

Auteur: M. Souleymane COULIBALY, Chef du Centre de Documentation du Centre Ivoirien de Recherche Technologique (CIRT), Abidjan, Côte d'Ivoire.

Commentateur:* M. Ousmane KANE, Directeur, Exécutif Adjoint, Centre Regional Africain de Technologie (CRAT), Dakar

N.B. Etant donnée la nature particulière de cet atelier, qui est celle, dans les limites du possible, d'un remue-méninges, toutes les communications doivent se plier au minutage que voici:

Présentation: 20 minutes
Commentaire: 10 minutes
Discussion: 60 minutes

Ordre du jour à Dakar (suite)

Mardi 24 mars 1987

***Note:** Les commentateurs devraient recevoir, avant le début de l'atelier, l'exposé sur lequel ils seront appelés à faire des commentaires. Dans ces commentaires, ils analyseront brièvement les idées qui y sont exprimées et présenteront leur propre point de vue sur ces questions, immédiatement après la présentation de l'exposé.

12h00-14h00 Déjeuner

14h00-15h30 **Sujet 2** Le besoin d'une information socio-économique en Afrique subsaharienne

Auteur: Mme. Wambui MAGASHA, CODESRIA, Dakar

Commentateur: M. Momar DIOP, Professeur/Sociologue, Faculté des Lettres, Université Cheikh Anta Diop, Dakar.

15h30-15h45 Pause

15h45-17h45 **Sujet 3:** Les systèmes d'information à l'aide du développement rural

Auteur: M. Raphael NDIAYE, Directeur, Bibliothèques Publiques du Sénégal, Dakar.

Commentateur: Mme. Rokiatou TALL, Secrétaire Exécutive, Service International d'Appuis à la Formation et aux Technologies en Afrique de l'Ouest/Sahel (AFOTEC), Dakar.

Ordre du jour à Dakar (suite)

Mercredi 25 mars 1987

9h30-10h30 **Sujet 4: La mise en valeur des ressources humaines**

Auteur: M. Henri SENE, Directeur de l'Ecole
des Bibliothécaires, Archivistes et
Documentalistes (EBAD) de
l'Université Cheikh Anta Diop,
Dakar.

Commentateur: M. Théodore NDIAYE, Directeur de la
Bibliothèque Centrale de l'Université
Cheikh Anta Diop, Dakar.

10h35-10h45 Pause

10h45-12h15 **Sujet 5: Les outils et les techniques d'information**

Auteur: M. Grégoire OMONA, Directeur, BERIAC
Douala, Cameroun.

Commentateur: M. Alassane SECK, Ancien Directeur du
Centre Regional pour les pays
francophones d'Afrique du Bureau
Intergouvernemental pour
l'Information, Dakar.

12h15-14h00 Déjeuner

14h00-15h30 **Sujet 6: Le développement d'une infrastructure de
l'information et de l'aide institutionnelle**

Auteur: M. Alioune Badara CAMARA,
Coordinateur du RESADOC, Institut du
Sahel, Bamako.

Commentateur: M. André EHIMBA, Chef du Centre de
Documentation de la Présidence de la
République, Dakar.

15h30-15h45 Pause

Ordre du jour à Dakar (suite)

Mercredi 25 mars 1987

15h45-17h45 **Sujet 7: Le financement et la maintenabilité des projets et des programmes**

Auteur: M. Amadou Moustapha SOUGOUFARA,
Ministère du Développement Rural,
Dakar.

1er Commentateur: M. Pathé NDIAYE, Directeur du Bureau
Organisation et Méthodes, Présidence
de la République, Dakar.

2e Commentateur: Mme. Sally NJIE, Directrice,
Bibliothèque Nationale de Gambie,
Banjul.

Jeudi 26 mars 1987

9h00-10h30 **Sujet 8: Les besoins en information de l'Afrique sub-saharienne au cours des 5 à 10 prochaines années, telles qu'elles sont perçues par PADIS/CEA.**

Auteur: M. Kebour GHENNA, PADIS/ECA, Addis
Abeba, Ethiopia.

Commentateur: M. Kola CISSE, Conseiller, Amélioration
de la Gestion dans les Instituts de
Recherche au Sahel, Dakar, Sénégal.

10h30-10h45 Pause

10h45-12h00 Discussion

12h00-14h00 Déjeuner

14h00-17h00 Discussion, conclusion, recommandation (et pause)

Agenda

**Workshop on the Development
of an African Strategy for the
Information Sciences Division of IDRC**

Hilton Hotel, Nairobi, 29-31 March 1987

Rapporteur: **Mr. Dejan ABATE**
Mr. Kebour GHENNA

Sunday, 29 March, 1987

**0900-0930 Adzei Bekoe, Regional Director, Eastern and Southern Regional
Office (EARO), IDRC, Nairobi.**

Welcome

IDRC's:	- Mission)	What has worked and what has not
	- Approach to Program Planning and Program Development)	
	- Modalities for Support/Delivery Mechanisms)	
	- Experiences in Africa)	
	- Overview of the Research Environment)	

The Role of Information in Research and Development Planning:
What is the problem? - A User's Point of View.

Nairobi Agenda (Continued)

Sunday, 29 March 1987

0930-1015 Garth Graham, Regional Program Officer, Information Sciences Division (ISD), IDRC/EARO, Nairobi (Chairman) and Shahid Akhtar, IDRC, Ottawa (Co-Chairman).

- Workshop Objective
- Workshop Structure and Procedures/Rules

- EARO: - The Geographic Coverage
 - The Socio-Cultural and Linguistic Environment
 - The Institutional Environment
 - National
 - Sub-regional

- ISD in EARO: - The major currents
 - Gaps
 - Successes
 - Failures
 - Difficulties

1015-1030 Coffee Break

1030-1200 **Topic 1: The Need for Scientific and Technical Information in sub-Saharan Africa**

Speaker: E. LUMANDE, Ministry of Agriculture and Water Development, Mt. Makalu Research Station, Chilanga, Zambia

Discussant:* Dr. Charles Y. WEREKO-BROBBY, (Ghana), Project Officer, Office of the Science Advisor, Commonwealth Science Council, London, England.

Note: Given that this workshop has been organized as a "think tank" or "brainstorming" session, to the extent possible, all papers should adhere to the following format:

Presentation: 20 minutes
Discussant: 10 minutes
Discussion: 60 minutes

Nairobi Agenda (Continued)

Sunday, 29 March 1987

*Note: "Discussants" should receive, prior to the commencement of the workshop, a copy of the paper that they are expected to comment upon. They should react to the paper based on their perspectives on the issues addressed, and provide some analysis of the viewpoints expressed, immediately after the presentation of the paper. In so doing, they should feel free to provide supplementary information, ideas and suggestions from their own experience. In essence, the discussants are expected to help stimulate the discussion that follows each presentation.

1200-1400 Lunch

1400-1530 Topic 2: The Need for Social and Economic Information in sub-Saharan Africa

Speaker: Nathaniel Motunbade ADEYEMI, Institute Librarian, National Institute for Policy and Strategic Studies, Kuru, Nigeria.

Discussant: Noah NSUBUGA, Senior Librarian, International Centre for Insects Physiology and Ecology, Nairobi, Kenya.

1530-1545 Break

1545-1745 Topic 3: Information Systems in Support of Rural Development

Speaker: Kingo MCHOMBU, Department of Library Studies, University of Botswana, Gaborone.

Discussant: Mrs. Anne KINARA, Librarian, United States International University, Nairobi.

Nairobi Agenda (Continued)

Monday, 30 March, 1987

0900-1030 Topic 4: Human Resources Development

Speaker: Wilson O. AIYEPEKU, Department of Library
Archival and Information Studies,
University of Ibadan, Nigeria

Discussant: Mr. James M. NG'ANG'A, Librarian,
Kenyatta University, Moi Library,
Nairobi.

1030-1045 Break

1045-1215 Topic 5: Information Tools and Technologies

Speaker: Elliot ZWANGOBANI, Scientific Computing
Centre, Harare, Zimbabwe

Discussant: Dr. A.J. Rodrigues, Director, Institute
of Computer Studies, University of
Nairobi, Nairobi.

1215-1400 Lunch

1400-1530 Topic 6: Information Infrastructure Development and
Institutional Support

Speaker: Dr. Clemence NAMPONYA, Southern African
Centre for Cooperation in Agricultural
Research (SACCAR), Gaborone, Botswana

Discussant: Mr. WO Yen Lee, Director, INFOTERRA,
UNEP, Nairobi.

1530-1545 Break

Nairobi Agenda (Continued)

Monday, 30 March, 1987

1545-1745 Topic 7: Funding and Sustainability of Projects/Programs

Speaker: Edith MUTHIGANI, Science Secretary,
National Council for Science and
Technology, Nairobi, Kenya

Discussant: Dr. Charles Y. WEREKO-BROBBY, (Ghana),
Project Officer, Office of the Science
Advisor, Commonwealth Science Council,
London, England.

Tuesday, 31 March, 1987

0900-0945 Topic 8: Information Needs, Priorities and Plans of the SADCC
Secretariat Over the Coming Five Years

Speaker: Mr. Peter Boyle, Consultant, SACCAR
Project, Gaborone, Botswana.

0945-1030 Topic 9: North African Experiences in the Field of
Library, Documentation and Information Science: With
Special Emphasis on the Use of Information
Technologies and South South Cooperation (TCDC)

Speaker: Mrs. Faria ZAHAWI, Director, Arab League
Documentation Centre (ALDOC), The Arab
League, Tunis, Tunisia.

