

Analysis of Information Communication Technology on Crop Marketing in Zambia: Problems and Prospects

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Abstract

The study analyses Information Communication Technology with a view to ascertain problems and prospects on crop marketing in the Agriculture Sector in Zambia. The inevitable gap between the potential and the extent to which Information Communication Technology is meeting crop marketing in the Agriculture Sector has continued to prompt further research into how the benefits of Information Communication Technology can be better allied. The study used both primary and secondary data to establish the problems and prospects of Information Communication Technology on crop marketing in the Agriculture Sector. The total population for the three districts analyzed comprising six camps under study was 7840; and the sample was 290.

The findings revealed that some benefits to be gained by farmers, traders and agricultural workers using Information Communication Technology in crop marketing were that of interactivity which created opportunities and awareness on the availability of crops' quality, quantity and location. The study concluded that timely knowledge about who was buying the crops, how much one paid and where they were located could be an important tool in decision making by traders, farmers and agricultural extension workers. It enables them to balance their activities. Unfortunately, information on crop marketing rarely reached farmers in rural areas due to poor signals and electricity power outages. It was therefore recommended that establishing market information centers and tele centers in rural areas could boost access to crop marketing information.

Keywords: Information Communication Technology, Crop Marketing, Problems, Prospects.

Introduction

This paper gives an account of Information Communication Technology on crop marketing in the Agriculture Sector in Zambia. Agriculture remains a priority sector in Zambia for attaining sustainable economic growth and employment creation. Currently, it is estimated that over 80 percent of the Zambian population entirely depend on agricultural related activities for their livelihoods (CSO, 2018). The role Information Communication Technology plays addressing problems and prospects is becoming more widely important. Information Communication Technology can bring economic development and growth as it helps bridge critical knowledge gaps. Cooley (2003) found that the strategic use of Information Communication Technology (ICT) to the agricultural industry in most African countries, offers the best prospects for economic growth. The adoption of ICT in crop

marketing is considered as a feasible option to reduce constraints in agriculture marketing and contribute to developing effective policies for improving the information flow. However, limited information is available in Zambia on the current use and adoption of sustainable ICT on crop marketing.

Research problem

Crop marketing and processing costs accounts for 50 to 70 percent of the total cost paid by consumers in Southern Africa (Halewood and Surya, 2012). Nevertheless, strategies that can successfully drive down costs on crop marketing can simultaneously raise the incomes of farmers; improve poor people's food security and disposal incomes. Most often, studies of ICT have underscored their effect on general socio-economic welfare. There is scarce empirical evidence at best on problems and prospects of Information Communication

Technology on crop marketing in Zambia. Rafea, (2009), argues that development of Information Communication Technology offers unprecedented potential to deliver information to rural communities. In view of all that has been mentioned so far, one may suppose that, it is not clear as to what problems and prospects Information Communication Technology has on crop marketing. Although, some studies have been undertaken on the impact of Information Communication Technology, very few, if any have been linked to problems and prospects of ICT on crop marketing in the rural areas of Zambia.

Research objective

The objective of the study was to assess problems and prospects of Information Communication Technology on crop marketing in the Agriculture Sector;

Literature review

A large and growing body of literature has investigated ICTs. Seshamani and Kabala (2016), postulates that ICTs cover many different types of technologies which include computers, the Internet, radio, television, mobile phones to mention a few. Much of the current literature on Information Communication Technologies in crop marketing dates back to the period of arrival of computers (McKinsey, 2013). Subsequently, various Information Communication Technologies tools have been used at different stages. Traditional, communication tools like print media, radio broadcastings, television, CD-ROMs have been used for communication in several countries (Mwakaje, 2010). More recent attention has focused on the provision of Information Communication Technologies which pays particular attention to devices, tools that permit the exchange or collection of data through interaction or transmission the CSO, (2018) shows that mobile cellular subscription stands at 10,838,000 out of a population of about 14 million people. At least one of Zambia's mobile networks now has coverage throughout the national territory. The fixed telephone network, however, remains extremely limited in range and use largely confined to the main urban centers, the Copperbelt and the rail links between them. In 2008 there were just over

90,000 fixed line subscriptions. While the mobile and internet sectors are competitive there are three national mobile operators and some 20 internet service providers (ISPs) the fixed network has remained a monopoly of the state-owned company ZAMTEL. ZAMTEL also has monopoly rights over the country's international gateway which allows phone connectivity to other countries (Chiumbi et al, 2016).

