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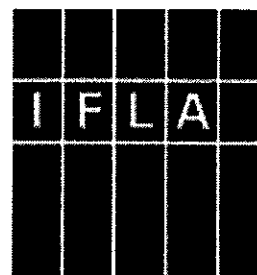
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**Approaches, Strategies and Challenges for Information
Management and Usage in Fostering Sustainable Agricultural
Growth and Rural Economic Development in Sub-Saharan Africa**



APPROACHES, STRATEGIES AND CHALLENGES FOR INFORMATION MANAGEMENT AND USAGE IN FOSTERING SUSTAINABLE AGRICULTURAL GROWTH AND RURAL ECONOMIC DEVELOPMENT IN SUB-SAHARAN AFRICA¹

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Abstract

The strategic link between poverty reduction in Sub-Saharan Africa (SSA) and sustainable agricultural growth which heavily depends on effective and efficient agricultural extension delivery was examined. The pivotal role of information sourcing; storage, packaging, dissemination and utilization by end-users, under the SSA diverse situations, was reviewed with the aim to answer key issues of access to information, impediments to accessibility, adequacy of supportive infrastructure for communication of information, value and perception of information literacy, among others.

Current approaches and strategies being use in most SSA countries for information management and usage towards ensuring a sustainable agricultural growth and rural economic development were analyzed as discrete and isolated with little accumulative wealth of experience unable to domesticate and build on the internal resource and potentials of the region. The challenges posed by the rapid socio-economic changes taking place in most SSA countries, the aging as well as the emerging technologies in the information generation and dissemination business as well as communication of information and feed back were identified and analyzed .

The paper advocate that information management and use, modernized or old fashioned, will mainly rely on ease of use, time of release, flexibility, cost, quality of personnel, supportive facilities requirement, etc upon which four elements of Sources-Message-Communication- Receivers-Effects are handled. The linkages in-between these elements also influence the degree of the fifth element of "E". Reflecting on the linkages amongst these five elements highlights were provided on policies and regulations, cost effectiveness, cost recovery, training and support, institutional arrangements, etc relating to the key issues raised. Recommendations pointing to mixture of sourcing and packaging of messages as well as information needs analysis, complimentary use of various channels, capacity building in communication development, expansion and relaxing policies, regulations and fair competition that might constrain access to information and communication and/or broadcasting services, among others were provided.

Key words: Agricultural extension delivery, access to information, emerging technologies, the Sub Saharan African, S-M-C-R-E model, linkages within the model, information literacy

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Introduction

Nowhere in the world is the outlook for farming systems more bleak than in Sub-Saharan Africa. In the last three decades, the continent has confronted a major decline in per capita food production; in the next two decades SSA is the only region of the world where the number and percentage of children who are malnourished is predicted to increase to 49 million, an increase of 50% from 1997-2020 (Rosegrant et. al, 2001).

SSA region relies heavily on agriculture. Agricultural sector accounts for more than 20% of total GDP and about 60% of the region total labour force- although most countries in the region depend on agric to a much greater extent (FAO 2003 and World Bank 2003). Small -Scale farmers predominate in a climate of population pressure, food insecurity, very low productivity, and rapid natural resources degradation. Ruben et al. (2005) reported poverty as a structural problem in SSA with about 40-45% of the population living in poverty. Three quarter of this population (74%) is residing in the rural areas characterized by unfavourable climatic conditions (IFAD 2001).

There's no doubt that the region's agricultural research and extension system is the most important single determinant of the level of its agricultural development and hence the yard stick of the quality of life of its people. In development studies, no continent/region has been known to achieve any meaningful progress in agricultural development without substantial investments in agricultural research and extension. There certainly has been substantial investment in SSA's agriculture especially through the World Bank loans in the past three and a half decades (in the ADPs and the Research Institutes). Unfortunately however, performance has not been commensurate with the size, scope and level of the investments in the system as evidenced by the farmers' poor productivity and the scandalously high food import bills across the different countries. Beintema, et. al (2004), asserted that Public agricultural research spending in SS Africa increased rapidly during the 1960s. Since then, growth has stalled for the region as a whole. Many individual countries, however, actually experienced a decline in agricultural Research and Development expenditures during the 1990s when funding became increasingly scarce, irregular and donor dependent. In addition, the national science and technology policies of many African countries were often poorly formulated. Given the continued withdrawal of donor funding, other sources will need to be consolidated and further developed in order to prevent a rapid erosion of agricultural R and D capacity (Ojo 2005).

However, despite this bleak future on R and D efforts directed to the agricultural sector, there is the consensus that relevant scientific and relevant information is available and floating within the Agricultural Research and Extension System ready to be packaged and disseminated to the yearning target users for immediate use (ISNAR, 2005). Part of the challenge is around information management between the Sources, Channels and target Recipients. Thus for the agricultural sector, it is pertinent to recognize the role of S-M-C-R-E model while discussing the selected issues.

This paper is an attempt to review the various extension approaches, identify the critical roles of information generation, dissemination and utilization from sources and users in a manner that will result in rapid agricultural growth and rural development. Highlights on how to promote easy access to information, improve basic infrastructure needed to revolutionize the strategic role of information leading to the removal of impediments to access. It will conclude with recommendations on how these can be effectively used to transform agricultural extension for the sustainable development of the Sub-Saharan African region.