1030-1045 Break

1045-1200 Discussion

1200-1400 Lunch

1400-1700 Discussion, Conclusions and Recommendations (with break)



NAIROBI	I. SCIENTIFIC AND TECHNICAL INFORMATION (STI)	
	PROBLEMS	ACTION NEEDED
	<p>How do nations and donors set priorities for S and T ?</p> <p>Large, existing knowledge base is underutilized.</p> <p>International STI dissemination systems are founded on innovation, not application, and are often imposed on the region.</p> <p>Lack of local level involvement in defining the research agenda.</p> <p>Inadequate degree of involvement of IS personnel with the knowledge holders/producers/generators.</p> <p>Lower priority given to intraregional links than to links with international databases and the national capacities to tap them.</p> <p>Researchers and information specialists often do not realize the political dimension of their work and tend to ignore its socioeconomic consequences/impact.</p> <p>The emphasis on applied research, rather than fundamental research, results in complexity and few rewards for researchers.</p> <p>Career progression in S and T takes researchers away for applied research; however, research publications are not read by policymakers.</p>	<p>?</p> <p>Improve communications methods.</p> <p>Set up S and T information systems that are problem-driven; spend time identifying the problems; draw priorities from the environment and users.</p> <p>Increase local participation by improving skills of researchers, local people (and extension workers).</p> <p>Encourage IS personnel and knowledge holders to interact to produce and transmit information.</p> <p>Link existing information resources in the region.</p> <p>Involve researchers in strategic planning and recommendation of policy; a multidisciplinary approach must be taken to setting up the S and T research agenda and plans for information systems in support of it.</p> <p>Determine incentives.</p> <p>Emphasize repackaging of information.</p>

NAIROBI	I. SCIENTIFIC AND TECHNICAL INFORMATION (continued)	
	PROBLEMS	ACTION NEEDED
	<p>Different types of users have different needs.</p> <p>Too much emphasis is put on academic publications instead of rural communication media.</p> <p>Existing national councils have no tradition of disseminating information.</p> <p>In some cases there is no available recorded information.</p> <p>The extent of STI services is not known in most of the countries.</p>	<p>Promote user-provider interaction so that information collection and dissemination can be tailored to different information users and providers.</p> <p>Promote development of rural communication skills.</p> <p>Build STI infrastructure.</p> <p>Assist in publishing scientific and technological research results.</p> <p>Survey STI organizations, management, and services and establish referral services and tools.</p>

NAIROBI	II. SOCIO-ECONOMIC INFORMATION (SEI)	
	PROBLEMS	ACTION NEEDED
<p>Statistical data are not available to describe the informal sector.</p> <p>Information collected at the local level is not used at the local level; there is no feedback from the central level to the local level.</p> <p>Statistical systems are too slow (by the time data are out, they are no longer needed).</p> <p>Extension agents are not motivated to collect data.</p> <p>The utility of aggregated data available at the regional level is questionable because of differences in methods.</p> <p>The standardization at the national level of socioeconomic indicators conflicts with the need to define problems locally.</p> <p>African socioeconomic statistical information systems are needed.</p> <p>Patterns of information use by decision-makers are not well understood; nor is decision-making, or attitudes that lead to non-use of information.</p> <p>Information-handling tradition is mainly one of storage.</p> <p>Self-motivated users look for information; others are not asked for what they want/need.</p> <p>Some users cannot use information as is (e.g. top policymakers, farmers, etc.)</p>	<p>?</p> <p>Urge that statistical data collected at local levels be organized and used there.</p> <p>Support timely collection, processing, and dissemination of data.</p> <p>Undertake feedback, sensitization, incentives.</p> <p>Standardize definitions, specifications, method.</p> <p>Start with local socioeconomic indicators, and aggregate regional/global systems.</p> <p>Reinforce PADIS-STAT (the statistical activities of PADIS).</p> <p>Conduct surveys and provide sensitization and education of users.</p> <p>Promote attitudes that information workers are "information brokers".</p> <p>Encourage users and providers to interact in a question and answer process.</p> <p>Support repackaging and consolidation of information according to user characteristics.</p>	

NAIROBI	II. SOCIO-ECONOMIC INFORMATION (continued)	
PROBLEMS	ACTION NEEDED	
Information providers are unable to keep up with the rapidly changing needs of users.	?	
PADIS' capacity to provide leadership requires strengthening.	Determine ways and means of strengthening PADIS.	
Risk of misinterpreting statistical data outside cultural environment.	Correlate statistical and nonstatistical (including cultural) data to facilitate interpretation within local environment.	

NAIROBI	III. RURAL DEVELOPMENT INFORMATION (RDI)	
	PROBLEMS	ACTION NEEDED
	<p>Existing traditional/indigenous knowledge is currently being lost rather than recorded.</p> <p>Existing information infrastructure and systems are unsuited to rural needs; information is needed to advance rural development.</p> <p>Links and connections between systems are more badly needed than new systems.</p> <p>District-level R&D efforts are sectoralized, fragmented; shift to integrated efforts at district level is under way.</p> <p>Key to the challenge of complexities of R&D is the use of local knowledge.</p> <p>National information flows are unidirectional; an appropriate/relevant RDI system is absent.</p> <p>Efforts are not directed toward RDI systems/services.</p> <p>The problem of poverty is not confined to rural poor.</p> <p>Reaching rural populations is difficult.</p>	<p>Capture, then document and diffuse it.</p> <p>Strengthen existing information systems, link them to R&D, and create a "participatory" information system rather than a "directive" one.</p> <p>As above.</p> <p>Assist emergence of integrated district-level information systems (including systems for the urban poor).</p> <p>Provide innovative access to local knowledge.</p> <p>Promote two-way flow RDI system (from rural to central and back), where the extension agent is the interface.</p> <p>Experiment with pilot village information centres.</p> <p>Include urban and peri-urban poor in efforts to reach marginal peoples.</p> <p>Support local language broadcasts with follow-up material (print, audiovisual, etc.).</p>

NAIROBI	IV. HUMAN RESOURCES DEVELOPMENT (HRD)	
	PROBLEMS	ACTION NEEDED
	<p>No common agreement has been reached on definition and role of an "information scientist" in the region.</p> <p>Schools have assumed the needs of the information profession without examining the market. The danger is inappropriate specialization of skills.</p> <p>IS profession needs leaders and managers.</p> <p>Decision-makers do not appreciate the importance of information to management.</p> <p>Research methods are not being applied to IS activities/problem solving.</p> <p>Curricula of library schools are outdated.</p> <p>Profession needs upgrading of skills in a climate of changing information technologies.</p> <p>Large number of people need training.</p>	<p>?</p> <p>Undertake inventory of IS human resources; evaluate HRD training programs.</p> <p>Incorporate management science training in IS training.</p> <p>Incorporate IS component in graduate level education in other disciplines, especially management.</p> <p>Support efforts in applied research.</p> <p>Update curricula and develop teaching materials; encourage ongoing interaction/consolidation between regional training programs and the communities they serve.</p> <p>Promote training of trainers and development of a critical mass of IS professionals; provide access to continuing education; incorporate IS elements in library education.</p> <p>Promote alternative methods, e.g. distance training, correspondence courses, etc.</p>

NAIROBI	V. INFORMATION TOOLS AND TECHNOLOGY (ITT)	
	PROBLEMS	ACTION NEEDED
	<p>Indigenous capacity to make informed choices is absent.</p> <p>Informatics policy doesn't exist at national and regional levels.</p> <p>Capacity to take advantage of available information tools and technologies has not been developed.</p> <p>National capacity to create inventories of natural resources is absent.</p> <p>The skills are poor in use of tools and technologies.</p> <p>The tendency is to use more information technology than is necessary.</p> <p>Present options for information sharing and data transfer are limited.</p> <p>Attitudes toward new information technologies are non-productive.</p> <p>Intraregional exchanges of information (e.g. SADCC) are needed.</p> <p>Users are unable to identify and state needs for information technologies.</p> <p>Information on information technology is not available locally.</p>	<p>Build indigenous capacity to make informed choices about information technologies and tools.</p> <p>Encourage political direction and policy formulation.</p> <p>Provide opportunities for hands-on expanded use of microcomputers.</p> <p>Build indigenous remote-sensing capacity.</p> <p>Develop appropriate skills and capacity to produce technology locally.</p> <p>Develop, adapt, and use "needs-based" appropriate tools and technologies.</p> <p>Promote standardization, systems compatibility, and appropriate interfaces.</p> <p>Support computer literacy and other programs.</p> <p>Develop protocols to facilitate information sharing.</p> <p>Include general systems analysis in IS curricula.</p> <p>Focus regional strategies on software and non capital-intensive programs.</p>

NAIROBI	VI. INFRASTRUCTURE	
	PROBLEMS	ACTION NEEDED
	Mail and messenger services are unreliable; resources are scarce.	Prefer referral services over specialized services (document delivery); encourage greater resource sharing.
	Capacity in some countries is underused and in other countries doesn't exist.	Promote schemes for the sharing of resources; enforce sharing if necessary by regulation; develop tools to facilitate sharing of resources.
	The multiplicity of services causes sectoral competition and overlap.	Develop modes of operation for improved coordination (centralized/decentralized, (top-down/bottom-up, etc.).
	Library-based systems do not deal with new technologies.	Upgrade skills of librarians in new information technologies.
	Foreign expertise is sought despite being irrelevant because of ignorance of local context.	Develop local consulting capacity and promote its use in projects.
	Frequent changes in policy direction distort original resource allocation objectives.	Improve long range planning.
	Local resources are sometimes unknown.	Promote dissemination of information on information sources; back excellence in individuals and institutions where they exist.
	Individuals are given prominence over institutions.	Ensure continued viability through institutional development.
	The infrastructure at all levels is weak.	Use the strong to help the weak; use national systems as the entry point (troubleshooting).
	Language is a barrier to intra-African sharing of information.	Translate abstracts.
	Existing knowledge is untapped.	Encourage document and journal production.