The National Agriculture Information Service (NAIS) is the major information and communication framework for farmers and other stakeholders in the agriculture sector. However, this channel is limited to radio programmers especially servicing the rural areas. Programmed on TV are proving to be more effective but the limited coverage of the TV network across the country has resulted in limited exploitation of the technology (Zambia National Farmers' Union, 2016).

Recently, researchers have shown that implementation and increasing use of ICTs in most countries particularly for agriculture which has had a long history of state intervention was largely justified in terms of factors such as the strategic importance of the sub-sector (the need for food self-sufficiency) and the need to stabilise an inherently unstable sector (Aker, 2010). To date there has been little agreement on how Information Communication Technology can increase efficiencies and improve competitive advantage in crop marketing. Information Communication Technology causes fast accessibility to the market, rising selection power, improving communication, identifying markets, saving in time and energy, improving marketing, and business costs reduction. Chaula (2014), predicted that time was rapidly approaching when the ability to make intelligent use of computers and other related technologies would be a prerequisite to everyday situations. This prediction is now a reality for crops' traders and farmers who are still sorting out the challenges of using information, communication and technology in their marketing efforts without sacrificing marketing quality. Sharma, (2003), observed that

“Development of new technology usually stimulates creative scientific improvements. This was true of Stone Age Technology as it is true in the modern world of digital and computer technology”.

Recent evidence by the Zambia National Farmers' Union (ZNFU) (2016) suggests that the development of technology in this dispensation has led to a number of people realizing the importance of Information Communication Technology in business. Traders and farmers can now share their experiences on the internet as well mobile phones. The debate about information communication technology has gained fresh prominence with many arguing that farmers are now given the opportunity to participate freely through radio, television news paper, mobile phones, computer and internet.

There have been a number of longitudinal studies involving information communication and global marketing environment that have reported (Ahmed, 2014). Nnadi, et al (2010)) show how, in the past, research into information communication technology was mainly concerned with the rate at which businesses were adopting Information Communication Technology in information storage, retrieval and advertising of agricultural crops. Along with this growth in the usage of information communication technology, however, there is increasing concern over how Information Communication Technology is making an impact on life for both the trader and the farmer (Hall, Clark and Frost. 2010).

Gorard and Madden (2003) acknowledged that *"ICTs facilitate interaction between trader and client by means of text, audio, multimedia or both in the presence or absence of face to face interaction"*.

Pant and Odame (2008)'s cross-country analysis (2012) showed that ICTs creates an environment which makes life easier for agricultural workers, farmers and traders to have access to market information thus improving marketing capabilities. This has made the acquisition of information easier and better in rural and urban areas.

A number of authors have also reported analyses of trends in trends on crop marketing. Farmers need information to make informed decisions at each stage of the farming phase, from crop selection, planting, harvesting to marketing. Appropriate information on prices not only helps to make decisions about what crop to grow or inputs to use, but enables farmers to balance their investment of family

labour on the farm during the growing season. ICT can play an important role in enabling farmers to produce high-value commodities and to capitalize on opportunities and participate in these markets (Hailu, 2009). Seshamani and Kabala (2016) argue that conversely, ICT is instrumental in improving farmers' and traders' access to information about markets and what is required to produce for them. In the same vein, Kleich (2017) in the study farmers and traders' sources of market information in Lira District, Uganda; notes that ICT greatly facilitates networking among farmers and provides new ways to communicate with institutions that are involved in carrying out transactions in these markets.

According to Mwakaje (2010) in her research study titled "Information and Communication Technology for Rural Farmers Market Access in Tanzania" postulated that while the relevance of Information Communication Technology has been well recognized by many countries the adoption and application of Information Communication Technology remains as a big challenge to many people. Similarly, Sarvanan (2010) narrates that the extent of their respective Information Communication Technology literacy creates a big challenge to the countries in terms of developing a wide range of Information Communication Technology applications so as to cater to different level of Information Communication Technology capability of various stakeholders. Together these studies provide important insights into the sophistication of Information Communication Technology Information Communication Technology in use for development could be largely as a result of the extent of Information Communication Technology adoption by stakeholders. Collectively, these studies outline a critical role for information technology plays in marketing.

