

The challenges of utilizing information communication technologies (ICTs) for the small-scale farmers in Zambia

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Abstract

Purpose – This paper attempts to discuss some of the key challenges that Zambia faces in the application of information communication technologies (ICTs) for the small-scale farmers.

Design/methodology/approach – A survey of information needs of small-scale farmers in two selected provinces was carried out in order to establish and prioritize their information needs. Evaluation of the existing information infrastructure provided insights into the type of ICTs that can support the provision of information to small-scale farmers in Zambia.

Findings – The paper highlights some of the salient findings of the research carried out under the African Technology Policy Studies (ATPS), Zambian Chapter and financed by the International Development Research Foundation (IDRC) from 2001 to 2003. These, among others, include: weak human capital and technical infrastructure, lack of clear national information policy and lack of a coordinated agricultural information support system for small-scale farmers anchored on ICTs.

Research limitations/implications – This study illustrates that it is becoming increasingly evident that the success of any agricultural development programme in Zambia requires a well-organized and functionally integrated information delivery system propelled by the application of appropriate ICTs. The paper presents recommendations for this to be realized.

Originality/value – The changes in the socio-economic and political arena in Zambia have had a drastic effect on the management of the agriculture sector. Further, even though it is widely acknowledged that information plays an important role in agricultural and rural development in Zambia, this conception has received less pragmatic attention and seems to have been less consolidated over time. The central role of information in this sector has thus been largely superficial. The need for a clear national policy framework on the use of ICTs for the small-scale farmers to enhance national development is thus articulated in this paper.

Keywords Communication technologies, Agriculture, Farms, Zambia

Paper type Research paper

Introduction

This paper documents work undertaken to assess the use of information communication technologies (ICTs) as a tool that would provide effective communication and information services to intermediaries that serve small-scale farmers in the agricultural sector in Zambia.

A survey of information needs of small-scale farmers in two selected provinces was carried out in order to establish and prioritize their information needs. An evaluation of existing information infrastructure to determine the basic information support required for the key intermediaries in information dissemination for the small-scale farmers was done. Further, a system analysis was used to analyze procedures and processes of the information support system that facilitates the use of ICTs in information provision to the small-scale farmers.

The study covered two selected provinces namely, the Central and Southern Provinces with a sample of 100 small-scale farmers in each province. Selected extension workers (and other intermediaries) and researchers were also interviewed. In addition, key informants such as planners and policy makers were interviewed in Lusaka (the Ministry of Agriculture headquarters). Questionnaires, interviews, planned discussions and observations were useful in the evaluation of information infrastructure and systems analysis in the country. The two provinces were selected because they have traditionally a strong farming presence; the Ministry Headquarters was selected to gain insights on the policy issues in the application of ICTs. A triangulation of both quantitative and qualitative analytical techniques was used for the analysis of data. Quantitative data collected were coded and analyzed to compute descriptive statistics such as percentages, averages, frequencies and cross tabulations of selected variables using an appropriate software package. Qualitative data arising from interviews and planned discussions were categorized to deduce significant themes on the utilization of ICTs in agricultural development in Zambia. The study proposed and recommended for an appropriate agricultural information and communication delivery system suitable for the rural farmers

Information support for agriculture development in Zambia

Several researchers in information flow and dissemination (Gessesse, 1987; Wapakala, 1982; Williams and Williams, 1987) have stressed the importance of effective agricultural information services in general, and information flow/transfer in particular. They have argued that there is a direct relationship between effective information flow and transfer, and agricultural development. Wapakala (1982), for example, observed that there are several key areas in agriculture where improvements would have an impact on the productivity and on the income of small-scale farmers in the country. He identified the key areas as: agricultural extension, local farmer participation, credit, and marketing, social services, project administration and training. Accordingly, each of these areas involves an element of information. In extension services, for example, the agent is basically the source of new information and can be an anchor to effective dissemination of the research results or the information necessary for the survival of small-scale farmers. Thus, in the Zambian agricultural sector which is characterized by diversity, in terms of agro-ecological conditions, farming systems, access to markets and support services, the role of information and its communication in supporting the work of extension staff (intermediaries) is particularly cardinal.