NAIROBI	VII. FUNDING AND SUSTAINABILITY	
	PROBLEMS	ACTION NEEDED
	<p>Foreign expertise is engaged on projects despite costs.</p> <p>Donor funding is not coordinated.</p> <p>Information services require financing for sustainability (free services sometimes undervalued by users).</p> <p>Information projects are long term, and often open-ended, unlike time-bounded research projects.</p> <p>Financial and human resources are scarce so information programs are weak and lack continuity.</p> <p>Information practitioners are insufficiently aware of issues like sustainability, accountability, and economics of services.</p> <p>Foreign exchange is precious.</p>	<p>Pool foreign expertise in a methodical manner and promote local expertise.</p> <p>Promote coordination by host governments, as well as by donors; focus should be "national" rather than sectoral.</p> <p>Examine feasibility of introducing user charges; highly specialized services have greater likelihood for self-support.</p> <p>Design projects to ensure government commitment and participation; remind recipients that long-term financial commitment is required; that plans must be in place for financing after cessation of donor support (e.g., core support); as a donor, take a flexible approach to financing and consider long-term, phased (10 years or more) support to ensure sustainability or long-term component-financing for critical blockage points.</p> <p>Improve professional status and provide incentives.</p> <p>Develop criteria and methods of measuring accountability, effectiveness, and benefits.</p> <p>Devise ways of conserving foreign exchange; fund recurring local expenditures (particularly salaries) from local sources; conserve foreign exchange for obligatory foreign-exchange transactions.</p>

NAIROBI	MISCELLANEOUS	
	PROBLEMS	ACTION NEEDED
	<p>Political priorities are sincere but derailed by crises.</p> <p>Formal procedures are needed for evaluating information programs and services.</p> <p>Technicians and professionals are isolated.</p>	<p>Increase awareness of decision-makers; support IS research, i.e., problem-oriented research to improve information transfers; study the patterns of information user, non-use and decision-making.</p> <p>Develop local criteria and capacity for evaluation.</p> <p>Promote South-South cooperation; consider pros and cons of sectoral systems and integrated systems (e.g., SADCC).</p>

DAKAR	I. SCIENTIFIC AND TECHNICAL INFORMATION (STI)	
	PROBLEMS	ACTION NEEDED
	<p>STI is not dispersed to assist in development.</p> <p>The STI delivery methods are inappropriate to the users.</p>	<p>Develop information services in priority areas of development, e.g., health, water, agriculture, appropriate technology, energy, small-scale industry, etc.</p> <p>Direct attention to local technology solutions and emphasize agricultural extension.</p>

DAKAR	II. SOCIO-ECONOMIC INFORMATION (SEI)	
	PROBLEMS	ACTION NEEDED
	Local difficulties are encountered in using information tools.	Take into account sociocultural environment in design and implementation of information systems and services.
	Supply of statistical information is inadequate.	Develop methods to improve access to and use of existing administrative information.
	Available statistical information is underused.	Provide better information on existing sources; involve documentation centres in dissemination; develop and adapt tools and methods for statistical use.
	SEI is not available to assist in development.	Develop information services in priority areas of development, e.g., law, trade, etc.

DAKAR	III. RURAL DEVELOPMENT INFORMATION	
	PROBLEMS	ACTION NEEDED
	<p>Disseminating and communicating information to grass-roots level are difficult because of language problems.</p> <p>Rural people are not involved in the information process.</p> <p>Rural problems are not clear.</p> <p>Not all end-users are literate.</p> <p>Knowledge of traditional technologies is being lost.</p> <p>Traditional technologies are difficult to describe.</p> <p>Adults who become literate lose the skills because of irrelevancy of available reading material.</p> <p>Information on relevant information technologies is lacking.</p>	<p>Use local languages.</p> <p>Increase two-way flow of information by involving rural people in collection and dissemination.</p> <p>Develop socioeconomic indicators: their definition, processing, and use.</p> <p>Use nonprint media.</p> <p>Collect, preserve, and adapt traditional knowledge.</p> <p>Develop glossaries of terms in local languages and international carrier languages.</p> <p>Constitute multidisciplinary teams for production of relevant texts and materials.</p> <p>Promote information services on available information technologies.</p>

DAKAR	IV. HUMAN RESOURCES DEVELOPMENT (HRD)	
	PROBLEMS	ACTION NEEDED
	<p>The value and status of information professionals are low.</p> <p>Decisions at many levels are taken without recourse to adequate information.</p> <p>Research results often do not reach end-users.</p> <p>The teaching environment is weak and information sciences is a slowly evolving profession.</p> <p>Technical training in basic skills in information sciences is lacking.</p> <p>Trainers (teachers, professors) are few.</p> <p>Curricula for training in information sciences in different countries are nonexistent.</p> <p>Training is often inadequate, especially in informatics management and marketing.</p> <p>Learning and teaching aids are few.</p> <p>Existing facilities for information training are weak.</p> <p>Interpersonal contacts are minimal.</p> <p>Skills of information personnel are out of date.</p>	<p>Sensitize policymakers, information personnel, and others about the value of information.</p> <p>Inculcate information-seeking behaviour widely (including through the educational system).</p> <p>Train researchers in communication of results.</p> <p>Promote research in information sciences at all levels.</p> <p>Increase non-professional training.</p> <p>Train trainers.</p> <p>Develop curriculum at national level.</p> <p>Promote innovation in training in informatics management and marketing.</p> <p>Develop and publish learning/teaching aids.</p> <p>Reinforce existing regional schools; promote twinning arrangements between schools (South-South and North-South).</p> <p>Promote information and other exchanges between documentalists and decision-makers.</p> <p>Promote mid-career training/continuing education.</p>

DAKAR	V. INFORMATION TOOLS AND TECHNOLOGY (ITT)	
	PROBLEMS	ACTION NEEDED
	Communication of information is difficult.	Provide information on existing and new communications technologies; support experimentation; encourage use of communications as part of information systems and services.
	Information about databases is not publicized so the services are underutilized.	Same as above; provide a directory of databases.
	Confusion abounds in the choice of information technologies.	Encourage local information services about technologies and build up local capacities to provide advice and expertise.
	Information systems are proliferating and incompatibilities are becoming the norm.	Coordinate, establish and promote standards, and interface methods.
	The attitudes toward new methods and technologies are ambivalent or are unrealistic.	Sensitize information personnel and others to pros and cons of methods and technologies; provide related education and training.
	Expectations are unrealistic.	Promote the development of user-oriented applications by the users themselves.
	There is a lack of familiarity, competence, and skills in the use of information tools and technologies.	Train personnel in the conception, utilization, maintenance, and application of ITT and in techniques of popularization.
	Affordable, appropriate information methods are few.	Support research in improving or adapting information technologies to available means.
	Potential producers and users are not motivated.	Provide incentives and awards to encourage experiments.
	Africa suffers from technological isolation.	Promote cooperation with Canadian partners (noncommercial and commercial).
	"Informaticiens" and documentalists are eons apart.	Introduce computerized documentation methods.
	Hands-on experience with ITTs is lacking.	Support experimentation and case studies.
	Human/financial/material resources are scarce.	Promote sharing of available resources.

DAKAR	VI. INFRASTRUCTURE	
	PROBLEMS	ACTION NEEDED
	<p>National capabilities are weak.</p> <p>Resources are insufficient to provide information services.</p> <p>Scientific publication is virtually nonexistent in Africa.</p> <p>Countries vary in levels of advancement in the information field.</p> <p>National information policies are lacking.</p> <p>Local expertise is scarce.</p>	<p>Build national information systems; reinforce existing structures.</p> <p>Encourage resource sharing.</p> <p>Improve writing, editing, and publishing skills and increase government involvement.</p> <p>Adjust the type of action according to specific country needs and capacities.</p> <p>Encourage (using pressure tactics?) bringing about the development of policies; prepare sample draft policies to help in this.</p> <p>Promote local expertise and networking (consultants).</p>

DAKAR	VII. FUNDING AND SUSTAINABILITY	
PROBLEMS	ACTION NEEDED	
<p>Information about donors' activities is dispersed.</p> <p>National funding and international support for information activities are limited.</p> <p>Possibilities of an information market/market place are unknown.</p> <p>Role of information in development is not recognized by many donors.</p>	<p>Support "IDRIS-like" systems.</p> <p>Experiment with methods of financial self-sufficiency (marketing, etc.); reduce duplication and promote regional complementarity.</p> <p>Support studies.</p> <p>Undertake sensitizing initiatives (e.g. documentation promotion days).</p>	

SURVEYING THE FIELD

ANNEX E

Garth Graham* and Gilbert Ndiaye†

*Regional Program Officer of the Information Sciences Division, International Development Research Centre, Nairobi, Kenya

†Formerly Regional Program Officer of the Information Sciences Division, currently IDRC, Dakar, Senegal

IDRC's strategy for support to subsaharan Africa drew on replies to a letter sent to relevant national and international agencies and individuals knowledgeable about information science in Africa. The letter solicited input on the items for discussion at the workshops to be held in Dakar and Nairobi and on any other pertinent issues.

This chapter summarizes the responses and includes edited comments from the letters. While we have attempted to represent respondents' opinions, some distortions may have occurred in our interpretations. As the points of view in this sampling at times conflicted and the contributors did not have the opportunity to debate or support their ideas, we have disguised many of the sources; however, we have included specifics for some responses, especially for those outlining activity in progress.

We acknowledge with great thanks all who took the time to record their concerns on the role to be played by information science in the development of subsaharan Africa. A total 42 substantive replies came from Africa and 42 from elsewhere.

In the Eastern and Southern African region, 95 letters were sent out; of the replies, 24 contained more than simple acknowledgments. Documentalists or librarians accounted for just under half (48) of the letters sent out in East Africa and more than half (14) of the responses. For West and Central Africa, 14 of 40 requests elicited comments, and the 100 letters sent from IDRC's headquarters in Ottawa prompted 46 replies. Respondents usually addressed more than one topic, and development of human resources surfaced repeatedly in comments from every region.