Research gap

While the literature review highlighted the importance of the ICT in crop marketing, there was no literature that highlighted on the extent to which information technology and its importance of introducing crop marketing in poor rural areas in Zambia, hence a knowledge gap.

Table 1. Response rate of target groups

Target Group	Target No	Responses	Response Rate in Percentage
Camp Agricultural workers	24	24	100
Traders	50	50	100
MAL Officials	4	4	100
ZNFU	5	5	100
Farmers	212	207	97.6
Total	295	290	98.3

Source: Survey data 2019

Methodology

To collect data for this study, a mixed method approach was used, which was both qualitative and quantitative. Data were collected through questionnaires, interview schedules, focused group discussions and analysis of documents. The total population for the three selected districts comprising six camps was 7840; whereas the total sample size was 290. To facilitate site selection, the study relied on the agricultural administrative demarcations that have been adopted by Ministry of Agriculture.

Specifically, a total of 207 farmers was interviewed; 70 in Mbala, 64 in Mungwi and 73 in Kasama. 24 agricultural extension workers in camps and 50 traders were also interviewed 4 Agricultural Officials at Ministry of Agriculture Headquarters 5 Officials from National Farmers' Union. Therefore, the total sample population under study was 290. Additionally, secondary data were collected from literature review.

Presentation of findings

The study sought to analyse problems and prospects Information Communication Technology has on crop marketing in the Agriculture Sector in Zambia. As mentioned in the methodology, the sampling frame comprised of five target groups i.e. farmers, traders, camp extension agricultural workers, Ministry of Agriculture officials at headquarters and officials from Zambia National farmers' Union. The research focused on Kasama, Mungwi, Mbala and Lusaka districts. The themes identified in these responses are summarized in Table-1. From the data in Table-1, it is apparent that the response rate was very good.

Source of market information by farmers

Farmers were asked to list sources of market information. The results are presented in the Table-2 below

Table 2. Source of Market information by farmer

Type of ICT	Number	Percentage
Mobile	51	24.6
Internet	11	5
Radio	48	23.2
Television	3	1.4
Newspaper	16	7.7
Primary	10	4.8
Fellow	173	83.6
Relatives	112	54.1
Traders	84	40.6

Source: Survey data 2019

The table-2 is quite revealing in several ways. Farmers were receiving market information mainly from fellow farmers were (83.6%). Those receiving from relatives were (54.1%) and from the traders were (40.6%) Nevertheless, a considerable number of respondents (24.6%) used mobile phones to get market information while farmers who received information through radio, newspapers and primary societies were 56.9%. The results above show that at least ICT was well integrated in farmer's activities. In rural markets, trade was characterized by direct sales of small quantities of produce by farmers to village traders and by retail sales to fellow villagers. Farmers who used internet to receive crop marketing was 5% which was relatively insignificant.

Traders were asked to list sources of market information and the results have been presented in the table below

Table 3. Traders

Type of ICT	Number	Percentage
Mobile phones	50	100
Internet	21	42
Radio	48	96
Television	6	12
Newspaper	14	28
Primary Cooperative Societies	10	20
Farmers	50	100
Relatives	5	10
Fellow Traders	38	76

Source: Survey data 2019

What is interesting in this data is that the above combination of accessing market information entails that a trader would use more than one type of ICT, without any restriction. Traders who were receiving market information mainly using mobile phones (100%), radio (96%) and farmers (100%), relatives (10%), fellow traders (76%), Television (12%). Traders who were receiving market information mainly using internet was 42%. Nevertheless, a considerable number of respondents (20% used primary societies to get market information while traders who received information through radio, television newspaper and societies were considerably significant.

Camp Agricultural Extension workers were asked to list sources of market information and the results have been presented in the table-4.