THE EVOLUTIONARY DEVELOPMENT OF AGRIC. EXTENSION IN SSA

The agricultural extension system in most SSA countries has evolved over four decades from a rudimentary, export crop-focused service to what can now be described as a professional service even if its effectiveness and efficiency remain just average at best. The evolutionary development of the SSA's extension service can be conveniently divided into three major eras viz (Arokoyo 2005): -

- i) the colonial and immediate post independence era: 1893 –1968;
- ii) the “oil boom” era: 1970 – 1984; (applicable to some countries like Nigeria, Angola, etc)
- iii) the state/nation-wide Agricultural Development Project (ADP) era: 1984– Present.

The lessons from each of these extension strategies/approaches are summarized briefly below.

I. The Colonial and Immediate Post-Independence Era: 1893 – 1968:

The strategies adopted during the era were hardly sustained largely because: i) planning was top-down with no involvement of the clientele, ii) little or no linkage with research in all the approaches resulting in the development of inappropriate technologies, ii) conflicting roles of extension – education and law enforcement, iii) and a flawed extension philosophy which saw the farmers as “traditional, fatalistic, ignorant and resistant” to change. The barriers for access to information by the target users were insurmountable in the sense that only what was decided was release to selected individuals/groups at the time planned by the colonial master contrary to what was needed. This was confirmed from the fact that the basic food security of most families were not guaranteed despite the abundance of cash export crops.

II. The “Oil Boom” Era: 1970 – 1984:

The myriad of inconclusive approaches (green revolution, operation feed the nation, etc) which followed one another in quick successions, left the farming populace probably more confused even though there were some noticeable marginal increases in food production in some nations within the region. Information was one-way from sources, which were mostly cosmopolite in nature. Access to the information was restricted to only participating farmers with minimal infrastructural support to have timely, cheap and high quality information. The extension programmes were, to say the least, regimented according to scientists dictates.

III. The Nation-wide ADP Era: 1984 – Present:

This extension strategy (T and V system) remains basically top-down in approach and the farmer remains a passive receptor of information, which may not necessary meet his needs. Even though there was some liberalization of getting information from other sources expected to be assembled all within the ADP structure, the involvement and participation of the end users in process of technology development and transfer remains low. The cost of getting the information through the elaborate structure of the ADP became prohibitive even for the public treasuries across the SSA countries thus the paradigm shift by the World Bank from T and V to participatory extension system (WB, 2001).

From the above, it is apparent that agricultural extension in SSA is still in its formative stage. The concerned actors in SSA need to appreciate that communication is the essence of extension services. Extension services, both people and approaches, seek to provide people residing in metropolitan, urban and rural areas with knowledge and information. The information and communications technology (ICT) revolution provides new options for accessing information by providing it directly to farmers and rural households or to non farmer sources of information, such as extension agents, agribusiness, and other intermediaries. Most extension programmes have yet to effectively integrate mass media and ICTs into systems for supporting extension staff and end users. These technologies are likely to become increasingly important as extension systems try to provide information to a wider and more diverse client base.

Agricultural extension systems have yet to exploit the full potential of mass media and communications technologies to improve rural people's access to knowledge and information. Development communications and mass media like radio, TV and print media have long been part of extension systems but have generally not received adequate attention or financing. New technological developments can make this function more efficiently and effectively and provide extension systems with opportunities to deliver new information services in new ways. Private Service delivery cost recovery and wholesaling of information are important strategies for expanding use of information and communications technologies in SSA extension systems.

Challenges for Agric. Extension System to Integrate Information and Communications Technology in service delivery

The cumulative advancement recorded in information and communication industry offers better and wider opportunities to reach more people and to carry out various functions within agricultural extension systems more effectively and efficiently. These advancements can provide easy access to local or global information and knowledge and are simple channels for two-way communications (Wete, 1991 and Haverkort and Zeeuw 1992). New technologies can give farm families better access and can be a major empowering resource. Key communications tools for improving extension services include (Ojo, 2005; Talero et al. 1996 and Perraton et al. 1983).

- **Development Communications:** This is essential to extension services, providing easily understood information for electronic, print, face-to-face, and/or any combinations of these such as media-forum, radio-internet link, call-in radio or TV broadcasts, etc communications.
- **Mass Media:** This includes broadcast (radio and television), print (newspapers, magazines, and extension brochures), and other approaches, such as poster campaigns, films, and theater shows, etc which enable a source to reach a target audience of many. Public extension services have been slow to realize the potential of mass media, but private firms use mass media effectively in advertising campaigns, etc. Mass media is relatively more important at "knowledge function". The key purpose here is creating knowledge and spread information leading to changes in weakly held attitudes environment.
- **Interpersonal contacts:** This involves a face-to-face exchange between two or more individuals. It includes the grass root field work of extension agents, friends and/or relations, demonstrations, songs, drama sessions, farm walk, study tours, agricultural shows, exhibitions, training sessions, meeting/consultations, market days, traditional/cultural gathering or ceremonies, etc. These channels have greater

effectiveness in the face of resistance or apathy on the part of the target audience. The formation and change of strongly held attitudes is best accomplished (Rogers, 1984).