From Eastern and Southern Africa, 17 respondents dealt with human resources, 14 with infrastructure, 11 with scientific and technical information, 9 with information tools, 8 with rural information, 7 with socioeconomic information, and 5 with funding.

In West Africa, respondents were concerned about scientific and technical information and socioeconomic information as well as human resources. One respondent dealt with use of information tools and technologies; all

but two of the replies addressed practical rather than conceptual issues.

The replies to letters sent from IDRC headquarters included comments from 20 countries — 4 in Africa, 3 in Asia, 11 in Europe and the United Kingdom as well as Canada and the United States; Canada and England — each with 10 — dominated the responses, with 1 or 2 responses coming from each of the other countries. Representatives from 9 UN agencies responded as did 3 from international agricultural research centres outside Africa. The bulk of replies to the letters sent from Ottawa came from donors or members of the development community outside Africa; a few of the letters to national libraries, universities, and statistics departments elicited substantive responses. Most of the replies from agencies outlined their activities and expressed interest in closer links with IDRC. Human resources development, promotion of and tools for information services, and coordinating activities of donors and national bodies were major focuses.

Seven of the respondents to the survey from Ottawa sent copies of project proposals, some of which have been tabled and others of which have been launched. Several respondents sent along publications.

A look at some of the responses indicates the variety of insights, including some comments about the role of information sciences in development.

ROLE OF INFORMATION SCIENCES

In East Africa, where politeness is valued highly, a few respondents expressed doubts about information sciences' having any role in development. One respondent said: "The argument is not against the use of high-level technology in the information profession in Africa. On the contrary African librarians and other relevant information persons should adopt a needs-oriented strategy to keep our professional house in order. We can then take advantage of the enormous benefits that emerging technology offers to the information profession. My main concern is that at the moment we are not ready to do this, not without an industrial base; not with collapsing economies; and, as painful as this may be, not even professionally. In plain language, we do not have the money; we do not possess the know-how; and we do not have the relevant infrastructures."

Another commented: "African information specialists know of developments in information technology. A few have been exposed to them personally, but what we know is that the continent's economic plight precludes a meaningful adoption of the new technologies.

Professionally, also, we lack the skill mix that will enable us to fully understand and manage the systems acquired."

Others expressed doubt about the seriousness of IDRC's efforts to involve Africans in a strategy for the continent. One respondent summarized the key arguments: "I wonder how much time the authors were given to prepare the papers. Even if they were given as much as 6 months, they may not be able to write a comprehensive paper on such a large region as Africa.

"It is practically impossible for an author in Zambia, for example, to critically examine the nature of the problems of scientific and technical information in Ghana, Nigeria, Sudan, Ethiopia, Uganda, Kenya, Swaziland, Botswana, etc. when the only sources of information available to him or her are the background reading materials you provided and a few, most likely outdated, reference materials in his or her library. I cannot see how one can write comprehensively about such a big region. If smaller areas like East, West, Central, and Southern Africa were to be written about by authors and then the papers were compiled, a more comprehensive subregional picture would be obtained."

Others did not question the intention to involve Africans but had comments about the approach.

Said one: "It is commendable to ask Africans to define their needs but concurrently those who have surveyed the region would be well advised to start identifying and mapping those centres of excellence with a good reputation for prompt and efficient response. This would provide a safe anchorage for the deployment of the strategy and the necessary linkages for workers already in the field."

Another said: "I believe that IDRC does accept to involve us in its plans to evolve a concept of an information science reflecting African initiative, needs, and application to African problems, but let us not wait for IDRC to tell us what to do. What is wrong with the application of wisdom and knowledge generated in Africa to the solution of African problems? We must play the role of change agents. This must come from our own conviction that we possess knowledge and wisdom that is valuable to the overall development of our nations."

A few respondents expressed happiness that IDRC was "taking a more integrated approach in developing a new strategy, rather than the adhocism that has tended to characterize some of the past efforts" and generally they acknowledged the absence of links among various information services.

One noted some deficiencies in the agenda: "I have the feeling that some points are neglected: the status of

information professionals in both the public and the private sector; job motivation, satisfaction, and performance; staff turnover; lack of effective professional organizations; lack of information science research on, for example, what is appropriate information. I am also a bit uncomfortable with the objectives of the exercise. Although each agency should certainly choose its own strategy, the latter can hardly yield positive results unless it is coherent with the strategies of other agencies. I was also surprised by the relatively short list of background readings. I would have expected that these workshops provide an opportunity for a comprehensive review of the literature. I doubt that the commissioned authors would have easy access to the relevant literature and it would have been helpful to provide them a good bibliography and the documents they selected from it."

Several people thought we were issuing a call for papers as an invitation to a meeting, and some requested the background papers sent to the participants in the workshops. When requested, the papers were forwarded.

One person noted that our request was too general, saying: "I am much better at addressing specific and smaller issues and brainstorming in person."

Another generalized: "There should be a greater exchange of scientific and technological information between developing countries in as large a number of fields as possible to maximize information inputs and obviate to some extent the danger of underutilization of equipment capacity inherent in the building up of information services and systems."

Many respondents had obviously given much thought to the issues. Said one: "The great mission of information is fundamentally to instruct, inform, and transmit to certain individuals scientific and technical facts and ideas by the most appropriate methods."

Within this general mission, the needs for scientific and technical information were regarded as permeating all levels of society. Someone else took the idea further: "Information [or its control] has become a factor in political, military, and economic inferiority and cultural subjugation."

One respondent said: "Practical application of science and technology presupposes that the knowledge and information be readily available — documented, processed, and promoted through appropriate systems. Inappropriate information or none at all may lead to failure of development projects, duplication in the areas of research, and the taking of untimely and unworthy decisions. Researchers, farmers, agroindustrialists, planners, and import-export industries all need to keep

abreast, to monitor developments in their fields, and to adopt modern practices. However, to meet these needs the African continent has perhaps the least developed scientific information system."

No one disputed the need for information, but how to absorb, process, and disseminate it in a directly usable form was less clear.

CURRENT ACTIVITIES

To some degree, said African respondents, attempts are being made to address most of the needs; the reported activities fit with the priorities identified — agriculture, livestock raising, fisheries, forestry, public health, and industry. Specifically cited were INFOTERRA's services — "not only the search of a wide range of databases but also the delivery of documents" — ILCA (International Livestock Centre for Africa), and CGIAR (Consultative Group on International Agricultural Research). Some respondents mentioned activities that were promising, such as Agritex in Zimbabwe, which was lauded as a prototype for agricultural extension.

One respondent wrote about a service for documents of standards: "Standards are a unique source of information covering virtually all sectors of industrial and economic activities. Professional specifications developed by various bodies around the world amount to 400 000 documents. This literature is managed by about 100 specialized information centres, 20 of which are operational in Africa. Centres in Africa are organizing themselves into a network by sharing their resources through the proposed African Regional Standards Organization, Documentation and Information Network (ARSD-DISNET) on standards and technical regulations."

A submission from East Africa noted that the ministry of industry in one country was implementing a management information system project based on a study of the organizational structure; information flow within, to, and from the organization; problems encountered in supporting firms, supervising corporations, and monitoring departments within the ministry; data processing considerations; documentation needs; equipment suppliers; and some user installations in the country. According to the submission, the study pointed to requirements for information to be collected about operations, sales, personnel, finance, and projects, as well as planning data that result from budget preparation.

Said another: "With financial support from the United Nations Development Programme, the Communauté économique de l'Afrique de l'Ouest recently created a subregional centre for commercial information and documentation in

Abidjan."

One respondent dealt with education, summarizing governmental activities locally: "By 1986 enrolment in basic education was growing very fast at 20.8% per year. Thus the existing study on needs for information approaches the problem from the point of view of planning and managing the educational system. Accordingly, the study called for improvement in the quality of statistical data collected; an extension of the range of data collected; an increase in the capacity for processing data; and an effort to raise the capacity for use of data in inventory control, general ledger systems, cost accounting, budget control, database management of school systems, and administration.

"With these objectives, the ministry of education has started a 4-year program of building capability. However the application of informatics need not be confined to the monitoring and planning of the educational system. Definitely, the use of informatics in the deliverance of educational materials and making textbooks and lecture materials available at the sparsely distributed schools has not been examined. Neither has the use of information technology to ameliorate the teacher/student ratio."

Another respondent focused on activities of the labour department, noting that some statistics are routinely collected, even though, as yet, they are not being systematically analyzed: "The labour department in collaboration with the national statistical office collects routine information on status of employment and conducts specialized surveys on urban employment, classification of occupations with related requirements for skills, registration of job sectors, and annual collection of labour statistics. The desired system of information has not yet been outlined."

Together, the letters received from around the world are a general appeal to researchers, information professionals, and decision-makers to reach out to each other to find out how they may best ensure the efficient development and application of research. Some excerpts of what was said about rural information, human resources development, information tools and methods, building an infrastructure, and funding appear on the following pages and complement what has been gleaned from meetings to design a strategy for information sciences in subsaharan Africa.

RURAL INFORMATION

Most respondents who addressed issues for rural development information systems viewed the activities as solely dissemination and broadcast. One, however,

referred to rural peoples as a source of information: "There is an urban emphasis in our services. Information should be directed more to rural and community development, to grassroots. There needs to be greater emphasis on information of local origin."

Another noted: "Many countries are looking at district/village levels as the forms for scientific-technical-social-economic development efforts," and went on to say, "effective data catchment and provision systems must be so designed as to take care of this approach. However the same systems may not be in a position to satisfy the rather sophisticated informational requirements of industry and science and technology departments in universities and colleges. Yet whatever the differences, the various systems must be interlinked, for the village information service could serve as the breeding ground for ideas that could later be listed by research and development organizations for application."