Table 4. Camp agricultural

Type of ICT	Number	Percentage
Mobile phones	18	75
Internet	15	62.5
Radio	12	50
Television	9	37.5
Newspaper	4	16.6
Primary Cooperative Societies	14	58.3
Farmers	21	87.5
Fellow camp Traders	24	100
	17	70.8

Source: Survey data 2019

The above combination of accessing market information entails that a camp agricultural extension worker would use more than one type of ICT, without any restriction. Camp agricultural extension workers who were receiving market information mainly using mobile phones (75%), radio (50%) and farmers (100%) relatives (33.3%), fellow camp agricultural extension workers (100%). Television (37.5%), traders (70.8), Internet (62.5%) and Newspaper (16.6%). Nevertheless, a considerable number of respondents (58.3%) used primary societies to get market information while traders who received information through radio, television newspapers and primary societies were considerably significant. Data from this table can be compared with the data in Table 2 and 3 which show Source of market information by farmers and traders. One of the Ministry of Agriculture officials bemoaned that *“For the last few years mobile phone has become part and parcel of our daily life. It has become an essential part of business. Mobile phones provide great assistance to users by giving the opportunity to access to information and technology”*.

Factors hindering farmers access to ICT

The table-5 below shows hindering farmers' access to ICT

Table 5. Factors hindering farmers

Factor Description	Respondents/ number	Percentage
Lack of money	159	76.8
No electricity to operate	137	66.1
Service is not available	13	6.3
Unfavorable radio broadcasting time	11	5.3
Power blackout	8	3.9
Lack of knowledge to use ICT	5	2.4
Unable access information	9	4.3
Total	207	100

Source: Survey data 2019

What is interesting in this data is that a large number of respondents (76.8%) said that they did not have money to buy the ICT services. 66.1% indicated they did not have access to electricity for operating ICT (watching TV, charging mobile phones) while others said some of the ICT network was not available in their villages (6.3%). Respondents also mentioned other constraining factors such as running costs, timing in broadcasting information (5.3%) and power blackout (3.9%). Others admitted that they did not know how to use ICT (2.4%) as well as how to access such facilities (4.3%).

One of the officials from the Zambia National Farmers Union bemoaned that *“one of the main challenges in using Information Technology in rural areas is illiteracy that must be overcome for farmers, traders and agricultural extension officers who should turn to new Information Communication Technology with enabled forums as an alternative to their traditional information exchange and trade”*.

He further went on to say not having the literacy in Information Communication Technology tools has prevented many users, especially rural farmers, from accessing pricing information and other potentially useful information”. He further suggested that one answer to address this barrier was trainings which can be conducted for Cooperatives and Village Extension groups in rural areas focusing on basic computer skills as well as mobile phone use, such as how to efficiently use text messaging as a market research tool to acquire accurate and current price information

Discussion of the findings

The findings revealed that some benefits to be gained by farmers, traders and agricultural workers using Information Communication Technology in crop marketing were that of interactivity which created opportunities and awareness on the availability of crops’ quality, quantity and location. The findings of this study agree with those of the study by (Kiplang’at, and Ocholla, 2005) that revealed that that Jeff Hawking’s, inventor of the Palm Pilot and chief technology officer for Palm Pilot, hypothesized that, mobile phone will become part of the digital life. World Bank Group (2016) also predicted that, after a slow start, mobile phones would become abundant. Today most

sophisticated phones already have the processing power of the mid-1990 Personal Computers while consuming 100 times less electricity (World Bank, 2018). The phones are used to send email, browse the web, take pictures and play video games. Hawkings further predicted that within the next few decades all phones will be mobile phones, capable of receiving voice and internet signals at broadband speed. Mobile phone bills will shrink to a few dollars as phone companies pay off their investment. This is also leading to the fact that agricultural extension workers, farmers and traders must now start embracing new information technology to increase their efficiency in the way they do business. Likewise, Traders who were receiving market information mainly using mobile phones (100%), radio (96%) and farmers (100%), relatives (10%), fellow traders (76%), Television (12%). These findings also agree with Aker, (2010) who asserts that crop traders enjoy a comparative advantage when using Information Communication Technology in accessing agricultural information than the farmers themselves. In other words, traders have the more propensities to seek for information through the use of different Information Communication Technology facilities including mobile phones for increased cheaper crops (Halewood and Surya, 2012): Moreover, most villages in Northern Province are not connected to the national electricity grid making it difficult to operate television sets.