Richardson (1997) also observed that most rural communities and small-scale agricultural producers in the developing countries are now influenced by "global

economic, environmental, and political trends". Accordingly, the old conception that small-scale farmers are "isolated" and living in "closed, self-sufficient societies" is no longer tenable. This is because "global trade relationships now place small-scale agricultural producers squarely in the middle of global market realities" (Richardson, 1997). It is also now true that interest rates, global commodity situations, changing trade patterns, transportation developments and tariffs structures all impact on even the smallest farm operation. This means, "without knowledge and without the communication capabilities required to access, analyse and share the information required to create knowledge, small producers remain at the mercy of global market forces" (Richardson, 1997).

Calvelo Rios (1996) writing on Latin America also confirms that "with knowledge, small producers can have a competitive edge over larger farm operations and corporate agriculture. Small producers often have the flexibility to quickly change crop choices, develop products for small niche markets and even market directly to the consumer or commodity broker in distant countries".

This means with information, small-scale, labour intensive farming can reduce input costs and provide consumers with higher food quality in production, safety and taste. In addition, when information or knowledge is harnessed by "strong organizations of small producers, strategic planning can be used to provide members with lower cost inputs, better storage facilities, improved transportation links and collective negotiations with buyers" (Richardson, 1997).

Most studies on information support for agriculture or rural development in Zambia (Kalusopa, 2003; Richardson, 1997; Chifwepa, 1993; Kaniki, 1989), also agree that the main challenge has been building institutional linkages among the key stakeholders in order to make information a development tool in its various functions. The recent survey of key information systems in the agricultural sector in Zambia and their methods of information processing, handling and utilization still shows that there is no co-ordination and collaboration in terms of their respective functions and roles and does not constitute an information network (Kalusopa, 2003). The existing information systems at present do not facilitate easy electronic data exchange relevant for agriculture development. The capacity of the local ICT resources available and the national capabilities to acquire, produce, process and disseminate information on agriculture is, thus, weak (Kalusopa, 2003).

As observed elsewhere in this paper, information must ideally have a three-fold function: as a tool for acquiring knowledge; as a tool for decision making; and as a process of communication between the stakeholders. However, it has now been acknowledged that the advent of technology driven information delivery can enhance the value of information in terms of accuracy, timeliness, completeness and relevancy. The application of ICTs, thus, achieves the successful use of information by enhancing the storage, control, manipulation and dissemination of information in formats that are desirable to the users so that the optimal use of information is realized. This must be done with the full participation of key constituencies such as the rural farmers, the information intermediaries and researchers (Kalusopa, 2003).

Ultimately, information has a key role to play in agricultural development. It serves as a tool for communication between the actors, as the channel for assessing trends, and as the tool for shaping decisions by both producers and policy makers. The priority must be to ensure the accessibility to information, its delivery, its free flow and its outreach so that informed decisions are made which will in turn lead to better methods of farming and thus increasing food production and self sufficiency at the small-scale level.

Information needs for small-scale farmers

From the results in selected areas, three important areas emerged with regard to information needs of the small-scale farmers in general: farm management, dairy management and poultry equipment and technology. The survey showed that with regard to farm management; most of the farmer (22.3 percent) would want agricultural information in agro-technology as it relates to farm land maintenance, farm water supply, forestry machinery, farm building, and land drainage as important to their farming activities. Some of the trends in relation to farm management are shown in Table I.

One of the most significant trends in dairy management, as Table II shows, is that of the need for information for the technology related to processing of milk and draught animals, housing and environment, building materials and equipment, feeds and feeding, food preservation, feed additives, and dairy products, with a result of 16.5

	Frequency	Percent
Farm land maintenance	25	13.3
Farm water supply	13	6.9
Farm building	2	1.1
Farm land maintenance and farm water supply	11	5.9
Farm land maintenance, farm water supply, forestry machinery, farm building and land drainage	6	3.2
Farm land maintenance, farm water supply, forestry machinery, farm building, waste disposal and land drainage	28	14.9
Fertilizer	23	12.2
Farm land maintenance, farm water supply, farm building and land drainage	42	22.3
Farm land maintenance, farm building and land drainage	6	3.2
Farm land maintenance and farm building	2	1.1
Farm land maintenance	2	1.1
Farm water supply and forestry machinery	2	1.1
Farm land maintenance, farm water supply and forestry machinery	3	1.6
Farm land maintenance, forestry machinery and waste disposal	6	3.2
Farm water supply, waste disposal and land drainage	1	0.5
Ploughs	1	0.5
Organic farming	1	0.5
Farm land, farm water supply, forestry machinery, waste disposal	4	2.1
Farm land maintenance and land drainage	8	4.3
No response	2	1.1
Total	188	100