The common perception was: "The information systems that support rural information are networks of rural libraries operated by the national library service; ministry of information library service; rural newspapers; extension staff of ministries of agriculture, livestock, health, provincial administrations; radio and television; national daily and weekly newspapers; and nongovernment organization programs. The purposes of the information acquired through these media are to enlighten the public on government plans, policies, and achievement; supplement formal education; support nonformal education (such as literacy programs); and facilitate reading as education for self-reliance, individual intellectual development and better use of leisure time."

Several comments made the rural farmer seem remote -- almost as if rural peoples are figures from the past instead of being the majority in today's Africa. Others recognized the central role of agricultural activities but saw no hope in the near future of involving farmers in information activities.

One respondent said: "The farmers are the principal actors of the rural development process and as such they become the main target of knowledge transfer. But only after they have undertaken literacy programs will we be able to discuss logically problems related to the development of information and documentation facilities and their use in rural communities. While waiting for literacy for rural populations, extension workers should act as information relays from research centres and libraries to rural communities."

Another respondent commented: "Extension workers need

preprocessed and repackaged information in a medium and in a language accessible to the majority of the illiterate rural community. They need information on practices that have been tested and proved useful to farmers. However, extension workers are rarely found reading in libraries because there are no library facilities in the rural areas to cater for them; or if libraries exist, they do not have the relevant literature. Furthermore, the link between research findings and farm practice is poorly organized. Hence, findings are not applied; the information needs of the rural community not identified and understood. Extension workers should benefit from refresher courses and continuous training to enable them to constitute a bridge between the researcher and the farmer. These courses should also show them techniques on developing information products and services for the farmer."

The magnitude of the job is put into perspective when one considers that currently, in Africa, extension workers number about 1 for every 2000 farmers.

One respondent suggested introducing "barefoot information services, repackaging of scientific and technical information, and strong interagency coordination of extension agencies involved in rural information work."

Another called for "research on the role and contribution of a library service that enhances adult education and that is relevant to the interests of villagers to improve their knowledge and sustain their reading skills," because "there is a general correlation between level of education, reading activity, and use of library services, and, therefore, rural public libraries have always had very close links with adult education, in roles of support and direct provision."

One respondent described an early warning system for food shortages in the context of rural information systems: "A number of government agencies have been active in attempting to solve the problem of lack of reliable indicators and control variables for planning rural development and specifically for forecasting the food situation. However, in the past, each data system reflected the planning needs of the agency concerned and focused on its activities. The analysis of the data and the level of collection and aggregation were not adequate to monitor food actually available to the population of a rural area. Moreover, the timeliness of the information was limiting. Thus the early warning system was set up with the objectives of providing data that warn of impending food shortage, information on deficit and surplus-producing areas for market stabilization, information on management of regional food shortages, and

quantitative information on the planning and management of regional food supply.

"The information is to come from crop monitoring; monitoring pastoral conditions and animal production in rangeland areas; monitoring prices and supplies; strengthening and extending meteorologic reporting; monitoring the status of community and family food stock, dietary intakes, and nutritional status."

The respondent envisioned: "establishing a system for efficient data processing and intersectoral analysis, a system of relaying, to all agencies responsible for action, the results of the data collected in a clear understandable form, and models that define the relationship between aspects that determine food availability."

This early warning system is said to be one of the most functional in Africa but is an expensive venture.

A respondent from West Africa mentioned efforts by SAFGRAD (Semi-Arid Food Grains Research and Development Project) to forge some links between agricultural researchers, extension workers, and farmers: "SAFGRAD has been successful in organizing peasant days at the test sites of research stations with researchers present. These facilitate free and open dialogue between all involved." This type of direct communication could be extended using modern technical equipment (audiovisual support, radio, etc.). Moreover every researcher and development agent in the countries is a potential communicator and trainer."

HUMAN RESOURCES DEVELOPMENT

As most of the respondents were information professionals, they had much to say about shortcomings in human resources development in the field. The other respondents also dealt with the training of information workers, policymakers, etc. One staff member from the UN commented: "Please note that my office is currently developing a project document on the development of indigenous capability in Africa with emphasis on educating the educators in remote sensing technology."

The thrust of comments from Africa was that the profession is passive, unprepared, underpaid, and out of touch. Said one respondent from anglophone Africa: "Years of experience and keen awareness of the peculiar needs of African librarianship learned on the job have led to invaluable service in the management of the libraries of the region. Most of the British-trained professionals had their experience in the conventional library because this was before the information age. Some of them have managed to keep abreast. However, the majority have failed to take advantage of the new opportunities on a formal basis

either because they think they are too old or because they have not considered any such upgrading necessary in the circumstances in which they find themselves."

Another said: "Existing personnel are passive and do not react to opportunities to go outside their institutions for cooperation in resource sharing."

The reasons for passivity and disinterest came out of several letters; for example: "Training policies and programs on information systems should be associated with realistic salary structures for trained personnel so as to stem the present exodus of existing and newly trained information technicians and scientists from developing countries to more advanced countries or even from public to private sector."

Also, "Funds should be allocated to supply regularly publications in the information field to key information specialists as a means of continuing education."

The list of disincentives included reliance on experts from outside the region. Said one respondent, "The issue of human resources development is central to past, current, and future programs in Africa. However, what is equally and probably more important is the issue of human resources utilization. The most serious aspect of the brain drain is often overlooked: a multitude of qualified and capable individuals are idle in their own countries. In several instances, their talents remain unrecognized and unutilized, unchallenged, and misdirected."

Another noted: "There is a tendency to perpetuate dependence on foreign expertise at the expense of indigenous expertise. Levels of national development are not uniform and the cultural context within which certain ideas must be interpreted are never the same, although similarities may be discerned in a particular region."

This respondent issued an imperative: "Distrust uninformed and arrogant foreign consultants whose ill-prepared advice is given on the basis of 2 months' experience. I urge IDRC to examine critically the possibility of engaging experts from within the region to carry out consulting missions."

Opportunities for Training

A related problem cited by another respondent was: "Local training has generally been concentrated on paraprofessional and subprofessional levels. Graduate and postgraduate level training is often undertaken overseas. Because graduate degrees are shorter and therefore cheaper for aid agencies, the paraprofessionals are likely to be overtaken by new entrants to the profession who enter at the graduate level and are promoted over persons with longer service."

The commonly mentioned difficulty in providing relevant training outside a country was the focus of several responses. One said: "There is a tendency to respect qualifications from developed-country universities and a tendency of donor agencies to give preference to home institutions. However outside training programs will not be relevant to the developing-country circumstances and the technology used in training may not be available. Frustration results and leads to turnover of staff."

From Senegal, where human resources are relatively strong, a respondent reported that the lack of opportunities for paraprofessionals -- in librarianship, documentation, and archives -- threatened the services offered by his institute. The argument was that such people are indispensable for execution of routine technical tasks and that the established document-handling institutions in the region should take on the responsibility for training the cadres, with government recognition of the diplomas.

Some approaches to dealing with shortcomings in training were put forward. An international association for the profession in West Africa sent in a response, urging national, subregional, and continental associations for information scientists to contribute to strategies for development of social, economic, scientific, and technical information in Africa. It also stressed training as a means to improve the status of the profession on the continent. Specifically, it recommended IDRC organize practical courses and reorganize public libraries that currently exist in Africa. The submission went on, "IDRC could make a valuable contribution by not restricting itself to the development of information and the application of sophisticated techniques but rather by helping the working masses who have a right to documentation and information."

One respondent summed up the thinking in several letters: "First of all, a survey of the manpower needs of the individual countries is a priority requirement. This important initial survey has never been done in any African country. Ad-hoc training, pursued without awareness of the exact target population and areas of training, has filled the profession with generalists who cannot respond adequately to the special challenges of the information profession and the information needs of troubled African economies."

Another said: "Provide specialist focus in general training programs to prepare staff for work in agricultural information centres, population documentation centres, social science and scientific databases, research information centres on tropical

diseases, outreach services, and a host of other mission-oriented information systems that will surely address some of Africa's pressing information problems."

Still another noted: "Since about 70% of sci-tech information and probably a much higher percentage of databases are in English, the curriculum needs of the anglophone countries are different from other countries where some emphasis must be on translation. Keyboarding errors are common in words that are almost the same in different languages and prevent retrieval unless an intelligent front-end is programed to pick up such mistakes."

Someone else commented: "For skilled information technologists and paraprofessional information workers, the emphasis in training should be on interpreting and repackaging information for ultimate users — especially peasant farmers."

Some respondents mentioned programs their organizations provided. For example, one said: "The information and documentation training section of Deutsche Stiftung fuer Internationale Entwicklung (DSE, the German Foundation for International Development) carries out training programs each year for personnel from East and Southern Africa; for example, in 1987, the program consisted of five courses — 4 days to 1 month long; subjects included basic concepts of bibliographic and documentation work; establishment and management of national information services; introduction to librarianship and documentation; curriculum adjustments; and agricultural information services. Partner institutions are the Eastern and Southern African Management Institute, the University of Botswana, and PADIS."

Another noted: "The Commonwealth Secretariat publication Rural Community Resource Centres: A Guide for Developing Countries is to be published. The guide advocates the involvement of the community in setting up its own information and learning resource service and details the task of the information officer as the coordinator for information exchange. A training guide will also be available."

As well, "Library schools in Africa are a recent phenomenon. Any assessment of the existing library schools should take cognizance of the background (professional) in which they were established and the existing systems they prepare people to serve. By and large, library education in Africa was fashioned on the colonial model. People were needed to staff conventional libraries, even special libraries; therefore the traditional core library topics of cataloguing and classification, acquisition, library administration,

reference and bibliography, and circulation formed the content of the school curriculum. The conventional librarian will be needed in the African environment for a long time, but after two decades and more of training this type of professional, we need to take stock of our programs and see whether the new development needs do not demand a change of focus, a reordering of priorities in information training programs."

The direction of the change was suggested by a response from West Africa: "In workshops and other training activities for information personnel, attention should be devoted to the mediators' role in viewing people as both producers and consumers of information."