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- **Telecommunications Systems:** These range from the pay phone to digital wireless phones and the Internet and are powerful tools for expanding the flow of information of all types, and facilitating market transactions, changes in employment, competition, emergence of new industries, and social transformations (Talero and Gaudette 1996). Phone communications enhance quality of life and make working and living in rural areas more attractive especially for the youths who are constantly abandoning farming as a primary means of livelihood.
- **Information Technologies:** These manage large volumes of information that can be used in planning, administering, and monitoring agricultural extension programs. Technologies, such as remote sensing, geographic information systems, global positioning systems, and weather and climate forecasting generate knowledge that agricultural extension systems provide to clients.

The new information and communication technologies and the inventiveness of agricultural scientists, farmers, rural women, and entrepreneurs are leading to new mass media and ICT applications in agriculture. Communications technologies can help extension systems provide information better, cheaper, and faster. The ability of information technologies to manage large quantities of data enables these systems provides new services. Desktop publishing, Power Point presentations, digital images, and lower-cost audiovisual hardware improve communication effectiveness. Computers and new software allow farmers, producer organizations, and extension agents to access information on a range of new technologies markets, and other information from local or remote databases.

The advancements can help the SSA researchers; extension agents, farmers, etc compete in the evolving knowledge economy where competitive advantage is often dependent on timely access to high-quality information. Changes in farming systems also require extension systems to provide more knowledge and information support as producers diversify to new crops, meet higher food quality standards, or adapt to greater resource constraints. Many benefits derive from linking new technologies with traditional media. Internet searches identify global knowledge resources for local print media use; call-in internet radio shows allow listeners to phone in questions that can be researched on the internet before the results are then reported over the radio. Having carried the discussion thus far, it is appropriate to respond to the four principal issues the paper intends to address.

To what extent access to information in metropolitan, urban and rural areas of SSA is being achieved?

To provide a satisfactory response to this question it is essential to examine the distinctions between the spatial entities of metropolitan, urban and rural areas within the context of SSA countries. Elijah and Ogunlade (1996) and CTA (2000) provided explanation why this distinction is always emphasized as:

- Majority of the population in SSA lives in the rural areas and more importantly, poverty also co-inhabits with the rural masses, therefore, development initiatives must focus on the needs of the rural populace, which necessitates an exact determination of those requirements, so as to render the development efforts successful.

- Rural domain exhibits different characteristics than urban areas, implying that the needs of an urban man can not be taken to mean the requirements of the rural poor as well, which is generally the convention. Rural sector is different from urban in the following aspects:
 - Marginalization (from mainstream)
 - Poor standard of living
 - Low literacy
 - Strong feeling of voicelessness and powerlessness
 - Strong local imprints
 - Conservative society
 - Traditional ways of learning

Characterization of the three locations and analysis of the existing situations against the selected outlets for information dissemination can give a good assessment of access to information in SSA region. Figure 1 shows a flow chart describing the spatial analysis while Table 1 shows the functional analysis of channels to access information in three locations in SSA region.

Access to information is a direct function of the types of generating sources and of the channels used to pass the message to target end users. It is therefore logical to review how spatial variability strongly affects the performance of these pillars in information dissemination. Sources of most agricultural information in SSA are either RIs (local or international) and/or agro-input companies or suppliers/marketers making them alien to most users. These were, according to Rogers et al. (1984), *cosmopolitan* in nature (i. e. those outside the social system of the target users which are *localite* sources – those inside/within a social system). It should be cautioned that there is probably a direct relationship between the cosmopolite-localite and mass media-interpersonal channels of information dissemination. Nevertheless, the two classifications are conceptually distinct; clearly interpersonal channels may be either local or cosmopolitan, while mass media channels are almost entirely cosmopolitan.

Access to agricultural information whether viewed from the perspective of its source (s) or from the channel (s) used for it's to dissemination, is dependent on whether both the source and/or channels are *local or cosmopolitan*. From Fig 1 and Table 1 it is observed that a linear decreasing trend exist in the access to information with spatial variability from metropolitan, to urban and to rural areas of SSA region, in that order. The degree of access to information in the three locations can be link to the ability of each location to domesticated or internalize any cosmopolitan information provided. Degree of accessibility to information would be high if cosmopolite interpersonal and mass media channels are combined to form a composite category of cosmopolite channels. Good example is media forums originally developed in Canada farm families and later spread SSA countries like Nigeria, Ghana, Malawi, Kenya, Tanzania and Uganda (Rogers, et al 1971 and Hudson 1998). The emergence of radio and TV links using self or pay phones is another concrete example.