	Frequency	Percent
Processing of milk	10	5.3
Feeds and feeding	1	0.5
Food preservation	4	2.1
Dairy products	4	2.1
Disease control	21	11.2
Processing of milk and draught animals, housing and environment, building materials and equipment, feeds and feeding, food preservation, feed additives, dairy products	31	16.5
Feeds and feeding, feed additives	2	1.1
Processing of milk and draught animals	13	6.9
Food preservation, dairy products	1	0.5
Processing of milk and draught animals, building materials and equipment, feeds and feeding	3	1.6
Housing and environment, food preservation, feed additives	1	0.5
Processing of milk and draught animals, housing and environment, feeds and feeding	1	0.5
Processing of milk and draught animals, building materials and equipment	2	1.1
Processing of milk and draught animals, feeds and feeding, food preservation	2	1.1
Processing of milk and draught animals, building materials and equipment	2	1.1
Housing and environment, building materials and equipment, food preservation	1	0.5
Processing of milk and draught animals, food preservation	1	0.5
Building materials and equipment, feeds and feeding	1	0.5
No response	87	46.3
Total	188	100

percent farmers inclined to this trend. In both areas especially in the Southern Province, most farmers felt they needed information relating to how to control disease (11.2 percent) as shown in Table II.

Results also indicate that, though significant, poultry management ranks low amongst most of the small-scale farmers with a large proportion of them 61.7 percent showing they did need information in this area. Key, however, is the 9.6 percent of those who saw the need, like in dairy management, indicated the need for information on livestock control. Another significant number (8 percent) indicated they would need information on poultry equipment and accessories, hatching equipment, feed equipment, feed storage, feed manufacturing machinery, product handling/transport equipment, quality testing equipment, energy serving equipment as shown in Table III.

Information sources for small-scale farmers and ICTs utilization

Findings from the study showed that the most helpful sources of information among most small-scale farmers are the Non-governmental organisations such as the Zambia Farmers Union (ZNFU), DUNAVAT, ZAHVAC (63.9 percent) who act as information intermediaries and also the information centers that are established by the ZNFU (65.5 percent). Results also indicated that only 36.7 percent felt that the government extension service provided them with the relevant information for their farming