Someone from outside Africa commented: "The traditional training of librarians should be retained to maintain academic and research libraries, but more emphasis needs to be given to the provision of services to the majority — i.e., those who will never have the education or the opportunity to use libraries based solely on the printed word, often in a foreign language. Training should be greatly expanded to include a sound basis in adult education, literacy, community, development, and communications; methods of analyzing, repackaging of information; practical skills such as typing and bookkeeping; alternatives to traditional forms of information."

A group of respondents addressed the issue of training for personnel in informatics, pointing out that except for training support by computer hardware sales companies, applications training in data processing and informatics management is nonexistent on the continent.

"Manpower planning is important in both the short and the long term for adoption and adaptation of informatics technology because the lack of trained personnel affects maintenance of existing systems and stultifies the development of new applications as well as their implementation."

Along the same vein, another respondent said: "Information technology depends on the computer industry in terms of a cadre of personnel needed to plan, design, analyze, implement, test, and maintain information systems software. There are also the engineers and technicians needed to maintain the hardware such as computers, communications systems, and microelectronic components in general.

"The major problems in getting and training staff are that there are no national training centres; the local training provided by companies is not adequate; education opportunities at higher levels are not available; funds are not available for training staff abroad; managers are reluctant to pay for training and to have their staff

away on courses; people with an aptitude do not join the profession because of low pay; and rigid recruitment procedures cause difficulty in selecting the right kind of people."

In sum, said another respondent: "There are no full-scale professional training programs in informatics in the universities. The training that is available is oriented toward users and specific applications and is promoted by computer system dealers."

One respondent directed comments toward IDRC: "I see very little hope of success for the two regional postgraduate programs in information science in anglophone Africa (at Ibadan and Addis Ababa as recommended by IDRC and Unesco). I think there are too many contending forces that make it extremely difficult for a regional institution to balance its activities to the satisfaction of each participating country within the region."

Although the focus of most responses about training was the information worker, some respondents commented on the preparation of users. Said one: "Use of information is not taught in universities. Users seldom look for new information and keep using what they already have. Scientific publication is not in their mother tongue, so information begins to be regarded as a luxury. People already live without many essential things — among them, medicine and medical care — as well as books and up-to-date information."

Another level of users was the focus of this response: "There is a lack of recognition by decision-makers of the crucial role information plays in development. There should be programs to influence the influencers like the ones once operated by the Coordinating Centre for Regional Information Training and the German foundation for international development (DSE)."

One reply from a UN centre said: "If information is going to be available for government decision-making and to support the sharing of experience in the region, the government officials and managers must be convinced that information (particularly indigenous information) has a role in development. One would need some African case studies that show how information has helped people get involved in the development process or has made development programs more effective."

A corollary was: "Senior managers of major national and regional institutions do not see the relevance of including an information systems' perspective in planning for organizational structure. An information component needs to be included in general management training programs."

Another respondent commented: "Decision-makers — that

popular but imprecise term — require digests of information and clear presentations of relevant facts and data. Even professors of science like reviews of progress in a field rather than to read all the original texts so information systems need to include brokerage or analysis services. Also, general training for staff in industry, commerce, and government services as well as scientists should include a thorough grounding on acquiring, selecting, repackaging, digesting, assessing, and presenting information."

Said someone else: "We need to think about distance learning programs based on expanded information services. The combination of selective dissemination of information (SDI) and reprints obtained through a current titles service now gives isolated scientists self-training opportunities. It is now possible to consider a partial replacement of traditional centralized supplier-defined training programs with information services of sufficient diversity so that users can satisfy their own perceived needs."

INFORMATION TOOLS AND METHODS

Others commented about the difficulties in finding out details about technology. Said one: "There is a great need for computer literacy among the current information professionals and a great need for cooperation among all professionals in information fields."

Another noted: "Even we in the information world need information on what technology is available. We need advice on what technology is best for our particular needs and what latest developments have taken place."

Several respondents echoed this concern about technology — especially computers; the letters suggest that many have serious doubts about the appropriateness and the directions of what is going on.

Said one respondent: "The much-cited benefits that can be derived from the application of high technology in information processing and management are more relevant in the context of economies with firm industrial bases and the know-how for managing both the hardware and software components of these technologies. There is a school of thought that developing countries can skip the industrial hurdle and jump straight into the era of high-tech information. This is as unrealistic as it is dangerous and misleading to those countries to whom it is being peddled. Such systems require careful planning at the highest policy levels. We have not been able to achieve that even for basic information. Many of the new technologies require more highly skilled workers than the traditional systems. How do we meet this need in our

present circumstances? These systems are said to be cheaper than, say, a decade ago when they were comparatively new on the market. This comparison is relevant in the rich countries. In the present African context, they are expensive and out of reach of most countries. They are also not very relevant because infrastructurally Africa is not ready. If, however, we are thinking seriously of adopting the new technologies, if we are convinced that they are the answer to our problems, then it is important, in terms of educational planning, to begin to train the labour force that will be charged with their implementation."

Said another respondent, "For cost-effective application, the new technologies in the African environment require efficient and advanced telecommunications systems. Internal telecommunications are inefficient and plagued with constant breakdowns. Electricity services are equally inefficient with blackouts and unsatisfactory levels of supply. Breakdowns may result from lack of spares or insufficient know-how on the part of maintenance personnel. High technology does not develop under such conditions."

This opinion was accompanied by unsettling news from a North American agency managing a national collection of scientific and technical information: "We are now receiving approximately 75% of document orders by some form of electronic mail. There are signs that fairly soon libraries may refuse transactions that do not come in through a protocol-based system. This could provide yet another impediment to the transfer of information to developing countries."

One respondent commented on the risk for increasing dependence on the North by purchases of software and hardware: "The implication of wholesale transfers of information technologies has not been subject to any in-depth study and the repercussions are thus unclear. African countries, with their minimal industrial base, will not be in a position to take the bold independent stands of India or Brazil in the foreseeable future. Increasingly, advanced communication and information technologies are purchased not transferred. Worse than the importation of hardware, dependence on industrial countries for software induces reliance on others for data processing research and design functions and moves us still further away from achieving our own capabilities. There is a need to develop information consultancy services and a need to build up the national capability in the design and installation of computer systems."

An inherent difficulty was noted by another respondent: "One of the main factors affecting the costs

of information technology is the costs involved not only in acquiring but in maintaining logistical support — management, engineering, and technical activities concerned with requirements, design, supply, and maintenance to support objectives, plans, and operations. A great portion of costs stems from management and technical decisions made during the early phases of the planning and design of advanced systems. Governments could consider mandatory publishing of life expectancy curves and dead-time estimates as well as average costs of a product; they could establish standards in reliability and logistical support or at least refer to the international standards that are most appropriate for a particular environment; give preference to suppliers with strong financial ties or links with the country; use Unesco coupons to purchase spare parts; order full technical information so that local repairs can be made where possible; ensure access to the source codes for software; search for packages that use standard computer languages; and examine carefully the training component in the sales contract (never less than 50% of the total training). Direct support by a manufacturer should be mandatory. Costs of technology derive from the development, construction, manufacturing, logistical support, and losses to the user during times when the equipment is not functioning."

Still, one respondent pointed out that computers are not new in Africa: "Many computer installations exist in Africa and much information can be extracted and elaborated from them. In Kenya, as an example, computerization started more than 20 years ago, and today the country has about 200 mainframes installed. Despite this rather long experience in the use of computers, utilization is still alarmingly low. The government computer centre in Nairobi reported lately that more than 90% of installed computers in Kenya have their power turned on fewer than 12 hours a day. I suggest a survey of accumulated experience (and not just success stories, which teach us less than failures)."

Along these lines, someone noted: "Recently the Commonwealth Secretariat mounted a project in East and Southern Africa, the objectives of which are to carry out a comparative study of experiences with use of the new information technology by governments in the region; assess the current impact on management systems, organizational structures, and policy frameworks that have evolved in response to technological needs; and identify and evaluate the adoption of new technology for information handling."

From anglophone Africa, a respondent said: "The indiscriminate introduction of modern electronics-based

information technologies in developing countries has often resulted, in the past, in the multiplication of information equipment subsequently grossly underutilized for lack of trained personnel to operate it and adequate databases. Information services must be established to serve, above all, the needs of the users and not merely in response to selling techniques adopted by the agents of manufacturing concerns."

Said another: "There are tendencies either to ignore totally or to embrace blindly a new technology. The obsession with technology rather than its resourceful applications makes important the planning of a national policy and strategy for the judicious use of informatics technology."

Frustration with optimistic claims was clear: "It is believed in certain quarters that Africa's development problems can be solved by the introduction of informatics. The idealists are convinced. Sweeping and unhelpful generalizations, applied in the African context, show clearly how far removed some of our Western colleagues are from the truth and the realities of the African situation. African libraries are failing to benefit from the new technology and are not on line to the technological advances and the new opportunities. On the contrary they are very much off line to anything — to basic printed resources, let alone new technology."

Among those who believed that computers had something to offer Africa was a respondent from an international agricultural research agency who said: "In the field of agricultural research management, the International Service for National Agricultural Research (ISNAR) has recognized the importance of strengthening managers' access to organized information sources. In Morocco, it is currently working with INRA (Institut national de la recherche agronomique du Maroc) to establish a computerized program and budget system that records the financial and human resource requirements of individual research projects, providing management with a detailed record of input needs and an aggregated budgetary overview by research program. ISNAR is also creating a database on the funding and human resources in national agricultural research. The difficulties are in the regular updating of information because those who are asked to supply information either do not see the results or do not see that the usefulness of the information to themselves is as great as the costs of providing it."