Linking the above principles and the exiting situations in the SSA region would give a clearer position of the first question. Summaries of existing case examples base on Table 1 are provided below:

CASE EXAMPLES ON DISSEMINATION CHANNELS IN TABLE 1
(Radio and TV)

In most SS African countries, broadcast radio (not to be confused with two-way personal radio service) remains relevant in all 3 locations, because it involves a relatively inexpensive

technology that effectively reaches rural people in their own languages. Radio and television broadcasts are now global, regional, national, and rural. The statement that advancement in technology has reduced the world into a global village is more apparent now than ever before. A rural radio is technically defined in terms of its relatively local range (25-50 km radius) or functioning at frequencies of less than 1000 MHz (Odame 2005). In some cases, rural radio stations using larger transmitters (e.g. 5000 Watts) can technically reach millions of listeners.¹ Multiple information and communication technologies (ICTs) support radio broadcasting, including in some contexts, digital systems, satellite communications and the Internet. Radio stations may be commercially or publicly operated, although distinguishing between the two is difficult in SSA region as government-owned stations increasingly engage in commercial activity while some commercial stations offer free services to government or non-governmental organizations.

It is also known that the diverse physical terrain of SSA region such as topographic conditions determine the potential electromagnetic “reach” of radio broadcasts (ISNAR, 2002; Uphoff, 2001). For example, a 5000 Watt transmitter Garden City Radio in Kumasi, Ghana technically reaches about 40,000 households and once fully operational the new MegaFM radio station will include up to 4 million listeners in the regions of Northern Uganda and Southern Sudan. Similarly the 1 of the 4 Federal Radio Corporations of Nigeria located in Kaduna, Northern Nigeria with short and medium wave frequencies 2500 MHz and with large transmitters (more 10,000 Watts capacity) transmit programmes to as far as 950km radius covering Niger Republic, Cameroun, Togo, Ghana, Benin Republic, reaching a population of over 80 million people with a common language that is understood (Omenza, 1997).

An average of 157 radios per 1000 people (as of 1997) and 0.37 internet hosts per 10,000 people (as of 2000) in rural areas of SSA countries were reported by World Development Report, 2001 and International Telecommunication Union, 1999. Supporting this statistics, Niang (2001) also reported that by the end of the 2000s, there were approximately 25 newspapers, 75 televisions, 498 radios, and 42 televisions for every 1000 Africans. This included more than an estimated 65 million radio receivers in sub-Saharan Africa, excluding South Africa (BBC, 1996). For Africa, the ‘digital divide’ is real because less than 1% of rural people in Africa have access to any single ICT. In 1999, Africa along with other developing world accounted for only 4.2 percent of all people connected to the internet (Gerster and Zimmermann 2003). There were only 0.7 telephones per 100 people in rural areas of SSA countries, compared to 48.5 in rural areas of Western World (Hudson 1998). Rural areas are also much less connected than urban areas.

Odame (2005) reiterated the leading role of that radio in which it is acknowledged as the most important medium for communicating with the rural populations of SSA countries (FAO, 2001). Farming systems thinking is presented with a continuing challenge to move beyond the “technology triangle” of research-extension-farmer linkages whereby information is selectively released and controlled towards a learning-centered approach for knowledge sharing. For linkage activities, emphasis must be placed on the “C” (communication) of ICTs. Evidence to date from a project at ISNAR suggests that broadcast radio is still a highly relevant ICT for agricultural innovation for rural development in SS Africa (ISNAR et. al, 2001).

(Extension Agents)

The orthodox extension delivery using field extension agents to provide access to information has already witnessed remarkable change in SSA region. Farming systems thinking has long dealt with the constraints of a linear approach to scientists developing technologies, government extension agents disseminating them as packages, and farmers adopting them. Okali and Sumberg (1986), for example, reported the neglect of farmers’ own knowledge and role in developing and adapting technology, which is often embedded in scientific organizations. As well, the middle ground of extension is seen on shaky, especially as structural adjustment in Africa reduces

subsidies to agricultural inputs and technical services (Farrington, 1994). As a result, many new, mainly private sector technology and extension providers enter the arena (Janssen, 2000). Such services are not necessarily accessible to all, as some farmers are far too poor to pay for them. Even for farmers who can pay the ratio of extension personnel to farmer population in SS Africa is estimated at no better than 1:3,000 (World Bank, 1999).

(Libraries)

The trend in development and equipping of libraries is not encouraging in most SSA region as reported by Aboyade (1987). Libraries are still restricted to educational establishment and mostly public base. Few libraries are private and supportive to agricultural and rural developmental efforts. This is despite the potentials library services hold in playing key roles in improving access to information. In same vein songs, advertisements, campaigns and demonstrations became unpopular in disseminating agricultural information in the cities and urban areas as compared to rural areas. The content/form and packaging of the message as well as the channels used (mainly face-to-face) were no more compatible with the custom of the people in the urban areas (Aboyade 1984).

(Telephones and Internets)

At the same time, it must be recognized that the Internet and mobile telephony have become increasingly accessible to organizations in SS Africa, if not affordable to all individual users. Telephony and Internet (email) access are just two of the popular services offered by *telecenters* in SS Africa. Benjamin (2000) distinguishes between two types of telecenters. One is the relatively small, private sector telecenter that operates mainly as a cybercafe or a secretarial/communications bureau. The second type is the larger, donor-funded telecenter that provides information services for development purposes to a defined rural population. Elijah et al. 2006 also reiterated the earlier observations that the key constraints facing ICTs in poverty alleviation in countries like Nigeria include: lack of access to electricity / unstable supply of electricity and the lack of adequate technical support. These constraints according to Heeks (1999), Melkote and Steeves (2001) referred to as “technological constraints”.