This result is at par with the findings of Chaula (2014). As noted earlier, four blocks in each of the following districts; Mbala, Mungwi and Kasama were visited in December 2019 and January 2019 respectively. A striking feature of all the sites visited is their poor accessibility due to the bad state of feeder roads. Distances ranged from 15km from the district center Malole to 90kms Chambeshi plain. Other distances ranged from 31kms in Mwamba in Mbala to 164km in Kasama. All the blocks have motorized feeder roads which are passable during the rainy season. The bridges were particularly unreliable. The situation appears to deteriorate as one moves away from the center of the districts. Thus, in many areas, agricultural inputs and products were difficult to deliver after December which is a rainy season.

The study established that Farmers were receiving market information mainly from fellow farmers were (83.6%). Those receiving from relatives were (54.1%) and from the traders were (40.6%) Nevertheless, a considerable number of respondents (24.6%) used mobile phones to get market information while farmers who received information through radio, newspapers and primary societies were 56.9%. Although farmers received much of the information from fellow farmers; the results above still show that at least ICT was well integrated in farmer's activities. Besides, Agricultural workers who were receiving market information mainly using mobile phones (75%), radio (50%) and farmers (100%) relatives (33.3%), fellow agricultural workers (100%). Television (37.5%), traders (70.8), Internet (62.5%). This study has revealed that Information Communication Technology is now supplementing information to Ministry of Agriculture and farms in terms of creating awareness on prices of crops and quantity of crops available. With the constant use of Information Communication Technology agricultural extension workers are now able to share knowledge and skills about the best strategies which could be used for crops.

The internet allows agricultural workers, traders and farmers to communicate with each other and thus supports the social aspects of the marketing environment. The study also indicated that, 84.5% respondents used television as a source of market information. However, 32% of the respondents indicated they never used a television as a source of agricultural information for their crop marketing. The number of districts focusing on integration of ICT in crop marketing for farmers is growing. It was also observed that, almost all respondents under study utilized a television to get some information on agricultural programmes to supplement their information on farming. Television combines sight, sound and motion which is appealing to senses with high attention. The disadvantage is absolute cost is high, and has fleeting exposure with less audience selectivity.

The study revealed that generally, most of the crops are sold locally or in Kasama town. However, there were a good number of respondents who through ICT communication were able to sell their products in distant areas

such as Lusaka and other countries such as Zimbabwe, Tanzania. Using ICT for local markets was not common. By taking their produce to distant markets, it meant farmers were assured of receiving good price and this was partly communicated through ICT especially mobile phones. This study agrees with Kohli and Devaraji, (2018) who attests that cost and availability of telecommunications determines the extent to which new ICT facilities are used and these access costs are often higher in poorer countries. This result is at par with the findings of (Kiplang'at, and Ocholla, 2005) where they found that radio and television still remain the most accessible and used ICTs to farmers. It became evident that radio is the highest utilized medium of issuing crop marketing.

Conclusion

The evidence presented in this study suggests that information communication technology is an important strategic innovation that can successfully drive down costs in crop marketing. However; it has been acknowledged that Information Communication Technology for crop marketing in Zambia has a lot of challenges.

A number of factors in Zambia constrain the spread of Information Communication Technology include high costs of operation poor reception and reliability. The multiplicity of power outages in the country and lack of investment in ICT infrastructure in many rural areas is a limiting factor against spreading of Information Communication Technology. The study further established that many marketing facilities and ICT infrastructure were ordinarily inadequate in Northern Province of Zambia. Local authorities generally did not have clear policies on developing these facilities to meet their farmers' and traders' future needs. The study concludes that government has a role to facilitate creation of an appropriate data base for farmers, traders, agricultural extension workers for them to access crop marketing information which borders on the timely planting of crops and marketing. Government agents such as Zambia Revenue Authorities can also access that information for tax purposes.

Implications of the research

In the twenty-one-century fostering ICT in crop marketing is a critical strategic method in reducing costs associated to crop marketing and sustain overall social-economic development of any nation. Therefore, in order for farmers and traders to benefit from their business, it is essential that appropriate ICT tools are accessed to assist them market their crops competitively. Thus, government and all concerned stakeholders involved in promoting ICT should try to create awareness on the benefits of ICT. It is therefore recommended that establishing market information centers and tele centers in rural areas could boost access to crop marketing information.

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