Also, a regional institute that trains information specialists in West Africa submitted a document detailing the software it had developed for database management. The institute commented that the availability of computers has affected all nations — no matter how

technologically advanced. The thesis was that the technologies have made transfer of knowledge practically instantaneous and that unless Africa absorbs them it will be left further behind. The institute maintained that some of the tools can now operate much more reliably in the tropics than they could 10 years ago, although, said the institute, the conventional equipment — large computers and minicomputers — requires powerful air conditioning equipment and stabilizers for the electric current: "By way of example, breakdowns in some countries have led to a central unit being inoperative for several months and holding up the payroll of entire administrations. This forced the employees to handle the payroll manually while they waited for the delivery of the spare parts and for the maintenance service to effect the repairs."

In contrast, the microcomputers are less sensitive to the heat, are easier to maintain, and can be shipped to service representatives.

Similarly, the institute was optimistic about the potential for programing and adapting software for the microcomputers. Cooperating with a university in Canada, the institute has begun setting up communications networks, revising software packages, etc.

The institute's optimism was shared by a few others. One respondent from East Africa said: "Lower the tariffs on equipment. A single exposure to the tools increases the chance for improving one's own and society's productivity. In fact those concerns that have resisted the introduction of new technologies have weakened competitiveness and are jeopardizing jobs. The more outgoing sectors of the economy — stepping up productivity by implementing technological innovations — are in fact creating new jobs."

A few respondents identified specific changes for bibliographic software used in automation of libraries. Said one: "IDRC's priority should be to improve MINISIS in terms of compatibility and certain library in-house activities. It would then be more applicable to the needs of national and university libraries."

Said another: "A good foundation may be growing for sharing information on microcomputer applications for libraries and documentation using INMAGIC and CDS-ISIS."

According to a respondent from the International Center for Living Aquatic Resources Management (ICLARM): "CDS/ISIS software for microcomputers is the ideal bibliographic tool and it is already finding wide use in Africa; in Nairobi, there is even a user's group."

One respondent outlined the ideal software for documentalists: "The analysis of typical library or information centre needs in a developing country shows

that the computerization of essential procedures and services requires a number of general software features and functions:

- o Powerful and flexible online input, data management, and retrieval facilities.
- o High degree of user friendliness (resource directory, expanded help and error messages, search term truncation, possibility for multilingual commands, etc.).
- o Support of various character sets in non-Roman alphabets.
- o Support of general library management applications such as acquisition control; lending and circulation control; as well as of thesaurus maintenance.
- o Support of connection to external online information retrieval systems.
- o Support of as many different forms of output as possible (computer output, microfiche/microfilm, photocomposition, compact disk/read only memory).
- o Support of SDI.
- o Extensive user and system documentation available in different languages.
- o Compatible where possible with other packages already in wide use in developing countries.
- o Standard formats for exchange of bibliographic information."

Other respondents commented about the utility of different information tools. For example, "The day it will be possible to have an integrated publishing press on top of a desk, the computer will be of greatest use for information centres in Africa."

And, "Microfiche remains essential to facilitate the storage and retrieval of important fugitive materials that often escape the attention of sectoral scientists."

Finally, "Among the information tools for francophone Africa is a catalogue of university periodicals; it is methodically prepared at the university library in Abidjan."

BUILDING THE INFORMATION INFRASTRUCTURE

The perspectives on infrastructure development varied widely and were contradictory; however a simple imperative came from an international research agency and for this demand there were no dissenters among the replies: "Please address the publication of scientific and technical information and the relations with media in disseminating it."

One respondent outlined the overall requirements for an information infrastructure: "In Africa we need integrated systems of information incorporating reference

libraries, databanks on resources, publication services, etc. and these must be linked with the national bureaus of statistics as well as the offices for rural radio."

Debate revolved around the approach. Three respondents believed that pan-African or subregional approaches are essential for project development:

"Strengthening of mission-oriented information systems such as AGRIS and INFOTERRA is important, not only for the subsaharan region but for the worldwide exchange of information."

"Regional information systems such as PADIS should be strengthened."

"There is a lack of communication between groups and institutions within the region in spite of common problems. Even within a country, resources are largely uncoordinated and there is no effective network established to tap resources elsewhere."

Another respondent called for concerted efforts to rectify the lack of coordination: "On the one hand there is an increase of interest in management of information, and on the other there is a marked lack of coordination on the part of national and international agencies in response. We have recently sought to encourage cooperative work between countries to derive strategic thinking of benefit to a wide audience. We cannot make agencies work together but we should at least be able to exchange information on progress and on plans."

ILO is among the organizations moving in the direction of regional information sharing, according to the reply from there: "The International Labour Office would like to cooperate with the Economic Commission for Africa to develop an information program. Any initiatives would aim to be compatible with PADIS standards. The only documentation activity we have planned for Africa in the next biennium is a seminar on labour information for labour administration programs, labour ministry officials, and ILO staff in the region."

The reply from the World Health Organization noted: "Since the WHO literature services program was launched over 10 years ago, the regions have been working toward their self-determined goals. The program emphasizes library cooperation and regional self-sufficiency. Unfortunately, the health libraries in Africa lack trained staff, financial resources, and equipment; above all, they lack networks. Our activities have been essentially aimed at the training of health library personnel (seminars have been held in Arusha and Dakar). Until recently WHO was able to finance a limited number of photocopies and MEDLINE searches, but the service is unlikely to continue much longer. We are trying to identify local resource libraries on a subregional basis

that would be willing to provide photocopies of periodical articles for a small fee to health libraries and workers within their region."

The difficulties in setting up large information networks were underlined in a response from the UN Advisory Committee for the Co-ordination of Information Systems, "The United Nations Centre for Science and Technology for Development has shelved the global information network for the time being because of lack of funds but it will be producing a directory of science and technology information services in the UN system at headquarters and field offices and other locations."

The bulk of respondents pointed to national level activities as the essential building blocks.

Said one: "Support for regional cooperation in information systems is gaining ground in Africa because there are international foci in the form of the various economical and political groupings such as the Economic Commission of West African States (ECOWAS) and SADCC. These can only succeed when there are articulated and viable information infrastructures at the national level to form the base. High-level politics can play a negative role and frustrate regional cooperation if a sound base is not in place from which to negotiate vested interests. The still-born SADIS [Southern African Documentation and Information System] venture is an example. One would expect a continental umbrella information organization like ECA-PADIS to perform an advisory and coordinating role in these matters. Its leadership role so far in this respect has been limited."

In sum, said another: "National information networks must be developed or strengthened before we can contemplate regional, continental, or international networks."

The same sentiment was clear in a response from Canada: "We assume that you are concerned not only with the transfer of scientific, technical, social, and economic information to subsaharan Africa but also with its development, dissemination, and application within the region. Many people in the region have the knowledge and skills to determine the needs with respect to transfer, but their efforts are hampered by inadequate databases. The methods of analysis often exceed in sophistication the quality of the data to which the analysis is applied. We recommend that consideration be given to the support of basic data collection and the examination of techniques and technology appropriate to the institutional and research environments of subsaharan Africa."

An African respondent said: "Priority should go to strengthening national information services but only by

avoiding the development of uncoordinated services. The approach should be to create or strengthen specialized information analysis centres and national databases; initiate national committees to coordinate the development of information services; provide education at the graduate level as well as continuing education for information personnel; enhance the demand for information through user education; strengthen contacts with international and regional systems that will search commercial databases; and in the long term acquire or gain online access to foreign databases."

Another respondent said, "Establishment of national systems in Africa has failed because of the refusal by the lords of the archives, libraries, and documentation centres to leave the empires that they created at a time when it was unthinkable to talk of coordination of all information activities at the national level. We propose the establishment of a national system in each country:

- o A national council for documentation and information in charge of defining the national policy in matters of scientific and technological information and establishing the national plan for information.
- o A directorate of documentation and information charged with the responsibility of carrying out the decisions of the national council, coordinating training and national activities, assisting in the establishment of the national network through national subnetworks and working at the creation of sectoral centres. This directorate should not be a pilot information centre. The directorate should be attached to the Office of the President.
- o A network of sectoral centres using the same standards and compatible software packages."

Some countries are currently planning systems: "It is hoped to set up a computer systems network that will link the planning committee to regional planning offices and other institutions for national resource planning. The needs have been identified as being the creation of an inventory of natural resources (disaggregated and regionally homogeneous); the establishment of a system of economic and social data from the central and local level and field surveys outlining procedures for future updating; development of computerized data transfer, entry, storage, updating, and retrieval in all suitable forms; design of appropriate tools for analysis and planning, and forecasting using macro models, input-output tables, etc.; and research tools for the solution of selected problems of planning in a regional/national systems framework."

Standardizing is one concern: "A national committee

has been set up under the central statistical office to coordinate the use of computers, ensure the standardization of information processing and transmittal methods to allow for multiple users, determine the actual needs of systems requests and their compatibility with existing and planned systems, issue indicators and ratios that will help assess the need for and rate of technological absorption, and give policy inputs to government. The composition of the committee includes systems analysts and software engineers."

One respondent cautioned against attempting to effect development from the centre: "Economic development is a local phenomenon, not a regional, national, or subregional one. The consequences of a macro approach can be seen in the heavy centralization of development, with all its social disruption in many countries. The growth occurs only in the centre; so it is with macro strategies for information, which reinforce centralization. The transfer of information into effective economic and social action takes place at the local level."

Others agreed that centralization was not the best route to take: "Associations have a big role to play in strengthening cooperation and coordination within national systems since government ministries place a higher priority on control of than on access to information."

Someone else said: "In all the countries where an attempt has been made to organize information activities, the structure created very often does not meet the approval of different sectors concerned mainly because of strict centralization and poor planning of the tasks assigned to the national system."