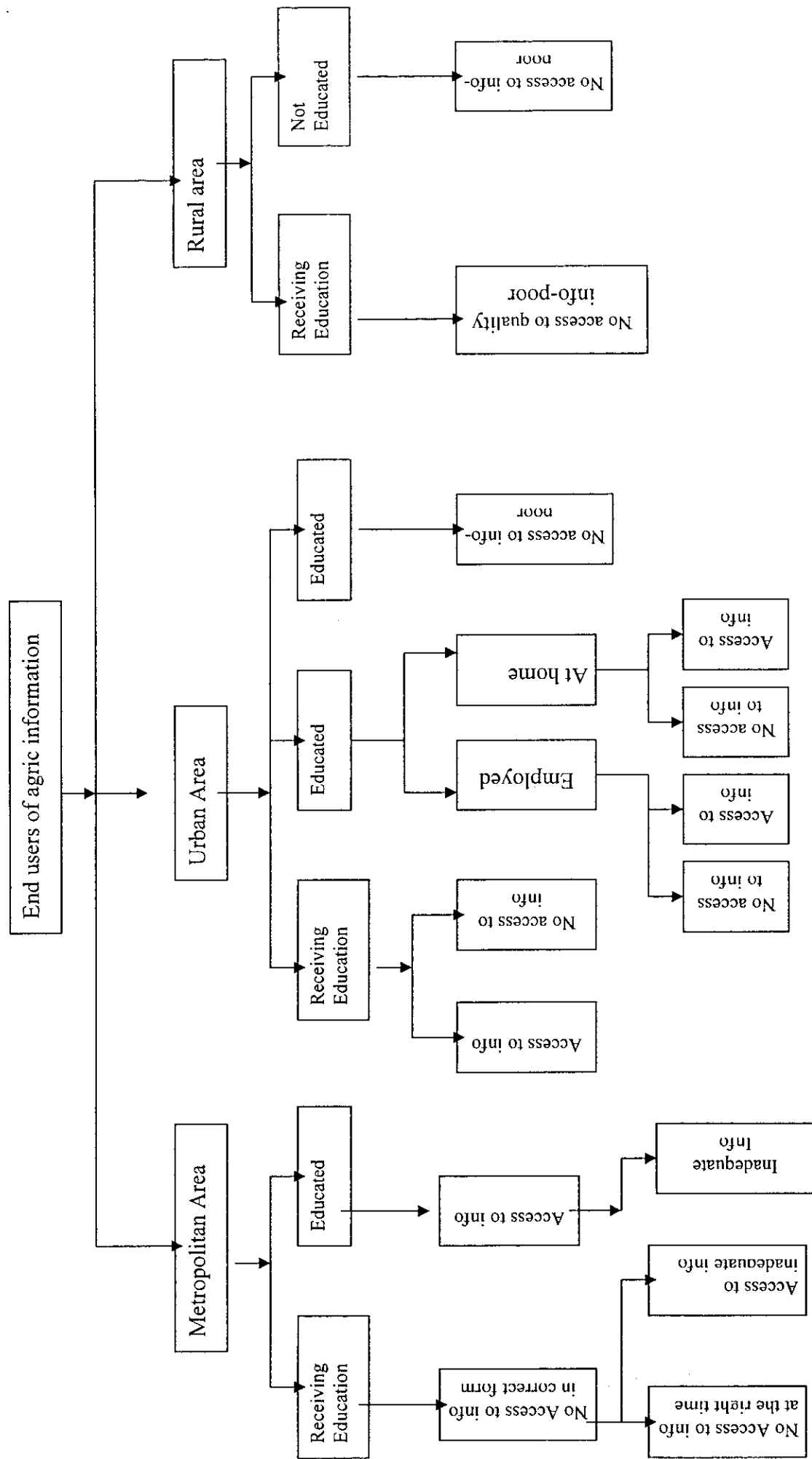


Figure 1. Spatial analysis of SSA Information Environment to assess the accessibility of agricultural information

What are the Impediments/Constraints to Accessing Agricultural Information

Generally most agricultural extension services in SSA region target the farmers with their information perceived as the sole users, but more often, farmers don't seem to use much of the information provided as compared to other categories of users like researchers, extension agents, lecturers, marketers, processors, and students etc. In order to understand the information needs of the farmers so as to provide them with a service that is responsive to their real demands, surveys on information needs have become a common feature in most SSA countries. In October 2000, ISNAR, together with global partners (DFID, UNESCO, CTA etc) sponsored a pilot study on this issue in four African countries: Cameroon, Ghana, Mali, and Uganda. ISNAR et al (2001) and UNESCO (2002) reported that a linkage gap between information sources and dissemination organizations exists and gains relevance with the 'digital divide' of ICTs in SS Africa. It is found that few cosmopolitan information sources, CISs, (e. g. RIs) in the four project countries have active research-broadcast linkages embodied in their work plans. No single institute, with the exception of the NARO, Uganda includes radio and television in its national agricultural research information and communication strategy trying to replicate the operations of NAERLS in Zaria-Nigeria. Management attitudes of most CISs and dissemination organizations (e. g. radio, TV, Printing presses, etc) also suggest lack of awareness about each other (ISNAR et. al, 2001). The former groups perceive the latter groups as "politician followers" and not agents for community development. The latter on the other hand, find the former highly academic with insufficient practical information to offer listeners. The CISs contributions to creative, locally popular formats such as story telling, drama and magazine radio programs are underutilized. Table 2 present summary of constrains impeding access to information across the SSA region reflecting other principal dimensions and levels of the various constrains.

