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A LITERATURE REVIEW

RESEARCH INFORMATION IN AFRICA:

Its Management, Use and Dissemination

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Research Information in Africa — Its Management, Use and Dissemination: A Review of the Literature

I. Introduction

Research Information in Africa - Its Management, Use and Dissemination: A Review of the Literature focuses on what African information professionals are saying about the problems they face in identifying, collecting, processing, repackaging, and disseminating information in their countries and across their borders. The purpose is to bring to light possible barriers to the research dissemination work of the Health and Human Resources Analysis for Africa (HHRAA) project and its component, Support for Analysis and Research in Africa (SARA), and to identify avenues where targeted strategies may help remove these barriers. Here, the Africans themselves are identifying the impediments; they are also suggesting some of the solutions.

The information sector in Africa was examined primarily from the viewpoint of traditional information provision, emphasizing print media and the traditional infrastructures information professionals rely on to maintain information flow. It should be noted, however, that the advent of electronic media for transferring information presents endless new possibilities for Africa, and may help overcome some of the traditional barriers; references to these media have been included in this review.

The literature for this review was identified from a number of bibliographic resources, among them Library and Information Science Abstracts (LISA), Information Science Abstracts, the Educational Resources Information Center (ERIC), Pascal (a resource provided by the CNRS/INST, Institut de l'Information Scientifique et Technique), the Public Affairs Information Service (PAIS), and Academic Index.

II. The Objective of this Literature Review

The objective of this review is to present an overview of what has been written on the information sector in Africa. This, in turn, can provide guidance in defining priorities and approaches that will facilitate the dissemination of research information. These priorities and approaches will suggest action that may be undertaken to strengthen the capacities of those who disseminate research information.

III. Background

A. Information as an Economic Sector

Information has emerged as one of the fastest growing, most important sectors of the

industrialized world. The efficiency and effectiveness with which knowledge is transmitted, collected, repackaged, and disseminated to those who need it directly impacts economic competitiveness, political decision making, and social welfare. Those who possess relevant knowledge at the right time has the power to alter the course of their own lives and the lives of others.

As early as 1967, a U.S. Department of Commerce study of the U.S. economy reported that more than 46 percent of the GNP and 53 percent of labor income was generated through work in knowledge, communication, and information industries (Hanna 1991). In OECD countries, information technology has become the largest component of fixed capital formation. By the end of the 1990s, information-technology industries are likely to constitute the largest industrial subsector (Ibid.). The impending establishment of an information superhighway is expected to bring the information age directly into people's homes on an unprecedented level, with its attendant industries jockeying for position to provide goods and services.

Not only have information handling and the technology that supports it become an important economic subsector in the industrial world, but information content—knowledge quickly and easily obtained and strategically applied—has also become a driving force in all other sectors of the industrial world's economy. "Information technology has accelerated the pace of research and innovation and significantly cut the lead time for bringing innovations to the market place. In an increasingly competitive environment for science-based industries, taking advantage of this shorter lead time has become crucial" (Ibid.).

Against this backdrop of rapidly moving data and fierce competitiveness in the industrial world, the developing world is struggling to provide the most basic human needs for its citizens. The promise of knowledge as an avenue for solving problems of disease, ignorance and want is blunted by a pervasive poverty that saps human and material resources.

B. Information Technologies for Development

Over twenty years ago, the United Nations predicted that by 1980 every nation would be capable of using computing power. Computers, the UN argued, would give developing countries the *entrée* they needed to be full participants in the world economy (Ibid.). Although some countries such as India have made great strides in the information sector, in 1994, well past the UN's predicted 1980 breakthrough, many countries, particularly those in Africa, continue to struggle with emerging information technologies.

At least part of the inability of developing countries to adopt "computing power" may lie in the lack of a written information tradition—a tradition that not only captures the wisdom of experience of present and past generations, but also incorporates lessons derived from an examination of root causes of problems and applies those lessons to development. In the developing world, government planning often takes place in a vacuum: what data

that may exist are out of date; monitoring systems are cumbersome; networks and mediums of information exchange are limited or nonexistent; knowledge workers are undertrained and underpaid; access to government data is denied; research is needlessly duplicated.