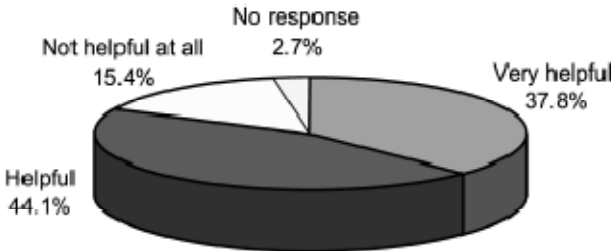
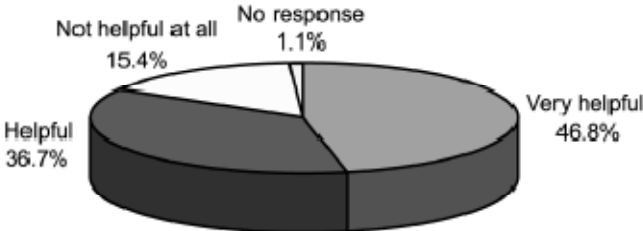
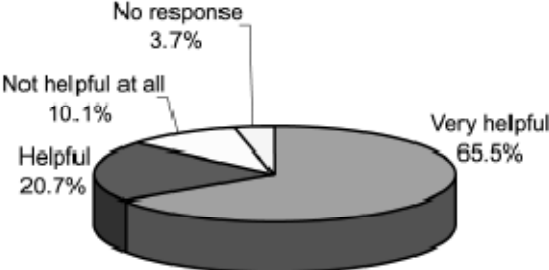
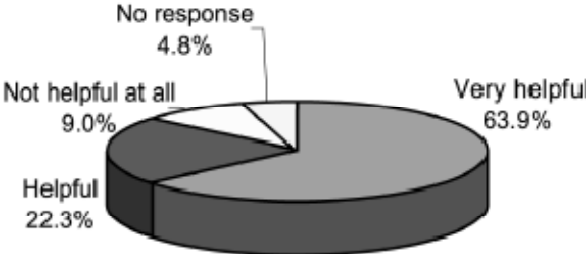
	Frequency	Percent
Poultry equipment and accessories	10	5.3
Packing technology	1	0.5
Housing/environment	6	3.2
Livestock/disease control	18	9.6
Poultry equipment and accessories, poultry housing/environment	4	2.1
Poultry equipment and accessories, hatching equipment, feed equipment, feed storage, feed manufacturing machinery, product handling/transport equipment, quality-testing equipment, energy-serving equipment	15	8.0
Poultry equipment and accessories, incubators, hatching equipment, feed equipment, feed storage transport equipment, feed manufacturing machinery, poultry slaughter equipment, packing technology, preservation machinery for poultry, product handling/transport equipment, quality-testing equipment, energy-serving equipment, waste disposal, poultry breeding, poultry housing/environment and livestock/disease control	4	2.1
Poultry handling/transport equipment, poultry breeding, poultry housing/environment	3	1.6
Poultry equipment and accessories, feed equipment, feed-manufacturing machinery, product handling/transport equipment, poultry breeding, poultry housing/environment	1	0.5
Poultry equipment and accessories, poultry breeding	4	2.1
Incubators, hatching equipment, preservation machinery for poultry, product handling/transport equipment, quality-testing equipment	1	0.5
Poultry equipment and accessories, feed equipment, feed-manufacturing machinery, packing technology, preservation machinery for poultry, product handling/transport equipment	1	0.5
Poultry equipment and accessories, livestock/disease control	1	0.5
Incubators, hatching equipment, feed equipment, packing technology, energy-serving equipment, waste disposal, poultry breeding	1	0.5
Feed storage transport equipment, poultry slaughter equipment, quality-testing equipment, livestock/disease control	1	0.5
Feed equipment, feed storage transport equipment, feed-manufacturing machinery, poultry housing/environment	1	0.5
No response	116	61.7
Total	188	100

activities. The illustration below shows how the small scale felt on Non-governmental Organisations and their information centers as their key source of information in Figures 1 and 2.

The study also indicated that most small-scale farmers still rely on indigenous farming methods and because in most cases there is a vacuum in terms of a reliable information delivery system, the farmers were left with no option but to rely on local groups, relatives and personal experiences in their farming activities. Evidently this is confirmed in Figures 3 and 4: personal experience (46.8 percent) and local groups (indigenous knowledge) (36.7 percent) still remain one key source of information among the farmers.

The research also showed that there is a low penetration of computer technology in most of the rural areas. Owing to the poor telecommunication infrastructure, high tariffs and slow pace of private investment in this area, the use computer technology

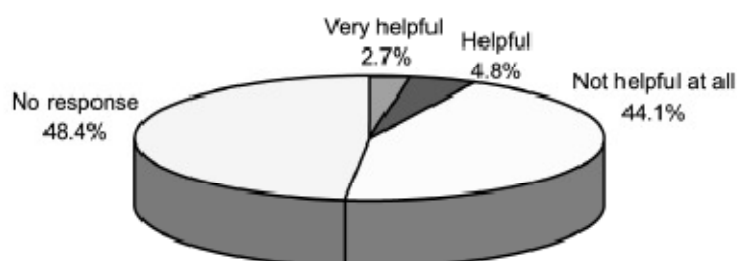
by the information intermediaries is yet to have full impact. For example, the private sector drive in terms of community radios and cellular phones is largely in its infancy. The digital divide therefore still remains wide. This means, as shown in Figure 5, that very few government extension workers and other information intermediaries (District



Agricultural Co-ordinators for ZNFU) rely on computer searches to get the information that they deliver to the farmers.

Further, although in the study, some of the small scale farmers themselves felt that the radio/television (34 percent) were a good tool for the transmission of information related their information needs, they on the other hand revealed a lot of problems that radio/television present to them as shown in Table IV (80.9 percent indicating they do not have access to television and 11.2 have no access to radio).