The constraints are of three categories in SSA region where sharp differences exist in areas such as social classes, locations, sexes, ages, etc. Constraints regarded as primary are those that affect all strata because of their basic nature and are directly associated to the user (individual or group). Examples are low literacy, language barrier, high cost, reliance on external sources, etc. The secondary categories are, on the other hand, those that provide the fabrics and flat form upon which the first category strive. These include things like policy, facilities, and socio-cultural discriminations/barriers. The lowest level comprises of qualitative dimension of information such as reliability, timeliness, quantity, format and content, etc. Again a linear relationship is established between the degree of impediment and the spatial variability of a typical SSA region. This means that rural areas suffer from all the three categories followed by urban areas which suffers from mainly secondary and tertiary categories while metropolitan suffers mainly from the tertiary categories.

What is the adequacy of infrastructure for communication of information and knowledge (physical, policy and cost issues)?

Telecommunications and information (print, electronic, phones, internet, GIS, GPS, etc) services depends a lot on adequate, reliable, efficient, flexible infrastructure that is put to use in a sustainable manner and that enjoys the support of both public and private sectors (Wete 1991, Hudson 1998; Bugembe 2002; Omeneza, 2006;). Addressing the question can be treated by analyzing the subject from following perspectives viz: i) physical, ii) cost effectiveness and cost recovery, and iii) policy and regulation.

Physical issues

Addressing the points below will ensure provision of durable physical infrastructure needed for information communication:

- i) basic items of road network, electric power supply and distribution, transmitters, UTL aerial and ground lines, etc
- ii) Machines, and facilities for both print and electronic packaging such as printing press, radio and television broadcasting stations (short, medium or long waves), etc,
- iii) Telecommunication and electronic equipment for land and wireless phones, internet link, etc
- iv) Maintenance of these machines, equipment and facilities,(spare parts, consumables, etc)
- v) Operation of these machines, equipment and facilities (qualified technicians, and other specialized personnel),
- vi) Capacity building of the qualified technicians and specialized personnel,

Investment, Cost and cost recovery issues

To exploit the opportunities listed above, the following points need to be taken into account:

- i) acquisition or provision of physical assets such as utilities, machines, equipment, etc,
- ii) strategic partners or investors willing to develop the sector with out undue pressure to have immediate gains and
- iii) optimal operation and maintenance,
- iv) Un-conventional costs such as alternative power source and energy & operator, additional security, etc
- v) cost recovery in an environment that is yet to see information as a strategic need and input in all developmental efforts
- vi) Commensurate rate of recovery to ensure sustainable use of assets,

Policy, regulation and security issues

A favourable and friendly environment for the information sub sector can be provided until the points below are addressed:

- i) Flexible and friendly enabling laws on how to establish especially private or community radio and television stations, newspapers houses, printing presses, telecenters, etc
- ii) Regulations on how these outlets operate in diverse situations of the SSA region such as use of languages,
- iii) Regulation on territorial jurisdiction of the broadcasting stations and the content of the broadcast or the content of the daily newspapers,
- iv) Intellectual property right policy on media outputs (print, electronic or on-line etc), though not very effective in SSA region is hindering the easy circulation of information within most systems in SSA region,
- v) The level of insecurity to both properties and life in most SSA countries demand that any investment towards the establishment of communication outlets must factor in additional cost for the security of both facilities and personnel.

Generally the adequacy of infrastructure for communication and knowledge in the SSA region can be said to be very low in size, in capacity, effectiveness, in efficiency, in dynamism, robustness, in flexibility, etc. In 1999, Africa along with other developing world accounted for only 4.2 percent of all people connected to the internet (Gerster and Zimmermann 2003). There

were only 0.7 telephones per 100 people in rural areas of SSA countries, compared to 48.5 in rural areas of Western World (Hudson 1998). Some selected areas discussed below to bring home the points outlined above.

CASE EXAMPLES ON ADEQUACY OF INFRASTRUCTURE FOR INFORMATION COMMUNICATION

COST EFFECTIVENESS: The dominance of public agricultural extension services in the SSA countries can be use to mainstream mass media in cost-effective extension programmes. The emergence of private extension service through NGOs and CBOs can strengthen this derive especially in the urban and metropolitan areas of SSA region. Good example can be seen in Malawi, even in the early 1980s, direct extension agent-to-farmer services cost US \$21 per contract; a one-day farmer training course cost US \$4 to US \$5 per participant; a mobile film show cost US \$0.17 per farmer per hour; and a radio program cost US 0.004 per listener per hour (Perraton et al. 1983). Advances in communications technologies have further reduced costs and opened opportunities for new and better applications of ICTs.