The information sector also presents a philosophical paradox for developing countries. Inherent in information exists the potential to assist in solving problems that hold nations in the grip of poverty. Yet that same information symbolizes access, openness, and accountability—decidedly democratic values not held by some governments—as well as a continuing dependence on industrialized nations for the means of acquiring information and its form and content. Adoption of information technology carries profound social and geopolitical implications for developing countries. There is at once a suspicion of information and a desire to embrace it.

C. The Information Sector in Africa

Nawe states that "... the economic differences between developed countries and developing countries in Africa have created both a psychological and a material dependency relationship. The aspirations of Africans for what they cannot attain add to the problems affecting anyone who is touched by technological change" (Nawe 1993). With regard to generating and disseminating research information, that dependence on industrialized nations is particularly marked.

Nevertheless, current efforts to make African nations more self-sufficient in creating, using, and disseminating information, such as the activities of the National Research Council and the Board on Science and Technology for International Development, have made notable strides. Technologies such as CD-ROM have shown great potential as information-sharing vehicles for harsh climates and remote areas (White 1992; Kanamugire 1993). As Tiamiyu notes, however, using high technology can produce new forms of dependence on outside sources for hardware and software despite the initial intention to foster internal capacity building (Tiamiyu 1989).

Dependence extends not only to the means of accessing information, but also to information content itself. African researchers' demand for information far outstrips the continent's internally generated supply. This, coupled with a desire for knowledge that industrialized nations can supply, creates a dependence on information from overseas. Not all information produced for industrialized countries, however, is necessarily appropriate for Africa's needs and does not address the needs of African nations to share their own information with each other (Zulu 1993). Add to this the low status of the information profession in Africa, which hinders its ability to attract well trained, well educated workers who can manage Africa's information needs (Kanamugire 1993).

Several major factors have been identified as barriers to disseminating research information in Africa: 1) lack of government support for information collection, maintenance, use, and

dissemination; 2) poor access to information; 3) inadequate human resources and training in the information sector to manage and disseminate information; 4) inadequate financing of information-related activities; and 5) poor quality or inappropriateness of information for African development.

IV. Barriers to Research Dissemination in Africa

A. Governments as Gatekeepers: Information Collection, Maintenance, Use, and Dissemination

The information sector itself presents a policy challenge in Africa. In the literature on the information sector in Africa, there is virtually universal agreement that government attitudes toward information collection, maintenance, use, and dissemination and their willingness to address the needs of the information sector in policymaking have a profound effect on information flow.

In developing countries throughout the world, ineffective management and use of a government's own information resources contribute to government unwillingness to support efforts toward improvement. A vicious cycle of non-support emerges when policymakers are unable to value the importance of information because of the poor quality of their existing information services—services that are inadequate because of lack of support (Boon 1992). This is no less the case in Africa, where many policymakers have not yet recognized the vital link between information and national development (Zulu 1993).

1. The Policy Agenda

In much of the developing world, information is seen as power, not as a tool for development (Mchombu and Miti 1992). Educating policymakers about the importance of access to information in relation to a country's ability to solve its own problems is a major area of concern, one that can affect a country's policy agenda.

Mchombu and Miti cite the International Development Research Centre's position on the relationship between the information sector and policy in a 1989 IDRC report entitled *Sharing Knowledge for Development: IDRC's Information Strategy for Africa*:

- a) It has become the practice for governments to allocate resources on the basis of principles and directions laid down by policies. Policies are therefore tantamount to declarations by governments of their intent to take development action.
- b) There is a need to have policies which establish governance over information activities, in particular regulatory policies are required for co-ordination,

networking and resource sharing, information exchange, importation of information products, standardization, creation and maintenance of information centres, data bases, data banks and statistical/numerical information systems.

- c) Policies improve the chances for locating accountability, defining institutional responsibilities and spearheading change.
- d) An information policy can energize and open up the informatics sector by laying guidelines for the application of information technologies, computers, and telecommunications, including the local manufacturing of information products.
- e) There is a need to co-ordinate donor support and this can only be done if the government shows its willingness to create supportive conditions for the development of the information and informatics sector.
- f) Without policies, governments cannot hope to stimulate an integrated approach to information provision, or to motivate coordination among existing information agencies and the effective creation and use of professional capabilities (Mchombu and Miti 1992).