One respondent presented an example where centralization didn't work: "The setting up of a national information system (NATIS) constitutes the kingpin of Unesco's program but is the one against which the development of information in the African context has come to grief. The assumption was that governments needed to be involved at the policy level first of all and would then have sufficient continuing interest to commit funds for policy implementation. But as of now, most African governments have not been able to establish NATIS and their information policies are still ill-defined. A suspicion that has become a conviction is that policymakers lack awareness and a commitment to the importance of information in decision-making. This argument can be countered by the fact that in traditional society, the mode of governance and decision-making is based on consultations at various levels. Hence for example the proverb of the Akan of Ghana, which says one head does not make a decision. In fairness to our

policymakers, ignorance of the importance of information is by no means the only reason for the low priority of information in national planning. With 80% of foreign exchange earnings going into repayment of interest on massive foreign debts it is not surprising there is severe narrowing of priorities. People will riot when food is scarce but shortages of books are barely noticed by the general populace because their effects, though devastating, are long term and lacking in drama."

The pros and cons of sectoral information systems were also given attention by respondents. Said one: "IDRC will do this region a great favour if it does not insist on dividing information systems along artificial sectoral lines currently being perpetuated. To insist on sectoral development is indeed to pretend that information and communication are not meant to have an impact on the overall national development effort."

On the other side was: "The major impact of computers would be in establishing management information systems to aid planning as well as enhance decision-making in resource allocations and management of complex projects. The choice of applications must match the development priorities set by government such as utilization of natural resources, agriculture, land records, meteorology, trade, industry, national statistics, demographic patterns, health statistics, etc."

A respondent from East Africa agreed: "There is a need to provide vehicles through which African policymakers, planners, and researchers can be assisted with socioeconomic information resources. Because of the needs to respond to clearly identified user characteristics, socioeconomic information (SEI) networks should be related to narrow sectors concentrating on specific topics such as population, education, law."

Said another: "SEI should separately cover information needs for governments, parastatals, and private enterprises. Governments need policy and control-oriented information. Public and private enterprises need implementation- and performance-oriented information.

According to someone else: "The demand for economic and social information is greater or at least longer standing than the demand for scientific and technological information. This is the result of the need of the state to exert control and of the economic managers to plan development and other efforts. Thus, statistical systems have been in operation for a long time, sometimes from the preindependence days. For scientific and technological information, promotion of demand would seem to be worthy of inclusion in a strategy for Africa."

One respondent stressed that, at present, the results of agricultural research are in the hands of a few and,

hence, researchers are marking time. This submission asked: "How is documentary production to be surveyed? How is the database to be fed? How does one go about organizing national documentary holdings on microfiche?"

Someone else analyzed a system for agricultural research documentation and called for enhanced national services to provide:

- o A central documentation and retrieval system for reports, data, research studies, and extension messages.
- o Systematic access to information on research design, planning, and results from external sources, data for policy formulation and facts (like pesticide toxicity) for service programs.
- o Current-awareness services to enable professionals and technicians to stay abreast of their fields.
- o Central controls and coordination of budgets and expensive print materials.
- o A system to support researchers stationed in different locations, particularly outposts.
- o A system to preserve and provide access to materials already present.
- o A campaign to increase people's understanding of research methods and sources of information and to counteract the general view of libraries as warehouses.
- o A career structure for information workers in government.
- o A variety of publication fora to encourage documentation of research efforts.

Said another: "The urgency of land-use planning and the generation and processing of land information could not be overemphasized. Land-use data are dynamic and require periodic updating. The only present land-use plan is based on the capital metropolitan area but experience with this plan is valuable as a pilot project."

One respondent suggested: "...the development of an inventory of uncompleted projects with a view to incorporating their completion in future planning — housing projects with foundations and walls but no roofs; bridges with only half the decks finished or with no ramps from the road; dams complete but still no irrigation scheme designed. These all seem to be cases of failure to realize benefits from major investments."

Another practical suggestion was: "Former colonies could derive great benefit from having access to information on the work done by researchers and technicians during the colonial period. A recent pilot project (between France and Vietnam) has shown that three elements are needed for successful ventures to provide such access:

- o The structure, within the beneficiary country, for the reception, handling, storage, and dissemination of such documentation;
- o The common aim of the two governments; and
- o The willingness by former colonialists to take inventory of the data and reproduce the useful documentation (judged by specific criteria)."

Others promoted their organizations' proposed or current activities. For example: "ICLARM could assist in the provision of information on aquaculture. The proposed service illustrates the virtual absence of African outlets for research results. A regional journal would be ideal but a newsletter would make a good beginning in reducing the isolation of individual scientists."

Another provided examples of what libraries could do as part of the national network: "They should explore cooperative or shared acquisition on the basis of subject allocation; selective abstracting to assist researchers to reach materials buried in existing periodicals; preparation of SDI research profiles and bibliographies in anticipation of needs, not just on demand; research on library issues; agreements for the production of national union catalogues as the basis of interlending; cooperation in curriculum revision in African library schools; seminars on national or regional information resource sharing offered to government departments and permanent secretaries of ministries involved in information services as well as librarians."

The respondent saw these activities as possible despite the lack of funding and resources: "Libraries work in isolation, duplicating scarcely affordable resources and wasting the enormous gains that could be made from sharing. Legitimate frustrations and feelings of hopelessness in the face of debilitating shortages in every sphere of life have smothered imagination and sapped initiative among Africa's information professionals. They sermonize to donor agencies at library association meetings instead of engaging in useful discussion of practical proposals for equitable use of existing resources."

FUNDING

The shortage of funds was acknowledged implicitly in many of the responses; a few dealt with it explicitly.

Several noted the problem of collapse of information services after withdrawal of donor support. Some had recommendations on how to improve results from donor assistance.

Said one: "Assistance in the past often stopped with a consultant's report. Pilot projects are more successful

where the consultant is involved in proposing, planning, and in implementing."

Another commented, "Project funding should provide for strong links to an institution in a donor country."

Someone else said: "Optimum duration of funding is 5 years renewable."

The ever-increasing constraints on funding for information systems and services in both developed and developing countries were the focus of a response from a Canadian agency with responsibility for national collection and handling of information on science and technology: "In the current climate of constraint, it is increasingly difficult to meet our national demands. There has been increasing talk of cost recovery; for example, one university now charges CA\$11 for an interlibrary loan. In such a climate African institutions will not be able to depend upon industrialized country information services. Our national collection of scientific and technical literature represents an investment of many millions of dollars over many years. It is doubtful whether such a collection could be put together again. The most active part is the most recent part. If we were starting again, we would probably go back no more than 5 years and depend on other sources for the older material."

Funding constraints and their implications were given a different slant, albeit pointing in much the same direction, in a response from an international agency: "A viable strategy for subsaharan Africa should emphasize the development of self-reliance by African institutions in dealing with their information and communication problems. For West Africa, our organization's experience is that the information activities are not funded well enough to make an impact on scientific and technical research; the lack of trained and skilled personnel in information handling and in exploiting the wealth of information sources and systems elsewhere in the world exacerbates the shortage of resources; and policymakers and decision-makers and heads of scientific research institutions need to be sensitized to the value of information in development so they can view investments in information processing as an integral part of investments in development."

In sum, funds are expected to become harder to get so professionals in information handling, researchers, academics, government personnel, extension workers, etc. in developing countries must all derive the maximum possible from the resources available. Also, donor agencies increasingly must work together to make their monies go as far as possible. Evidence is that the agencies are recognizing this imperative. One respondent

said: "In an effort to learn about the state of scientific and technical information activities in developing countries and what the needs were, the United Nations Centre for Science and Technology for Development wrote to all developing countries late last year. Replies included requests for aid in human resources development, networking, funding, etc. The Centre would be interested in cooperating with IDRC in rendering assistance if the requests fit your strategy and plans."

The goal is to improve the capability in subsaharan Africa for information transfer, adaptation, and use; the ultimate aim is a level of development that enables full participation in the world economy and an acceptable standard of living for the masses.

Project Ideas Tabled During Workshops

1. National seed centres to manage information on seed stocks, using micros.
2. Assist with the repackaging of SADC food security data into "information".
3. Support to early warning and food information system and geographic information system (at the Intergovernmental Agency for Drought and Desertification).
4. Assist ECOWAS in the creation of an information network among its member states.
5. Operationalize statistical component of DEVSIS, i.e. DEVSIS Level II and reinforce PADIS-STAT.
6. Establish inventories of sources of information.
7. Establish standards, formats and methodologies for the creation of inventories of ongoing research (e.g. convene workshops of key agencies such as CRAT, CODESRIA, RESADOC, PADIS that currently have inventories but use different methodologies to discuss, process, and agree to a common format and system).
8. Assist countries in establishing their national information policies and plans. (Convene workshops involving countries that have worked on developing their respective national information policies and those that have not, so that they can learn from each other's experiences).
9. Conduct surveys on methods and designs for national information systems.
10. Assist with the development and rationalization of curricula in existing (e.g., Botswana, Benin, Zaire) and planned (e.g. Cameroon, Ivory Coast, Ethiopia, Kenya) schools of library and information science (e.g. a workshop involving existing and planned schools to develop "model" curricula may serve as a good starting point).
11. Conduct manpower market surveys as part of human resources and assessment.
12. Produce appropriate teaching materials for information science education and training.



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13. Assist - particularly at the community level - with the documentation, in local languages, of traditional technologies and know-how.
14. Establish basic inventories of 1500-2000 rural development terms in local languages for key sectors, e.g. agriculture, medicine, energy.
15. Establish district level information systems and experimental village information centres.
16. Support research projects to study the linkages, variables, alternative delivery methods and the influence of African culture on rural development information systems.
17. Study information use patterns and their relation to decision-making amongst African policy-makers and planners.
18. Study and support ways and means of improving available information services.
19. Study the pros and cons of information technologies in Africa to sensitize users and decision-makers.
20. Set up an information service on information technologies and systems.
21. Train researchers in communicating research results through training in the area of scientific writing, editing and communicating.
22. Support South-South cooperation.
23. Improve exchange of information between donors (e.g. through IDRIS and similar systems).
24. Develop appropriate criteria for evaluating information programs.