COST RECOVERY: Most common extension services in the SSA region such market information and farm level advisory services provide private benefits that should be paid for by users. Cost recovery is important in expanding access to information services in all situations (urban, rural, etc). The new emerging culture of competition in service provision between mainly public and private sectors in the information sector, revenue from advertising associated with information dissemination (radio or television advertising) or subscriptions (Magazines or internet advisory services) offer opportunities for self financing mass media services. Public extension agencies need to establish good business relations with private partners, either by selling advertising to private firms for government owned media or providing high-quality information products for use by private sector publishers and broadcasters.

TRAINING AND SUPPORT: Introduction of modern gargets and facilities such digital audio and video editing suits, DTP computers and soft wares and new communications technologies in traditional extension agencies can improve efficiency but can also have major implications for training and technical support costs, in addition to the initial hardware costs. Investments in curricula of training programs and staffing are needed to provide extension service providers with the capacity to effectively use new technologies and to link clients and the diverse sources of information.

POLICIES AND REGULATIONS: Regulatory constraints may limit access to communication technologies. National and international regulations constrain expansion of local radio and television in most SSA countries. Protection of telecommunications monopolies, restrictions on voice-over internet protocol, and regulation of internet use often limit access to agricultural information especially in rural areas. Extension programs can identify such policy constraints and raise them with national policymakers. Educating the principal stakeholders (producer organizations, service providers, agribusiness, users etc) about these policy issues can create a constituency for reform. Again Intellectual Property Right (IPR) covering the entire mass media services is another crucial issue that retards the full utilization of the potential it offers.

What is the perception of value of information literacy and the importance of its teaching?

It was argued that the level of illiteracy of the majority of subsistence farmers is a significant barrier to access information (agricultural technologies, practices, markets, etc). This leads to low productivity, food security problems and inadequate nutrition thus compounding high levels of poverty.

NAERLS, (2004 and 2005); FAO (1998), Merrill-sands et al. (1989) had in the past established the fact that information literacy in the agricultural sector and most especially in the extension service delivery in SSA region is still a critical issue because of the following:

- Most farmers do not recognize the strategic value of information as a distinct ingredient and an entity in the catalogue of production inputs they require,
- Agricultural technologies and practices are not ends in themselves but means to an end unlike “information”,
- The need for information by farmers is an revolutionary process that depend upon the success of immediate efforts,
- The latent potential of the farmer can not be exploited if he is not reoriented such that he seek for “information” more aggressive than for fertilizer, improved seeds, credits, etc,
- That the success of the farmer in SSA largely depend on the type of “information” he get on how to optimally use fertilizers, improved seeds, credits, etc for higher results.

At the early stage of introducing the T & V extension system in the various countries of SSA region, the issue of single line command and concentration of duty was jealously guarded in the working operations of the ADPs and the field extension agents. The combination of farm input along side the technological message as a single package provided by same extension agent was recognized as the cause of ineffectiveness, inefficiency and diversion of attention confusing not only most farmers but also field officers and managers of extension agencies. Thus the question of “what is the technological message?” was often debated. This situation nearly transformed EAs to sales agents of specific farm inputs to an extent that some agro-companies connived to promote their products through these agents.

It was sooner realized that the “technical information” must be separated from the “farm inputs” if agricultural extension delivery was to be effective and the agents were to be efficient. This led to the separation of the ADPs from the agricultural supply companies in many SSA countries thereafter which sanity was restored.

This clearly demonstrated the age-long perception of information literacy in most SSA communities, farmers, field agent and managers of extension agencies inclusive. The adage that “information is power” is very relevant in this discussion and is applicable to the two categories viz;

- i) Literate communities or persons who could not distinguish between “the information” as the “prime mover” for any “hard ware”- farm inputs, garget, etc.
- ii) Non-literate communities or persons who do not have access to the “information” talk less of recognizing it as an independent resource that is needed to guide in the proper use of the physical products or farm inputs or implements or machinery etc.

So long as this double barrel problem is appreciated, it becomes a strategic necessity to address it. The easier is adult literacy campaign across the region to uplift the non-literates who dearly need to access the available information to change their agricultural fortunes. Many researchers advocated strategies on how to achieve this agenda (Monte, 2003). Monte further argued that there is the necessity to develop the literacy skills of the poor subsistence farmers, majority of whom are non-literate in the SSA region. This imposes on the actors in the field of literacy to challenge to influence policy frameworks to mainstream the role of Adult literacy programmes in such priority areas as technology-based information policy.

The second problem is the inability of most people to view “information” as a key ingredient and input in all other processes. This is more difficult to handle. The scope and horizon of this transcend the agricultural sector. Its global nature was long recognized by establishments like CTA of Netherlands. CTA established in 1985 a Question and Answer Services (QAS) to provide information and documentation to ACP partners on demand as a pilot case to address this issue (CTA 1995). The pilot case sought to devolve the strategy in SSA region resulting in the establishment of three QAS centers in Nigeria, Ghana and ?? taking into account the regional needs and perception of information literacy. The result so far in all the centers is very encouraging in terms of capacity-building, infrastructural development, sustainability, and most importantly change in *KAP* of the key actors in agricultural research and extension system (Arokoyo 1996 and CTA 2005). Furthermore, CTA (2000), ISNAR (2002) and Uphoff (2001) both argued that the relationship of literacy to Adoption of Agricultural technologies is still inadequate and therefore suggested the need for more Adult literacy -technology adoption-technology policy research linkage. He concluded that the need for sub-Sahara-African countries to put Adult literacy on the Agenda for technology dissemination policies and technology policy Research is the central issue.