Currently, the information sector may not be able to influence policymakers to direct their attention to national information policies. What may prove a more effective start toward an information policy is to include information components in the policies of other major development sectors, particularly science and technology, education, and economic production policies (Mchombu and Miti 1992). In this way, the information sector can then emerge as a support to these areas. A primary advantage of incorporating the development of the information sector into that of other sectors would be to help ensure balanced national development (Agha and Akhtar 1992).

But additionally, broader across-the-board policies to stimulate the information flow would then be needed. Such policies would provide guidelines for information professionals to develop a better information infrastructure, including all points along the "information transfer chain, from production to handling and processing, to the ultimate user target-groups and the information technology necessary to create and exchange" information (Mchombu and Miti 1992).

2. Freedom of Information

Freedom to access and generate information is a democratic value. Though every ~~government—democratic or otherwise—~~withholds certain information from the public in the interest of national security, governments that subscribe to the value of freedom of information form policies that spell out what constitutes classified material.

In Africa, much government-generated information is shrouded in secrecy. A lack of information policy defining what is secret and what is not leaves the majority of its internal information under tight restriction (Kaniki 1992). "It is difficult to envisage an information policy in a situation where governments are bent on secrecy and the misinformation of the public. Unless this attitude and practice changes, the spread of information will be stifled" (Mchombu and Miti 1992).

The question of freedom of information extends not only to government-generated reports, but also to research commissioned by the government. A consultant may do extensive research, collect data, and make recommendations only to find that the final report may be restricted, especially if the findings reveal information adverse to the political climate of the country. Without access to such reports, however, subsequent research may duplicate these efforts, wasting precious resources (Agha and Akhtar 1992).

3. Government's Relationship to the Research Community and Research Information

In many countries, the government is the principal research sponsor. Government and researchers often have competing interests, however, that can make government's perception of research findings and their dissemination difficult to overcome. Researchers are typically interested in determining whether the facts support or refute a particular hypothesis. Policymakers want facts that will justify their positions (Porter 1994).

Today, many African governments are sensitive about who is allowed to conduct research and the nature of the research to be undertaken—to the extent that some countries consider it a national security issue and require clearance from the highest levels of government to determine who has permission to conduct research and the scope of the research (Gathegi 1992).

Prior to independence, the majority of researchers and other information producers were expatriates who often took their records with them when they returned home, leaving nothing in the countries in which the work was done, and making it virtually impossible to retrieve information about their research (Cooney 1974). Despite the growth in expertise of in-country researchers, a large number of expatriate experts continue to conduct research in Africa. The findings of their research may still not be made available to local researchers either because of government restrictions on dissemination of research information, lack of local print and non-print media through which to share research findings, lack of an appropriate home for the data, or oversight on the part of the expatriate researcher.

Although research can and does contribute to the process of development, proposed research frequently does not relate or correspond to the stated needs of national development plans. Even when research does address development issues, the results are generally policy-neutral, taking an objective stand rather than defending or refuting a particular political position (Porter 1994). The utility of research findings in government

decision making is also dependent on the form the results take. Policymakers find much research reporting "voluminous and excessively academic or theoretical" and not easily adaptable for policy purposes (Rathgeber 1988). As a result of these problems, research findings do not make their way into mainstream development planning.

Restrictions regarding release of government-commissioned research have been mentioned above. Similar restrictions may also affect research that has not been commissioned by the government. Even if the research findings are scholarly in nature, they are likely not to be disseminated if the results are judged to be "prejudicial to the interests of the state" (Gathegi 1992).

Financial constraints also limit African governments' willingness to meet the needs of researchers. Policymakers may see researchers' needs to acquire and disseminate information to be closely tied to other research-related needs that require government funding, such as improved research facilities and additional funding to initiate new research (Mchombu and Miti 1992). Because of the differing priorities of researchers and governments, there often is little collaboration that could enhance the dissemination of research information (Rathgeber 1988). Though some movement between government and academe exists in Africa, for the most part researchers remain detached from government—in part as a survival strategy stemming from the tendency for persons to fall in and out of favor according to the regime in power (Ibid.).

Except for some foreign funding sources, the governments in African countries are generally the main source of research funds. With a scarcity of research funds, researchers prefer to apply their research money to the process of the research itself rather than on dissemination. External agencies that support research frequently do not provide for large scale dissemination (Rathgeber 1988).