The study also shows that most of the Extension workers never or rarely use electronic sources of information such as radio, TV or indeed computers in their delivery of information to the farmers. Only in few instances do they sometimes use these. As confirmed in Table V, only about 13 percent indicated they often use these ICTs.



Problems	Frequency	Percent
No electricity/batteries expensive	7	3.7
Lack of technicians (not accessible easily)	4	2.1
No access to radio	21	11.2
Only English is used on radio	2	1.1
Long distance to the information centre where radio could be accessed	1	0.5
Radio/television is expensive to buy	1	0.5
No access to television	152	80.9
Total	188	100

	Frequency	Percent
Never used	71	37.8
Rarely used	25	13.3
Sometimes	47	25.0
Often	26	13.8
No response	19	10.1
Total	188	100

Results from the interviews also indicate that there are currently a number of hindrances in the development and expansion of ICTs and ICT connectivity in the country with regard to agriculture development. Some of them include:

- High prices and tariffs in the telecommunication services and the internet access.
- Lack of co-ordinated efforts in the establishment of the information gateways leading to the duplication of effort among three ministries in Zambia: Science and Technology, Communication and Transport, Information and Broadcasting.
- Lack of government's involvement in the development of strategies of ICTs. This is coupled with lack of finances, legal barriers and inappropriate infrastructure.
- Lack of a national IT Co-ordination Centre.

Conclusions

Agricultural development activities are based on the utilization of information. However, for information to be effective, it has to be systematically collected, organized and repackaged to supply the consumer as and when needed. Information must be current and easily accessible. ICTs can thus enhance this process. ICTs can bring about new information resources and open up new communication avenues for the rural farming communities.

Although both government and the small-scale farmers in Zambia recognize the role of information in agricultural development, this has not received sufficient attention. As the study shows, the supply of information in the agricultural sector is thus scattered, and poorly developed and unfocused.

In order for agriculture to improve, there is need to have a well organized and functional integrated information delivery system, supported by efficient national collaboration programs. There is, therefore, a need to redesign the information support system for agricultural development. Results from this study exemplify the basis for the modification of the existing information system if it has to be strengthened and be of value so that it can provide information that is timely, relevant, accurate, and reliable and in desired usable forms.

Recommendations

In terms of policy implications, the following are the recommendations arising from the study:

- (1) The human capital infrastructure needs to be strengthened. The following needs to be done:
 - initiate and encourage training and capacity building of all key personnel; and
 - exposure of information intermediaries such as extension workers to ICTs.
- (2) There is also an urgent need for closer collaboration between the information personnel and the end users (small-scale farmers) if a better information service provision has to be achieved. Agricultural programs are complex and dynamic and therefore, user needs will change and evolve over time. A close interaction

between information intermediaries and end users should be the basis for the provision of a comprehensive and wide range of information services.

- (3) The application of ICTs must be stepped up. More hardware and software must be acquired to alleviate the problem of low-level computer technology in the agricultural sector. The acquisition of computer resources, for example, must reflect the future requirements such as networking and functional compatibility of the hardware and portability of the software. The use of community radios should also be encouraged to disseminate information to the rural small-scale farmers.
- (4) The national information policy, under review, must incorporate the changing needs of the information world and to give guidance to a coherent development of an information infrastructure in the country, particularly the agricultural sector.
- (5) The government needs to support private sector knowledge and communication technology innovations and service targeted to rural and agricultural communities.
- (6) There is need to create National Information and Technology Community Centers and to ensure that such centers target their services to the communities. The need to expand on the ZNFU concept, therefore, is desirable.
- (7) There is also need to encourage National Agricultural Research centers (NARS) to investigate the potential of national research knowledge systems and participatory research systems via the internet.
- (8) The governments must be involved in telecommunication service improvement to recognize the needs of rural and agricultural communities for service upgrades.
- (9) There is need to encourage governments to utilize knowledge and communication technology for administrative improvement, extension, and for civil society liaison within rural and agricultural communities (via existing field, extension, research, and administrative offices).
- (10) In order that the information system at the Agricultural Planning Unit be strengthened, the information system in the identified agricultural institutions must be effective as well. There is, therefore, a need for co-ordination in terms of data exchange through networking arrangements. Since most information specialists in the selected institutions expressed the desire for such a network even though their experience of ICT applications and skills may be comparatively low, a mutually compatible manual and automated information exchange is proposed.

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