Conclusion

The ease of acquisition, readily available qualified personnel, opportunities for training, falling cost and ever-increasing capacity of media (print, electronic, ICTs, etc) their ease of use and potential for wide coverage, and the entertainment value of cleverly packaged information and educational media present opportunities to mix different types of modern and traditional information technologies. Some of the challenges that need to be tackled in order to improve access to information and infrastructure, remove constrains or barriers blocking information and increase of information literacy include: i) matching media to messages; ii) developing content; iii) client or user analysis; and institutional arrangements for partnership:

Recommendations

Extension systems can use mass media, interpersonal contacts and ICTs in three inter linked information subsystems for accessing and developing knowledge products, supporting intermediaries and service providers and linking rural people directly to sources of information and knowledge. Investments are needed so that extension services in SSA region can:

- Develop extension strategies that identify available communications resources; access need for communications; and determine the type of communications support needed. Many traditional uses of mass media, interpersonal contacts and ICTs in extension are proven technologies that still need to be piloted and adapted to SSA countries.
- Analyze information needs through knowledge, attitude, and practice surveys, including gender analyses that can be conducted through rapid rural appraisals and do not need to be costly or lengthy.

- Domesticating foreign information by appropriate packaging thereby removing the major barrier of accessing such information by the various strata of a typical SSA community
- Expand use of mass media, especially radio, to complement other extension services and integrate use of various media and ICT for distribution of information metropolitan, urban and rural areas.
- Establish capacity in development communications to package information for use in extension and advisory service programs, including provision for building capacity for local input of content and for supply and distribution of local material.
- Building into programs strategies that promote equal access and opportunity for the poor and disadvantaged groups including women to use mass media and ICTs.
- Assess telecommunications policies and regulations that might constrain access to information and communication services and stage carefully planned advocacies for improvement of basic infrastructure like road network, electric power supply & distribution, security etc.
- Promote adult literacy in the rural areas and concept of “information” as a key input distinct from any other input necessary for sustainable development.

Cost efficiency and practicalities dictate the need to develop multipurpose information systems that provide health, educational, cultural and other information, as well as agricultural information. Extension programmes can also achieve efficiencies by wholesaling public information services, packaging information and distributing it through electronic and other means for use by frontline extension service provider.

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Table 1. Functional analysis of the degree of access to information in three locations in SSA Region

Channels for accessing to information	Categorization of Sub-Saharan African Community for information use		
	metropolitan	Urban area	Rural area
Radio	Available all the time	Available all the time	Available all the time
Television	Dependent availability	Limited availability	Rare availability
Publications	Untimely, barriers, cost	Barriers, cost, inadequate,	Barriers, cost, literacy,
Extension agents	Skillful, Unmotivated,	Inadequate, low skill, Unmotivated,	Inadequate, low skill, Unmotivated, ill-prepared
Demonstrations	Occasional, low relevance, felt-need-based,	Relevant, regular, need-based,	Regular, very relevant, need-based, demanded
Libraries	Available, well equipped, many users	Inadequate, fairly equipped, many users	Inadequate, ill equipped, few users
Films (projection or video)	Available, affordable, skillful, on irrelevant issues	Available, affordable, skillful,	Not available, not affordable, no skill
Songs	Available, capable, on irrelevant issues	Available, capable, limited exposure, irrelevant efforts	Available, capable, no exposure, irrelevant efforts
Advertisements	Very regular, effective, affordable, commodity specific	Occasional effective, affordable, general	Not common, ineffective, expensive, general
Campaigns	Not regular, relevant,	Regular, on relevant issues, easy replicable	Very regular, on irrelevant issues, easy replicable
Pay Telephones	Readily available, affordable,	Limited Availability, barely affordable,	Not available, not affordable,
Cellular phones	Readily available, affordable, high misuse	Available, very expensive, limited skill	Available, not affordable, no skill,
Internets	Available, expensive, skillful, no prioritization	Barely available, very expensive, limited skill	Not available, not affordable, no skill

Table 2: present summary of constrains impeding access to information across the SSA region

Impediments access to information	Categorization and ranking		
	Primary	Secondary	Tertiary
Ignorance of information sources	✓		
Unavailability/absence of information	✓		
Unreliable information			✓
Language barrier	✓		
Outdated information			✓
Lack of relevant and useful information			✓
Poor presentation and format of information			✓
Lack of funds to acquire information	✓		
Unduly delay in information release			✓
Low quality information			✓
Inadequate amount of information			✓
High cost obtaining information	✓		
Lack of facilities and technology for delivery		✓	
Poor infrastructure that can support the normal functioning of the sector		✓	
Low education/literacy	✓		
Low/no skill	✓		
Discriminations (Gender, socio-cultural)		✓	
Absence of or weak friendly policy environment and regulation to provide information easily		✓	
Reliance on information and knowledge generated outside local communities, countries and the SSA region	✓		