4. Managing and Using Information Effectively

Although there are African governments that recognize that information and knowledge are important to the development process, they generally do not manage and use information effectively. Rarely do methods exist for systematically collecting and organizing government information. Information and data are scattered among many ministries and are often not analyzed to make them intelligible for decision making, unless such a requirement is made by an outside donor (Mchombu and Miti 1992). New technologies for handling government information and data frequently are acquired from external sources. Thus, continued information management and use is often dependent on external support (Ibid.).

B. Access to Information

Access to any information, let alone research information, is difficult in Africa. Lack of basic infrastructures that could facilitate information and knowledge sharing are inadequate,

even for sharing information among African countries. Importing information from outside the continent creates additional burdens on the already tenuous infrastructure.

1. Infrastructure

Demand for journals and other library materials outstrips supply, making it necessary to import information from abroad (Alemna 1992). Importing journals can be a lengthy and ultimately unsuccessful process, however. In some cases, a library has to apply for an import license through a commercial bank to buy materials from outside the country. If the application is accepted and an import license is granted, foreign currency must be released—another point in the process that leaves the request open for rejection. By the time all the appropriate licenses are obtained and foreign currency is released, the process has taken months (Kanamugire 1993).

Furthermore, journal and document orders may require approval by a government ministry, which may tie up ordering for years (Alemna 1992). Add to this equation poor communication and transportation systems and slow postal services, and the result is an information quagmire (Kanamugire 1993; Cooney 1974). Perhaps the strongest argument for promoting electronic networking is that it can alleviate some of the dependence on an infrastructure that is inadequate for acquiring printed information products.

A shortage of professional journals and other print media exists in Africa for publishing research findings (Obikeze 1979). Local publishing infrastructure is not equipped to support local journals. Lack of funding means that journal issues are produced sporadically or entire publications disappear after a short run (Rathgeber 1988). Even if a publication exists that can accommodate research articles, the publication cycle beginning with the initiation of research to publication of a journal article can stretch to 45 months (Ehikhamenor 1990).

In addition, many researchers seek legitimacy for their work and international recognition for themselves by publishing their findings in overseas journals. As a result, what local journals exist suffer from a shortage of material, a particular handicap when the scientific community is small to begin with (Ibid.). When local journals suffer from a dearth of material it is difficult for them to begin to earn the professional credibility that would attract further research material, creating yet another vicious cycle.

Finally, the most basic equipment that might facilitate greater information resource sharing, such as photocopy machines, are not available unless donated from outside sources. Supplies and parts must also be acquired from donors; when the supplies run out, copying ceases. Equipment cannot be maintained beyond the life of the initial service contract. The application of higher technology creates the same problems of dependency on donors. Not only is maintenance a problem, but often equipment that has been obtained to support information activities is appropriated for other purposes (Kanamugire 1993).

2. Bibliographic Control

Simply stated, bibliographic control refers to the ability to keep track of published and unpublished material. Most training in the information sector in Africa focuses on acquiring and processing published information, to the neglect of unpublished literature. Unpublished reports, or "grey literature," however, may be one of the best sources of current, timely, and complete information for development. Unpublished reports often carry more detailed information and are normally issued within a relatively short time after the research is completed; important data can be edited out in the formal publication process, a process, as we have seen, that can take years (Zulu 1993).

Grey literature is generally produced in limited quantities, inhibiting wide dissemination. Lack of bibliographic control results in a lack of awareness that a report exists. In addition, lack of bibliographic control makes it difficult to find and obtain a report, even if it is known to exist (Kaniki 1992).

3. Coordination and Networking

Coordinating and networking information resources hold promise for increasing information access in Africa. By this strategy, libraries, research institutions, and information and documentation centers need not duplicate resources, as long as each participating institution knows which resources are held by the others and on what terms they may be used. Currently, however, the resources of libraries and information centers are poorly coordinated.

Simple methods of creating union catalogues (a single list of the holdings of several institutions) and sharing bibliographies among libraries and information centers on the local, national, and regional levels have been suggested. But lack of photocopy equipment and supplies, and limitations in communication infrastructure can create obstacles for even simple solutions (Chifwepa 1993).

Information-exchange agreements have been offered as a method of acquiring information, particularly information from outside Africa, but an inability on the part of African institutions to reciprocate in such arrangements limits this possibility. Lack of materials as a medium of exchange is one problem (Obikeze 1979). Lack of interest in or utility of information on Africa for the purposes of industrialized countries is another (Cooney 1974).

C. Human Resources in the Information Field

The human element in information management is important. However necessary a particular research endeavor may be to the development process, the fact remains that information isn't always easily retrievable by the researcher and when it is retrieved, it isn't always in a usable form. Therefore, information often must be retrieved, interpreted, and

repackaged by a qualified intermediary (Boon 1992). The low status of the information profession and inadequate training for information professionals are cited as principal barriers to recruiting and keeping qualified individuals who can obtain, interpret, manage, and direct information to those who need it.

1. Low Status of the Profession

The low status of the information profession has numerous ramifications. Low status means that the profession cannot command the salaries to attract highly qualified people (Boon 1992). Unfortunately, this poor image is accepted by many information professionals themselves, citing the lack of recognition of the profession as one of the reasons why libraries and information services do not effectively serve their constituencies (Nawe 1993).

For the most part, the information profession in Africa lacks active professional associations that can give support and credibility to the information sector (Wesley 1992). Such associations could serve to unite the information profession behind standards for information management and could provide a source of continuing education and pride.

Though information professionals cannot make information policy themselves, the low status of the profession even hinders their ability to influence decision makers toward adopting policies that would increase information access and give professionals more control over information management.

2. Training

Current training provided to information professionals in developing countries is generally inadequate to their special needs. In particular, information scientists receive little or no education connecting the importance of information to the process of development (Boon 1992; Kaniki 1992).

Many African information professionals receive training in environments very different from those in which they will actually practice their profession (Nawe 1993). This is particularly true when training takes place outside Africa and relies heavily on technological or other innovations and ideas that cannot be implemented when the professional returns home (Wesley 1992).

The training for information scientists also confines itself primarily to acquiring, processing, and managing standard published literature. Such training fails to equip information managers to seek out unpublished literature, which may provide some of the most timely, relevant information available (Zulu 1993). Training within Africa generally is also inadequate in helping information professionals to incorporate technological advances appropriately, where the opportunities to take advantage of technology may exist.

D. Finance

Information and the technology that can make it available are expensive. Since much information that is used in Africa is generated abroad, foreign currency is often needed to import it. When weighed against the need to purchase food or other essentials, information is accorded low priority for foreign-currency expenditures (Kanamugire 1993). Even when material is available in-country, the local currency with which to purchase it may also be in short supply (Alemna 1992).

With regard to financial allocations to information by the government, policymakers may choose to reserve funding for their special projects (Mchombu and Miti 1992). In addition, if policymakers do not think that information services have contributed something of value to development, they may withdraw what support there might have been (Boon 1992).

E. Information Quality

Quality information may be defined as information in its most usable form. To be usable, the information must be relevant in content, form (paper or electronic), format (bibliographic citations or fulltext articles), language, timeliness, and appropriateness to the situation for which it will be used (Kanamugire 1993). In 1974, Cooney cited limitations of expertise, resources, and staff that make it preferable to attempt to obtain information that does not need additional analysis or repackaging in order to make it usable. In other words, if fulltext articles are needed, then an information source should be found that is capable of providing fulltext articles without additional human intervention, such as making fulltext articles available via CD-ROM. Current problems of inadequate human resources, finance, access, and policy, as stated previously, suggest that this situation has not changed substantially over the past twenty years.

Material produced in industrialized countries often is not relevant to the needs of developing countries. Even if material is appropriate in content, such information is often produced in Western languages, particularly French and English (Kanamugire 1993). The publishing industry in Africa has not been able to supply sufficient materials in indigenous languages that could make information more widely accessible (Nawe 1993).

The issue of timeliness of information has been examined with regard to access; the longer it takes to obtain information, especially from abroad, the less relevant the information may be to a particular situation.

People also play a part in information quality. If information is received in a form not appropriate to the needs of the user, the information must be processed by professionals who not only are trained in the information sector, but also have sufficient sector knowledge, where necessary, to locate and appropriately interpret and present the information (Parker 1990; Kaniki 1992; Boon 1992).

V. Removing Barriers to Disseminating Research Information

A. Information Policy

A promising approach to fostering the development of information policy lies in taking advantage of the support role that information plays in relation to all other sectors of development, as noted above. Policies encompassing information collection, processing, and dissemination as support functions can be linked to policies developed in science and technology, education, health, and other sectors, giving emphasis to the importance of information access in managing and making decisions that affect the development process (Mchombu and Miti 1992).

By linking information policy to the policies of other sectors it may be possible to circumvent government resistance or indifference to the information sector and help the information sector obtain credibility that could pave the way for comprehensive information policies in the future. Such a sector-by-sector approach would require that information-policy advocates develop a coordinated effort to ensure that information policies are, in fact, in harmony across sectors.

Information professionals working in concert with the ministries can help in this policy process (Kaniki 1992). Information professionals should also seek opportunities to serve the information needs of key officials directly, with an emphasis on information content, exposing policymakers to the value of information packaged for decision making.

Development of comprehensive information policies addressing freedom-of-information issues can contribute to the process of democracy by defining criteria for classified material, freeing other material and making it available to the public.

B. Linking Information Dissemination to the Research Process

Another approach to disseminating research information is to make dissemination of findings a normal and expected part of the research process. As noted above, researchers often are reluctant to use funding for dissemination, instead directing as much funding as possible to data collection and analysis. The result may be that good research gets done, but its impact is lost. Making information dissemination a requirement and encouraging the development of innovative avenues for distribution—particularly within a country—could help ensure that research results would achieve wider availability.

Since governments are frequently involved in the approval process for new research, involving policymakers early on in the development of research proposals may also serve to garner support for dissemination of results later. Such involvement would also ensure that problems identified for research would more closely reflect national development needs, another potential factor in gaining government support for disseminating (and using) research findings.

Face-to-face opportunities to disseminate information should not be taken for granted. Conferences and seminars, whether on a small or large scale, offer further opportunities for exchange of research findings.

Here also, technology, in the form of computer conferencing, has a potential role in bringing together people with knowledge to share, to solve development problems.

C. Information Technology and Infrastructure

Despite the fears of dependence that information technology may have engendered in those engaged in more traditional information sector activities, information technology still holds much promise for disseminating research information in Africa. Climate-hardy technologies such as CD-ROM can alleviate problems of storage, online search costs, and timeliness of information. Electronic communication may prove to be cost competitive with postal services, more reliable in getting information to its destination, and more efficient in networking information professionals and researchers. Where feasible, electronic networking through efforts such those being undertaken by the Pan African Documentation and Information System (PADIS) and SatelLife offer endless possibilities for disseminating research findings.

D. Additional Measures

Some local conditions may limit the adoption of information technology for distributing research findings. African information professionals themselves have suggested a number of possible measures to promote wider distribution of research information, particularly unpublished literature. Such measures include compiling bibliographies of reports generated by their research institutions and exchanging these with libraries, colleges and universities, other research institutions, and national documentation centers, as well as international institutions (Zulu 1993).

Union catalogues (integrated lists of the holdings of several libraries) can make resources available, even if held by only one institution (Chifwepa 1993). A coordinated effort to collect materials and make them available can save money by curbing duplication of resources.

Continuing education as well as formal training for information professionals will continue to be a priority, whether traditional methods of information dissemination are used or new technologies are acquired that require new skills.

E. Considerations for Donor Support

Agha and Akhtar suggest a number of considerations for donor support of information activities (Agha and Akhtar 1992). These include:

- o The nature of the aid should be jointly determined by the donor and the recipient;
- o Commitment should be obtained for local participation in the administration of the program after aid ceases;
- o Program sustainability should be promoted through such measures as user fees, instituted during the aid period;
- o Donors and international agencies should coordinate their efforts, addressing different aspects of information infrastructure and policy;
- o Collecting and sharing success stories in the collection, processing, and dissemination of information could help generate new ideas, build confidence and credibility, and establish linkages;
- o Donors should support information systems that are "needs-based," serving a particular purpose, and not simply dump technology;
- o Donors should support programs designed to improve the national capability in the information sector;
- o Donors should support programs that will develop the national information infrastructure and national information policies regarding information.

In the realm of policy formation, Mchombu and Miti suggest that foreign experts should serve only as advisors to the policy development process, not as the primary architects of policy, which is a longterm undertaking (Mchombu and Miti 1992).

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