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An investigation into the use of ICT in the provision of agricultural information to small scale farmers in Harare

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Abstract:

This paper investigates the provision of agricultural information to small scale farmers in Zimbabwe. It seeks to find out the methods and means of disseminating agricultural information to the small scale farmers in Harare, Zimbabwe. Describes how Information and Communication Technology has impacted on the dissemination of agricultural information. Explains how I.C.T's are impacting on agricultural production among small scale farmers in Zimbabwe. Describes the extent to which information provision is utilised in promoting dissemination of agricultural information to small scale farmers. Highlights the challenges the farmers face with regards to access to agricultural information. Considers how the digital divide affects information dissemination considering the challenges of connectivity in emerging economies. Mentions the current ICT driven projects aimed at facilitating access to agricultural information to farmers.The roles of libraries, schools, and agricultural research extension (AREX) services in providing agricultural information towards sustaining agriculture are described. The use of alternative media like radio, television, and podcasting to disseminate agricultural information the challenges of using such media to communicate agricultural information information to small scale farmers are mentioned.

Introduction

Zimbabwe is an agricultural country because the majority of its population is based in the rural areas and these people heavily depend on agriculture as a source of livelihood. Information and Knowledge are indispensable tools for empowering small scale agricultural farmers so that they will be able to make informed decisions. Muriithii et.al (2009) notes that access, efficiency and affordability of agricultural information are the major barriers in the battle to uplift agricultural productivity among small scale farmers. However this challenge can be alleviated through the effective exploitation of innovative solutions that integrate Information and Communication Technologies in the dissemination of agricultural information. The role of ICT's in enhancing agricultural productivity was highlighted at the 2005 World Summit on Information Society. The WSIS Plan of Action notes that

governments should prioritize access to agricultural information through promoting "e-agriculture'.

Information Communication Technology and Agriculture

The Zimbabwean ICT framework draws its strength from Science and Technology Policy (2002), Industrialisation Policy (2004), Nziramasanga Education Commission(1994), WSIS Declaration and Action Plan (2003) among other documents. This means that governments are obliged to embark on innovative programmes as a means to provide for the systematic dissemination of information using ICT's on agriculture and related areas so that small scale farmers will be able to access reliable and valid information and knowledge that can enhance productivity. Hattotuwa (2003) observed that ICT's have become an effective and reliable force in transforming social, political and economic life globally.

Zimbabwe's economy is anchored on agriculture and the country has heeded the clarion call by embarking on innovative and pro-active agriculture transformation through the incorporation of ICT to promote food security, land management, and enhance productivity and to promote information sharing for forecasting and sustainable agricultural development. O'Farrell notes that Information Communication Technologies refer to the combination of hardware and software and the means of procedures that enable the exchange, processing and management of information and knowledge. This technology includes radio, television, computers, internet, and geographical information services cellphone among other communication devices.

Kundishora notes that ICT is a general or all inclusive term that embraces all those technologies that are employed in collecting, storing, organizing, and communicating information in various forms. Huyer and Sikoska,(2003) note that ICT's have the immense potential to reshape, reorganize, and restructure working methods because of their inclusive advantages of efficiency, information sharing, storage, faster knowledge accumulation, dissemination which permit new and collaborative work methods. This is critically essential in agriculture where lack of reliable information can be too costly to business.

Background to Urban Agriculture in Harare

The Municipal Development Partnership for East and Southern Africa (MDPESA) defines urban agriculture as the systematic domestication of plants and animals for food and other uses within urban and peri-urban areas, and related activities such as the production and delivery of inputs, and the processing and marketing of products. There are various types of urban agriculture which include on-plot farming around the residential plot and off-plot which takes place on open spaces within the built up areas. Urban agriculture is an important socio- economic activity for the urban poor particularly for the developing countries. Urban and peri-urban agriculture, incorporating production and livestock keeping, has become part of the food security system in the urban areas of most countries in Eastern and Southern Africa.

Harare is the capital city of Zimbabwe and it is situated on a watershed plateau between two the Limpopo in the South and Zambezi in the North, yielding some of the country's best agricultural soil. The census report of 2002 Census puts Harare's population at 1896134 with a growth rate of 5-7% due to internal displacement caused by socio-economic challenges.

Agriculture is central to Zimbabwe's economy and the majority of the population is directly and indirectly dependent upon agriculture for employment and food security. In urban areas agricultural activities are highly prioritised for example during the 2008/2009 agricultural season an estimated 57%of the population grew staple maize. Kisner (2008) observed that in Harare urban agriculture was critical for the economically marginalized because it contributes 60% of food consumption.

Methodology

This research is based on the use of primary and secondary sources of data. The research is based on the survey methodology. The research is mainly descriptive. The researcher made use of questionnaires and interview which were administered and conducted on a selected sample representing the research population. The indicators of the investigation that the paper seeks to study are contribution of ICT's towards the dissemination of agricultural information; the extent of utilisation of ICT's to promote agriculture and sustainable development, synergies between government and non-governmental organisations in promoting access to agricultural information and the impact of ICT on provision of agricultural information to farmers. There are also other indicators like high productivity, environmental awareness, e-literacy among others. .

Concept of an Information Society

In Zimbabwe there are various programmes that are meant to uplift the country into an Information society. Kumar (1999) defines an information society as one in which major decisions are determined by information. This makes the right to access information a fundamental right if a country is to afford its citizens the right to determine their own destination. The information society is a society in which the economy is heavily dependent upon information, hence, the concept of an information econmy.In this type of economy the production of goods and services and decision making is heavily dependent upon information.

The Information society is a society in which information assumes a commercial value as opposed to a public good that is accessible for free. Kumar (1999) notes that the information society was popularized by Daniel Bell and Fritz Machlup who envisaged a post industrial society which would be characterized by an information industry. The integration of ICT's in agriculture will help to improve agriculture and reposition Zimbabwe as the bread basket of Southern Africa.

Identifying and reaching out to the Publics

An information need is basically a basic requirement for information that is of value for one's private or social. The needs of agricultural farmers are quite unique because they are shaped by socio –economic activities of the group. These public are identified through the use of primary and secondary sources of information, for example, census reports, demographic and health surveys, community profiles or user profiles and other data from the central statistical office. These are conducted on different intervals depending on availability of resources. There are also outreach programmes by libraries, agricultural extension officers, non-governmental organisations and government to reach to everyone. The government also uses the National Radio and television station to communicate agricultural information to various

stakeholders through various programmes broadcasted in the official and ethnic languages. The main purpose of a community profile is to provide information which can assist the librarian in planning the services of the library.

It is an analysis/study that describes the various components of a community, producing a composite picture or profile of that community. This may include: geographic boundaries, political constituencies, demographic features and projections, economic/industry drivers and trends, socio-economic advantage/disadvantage data, social/community needs, access to services.

Kaniki notes that the basic philosophy upon which community information services were founded from their earliest times and through their development in history has been to serve communities within which they are established.The public library, as a social instrument, takes its shape and purpose from the society or community in which it is established**.** A community profile is produced to provide a snapshot of the countrywide system using demographic information, library usage patterns, road networks, commercial and retail development.

AREX

The Agricultural research extension services (AREX) operates under the auspices of the Ministry of Lands and Agriculture. It plays a critical role in providing agricultural professional services, research, extension and farmer training, advisory and technical support to farmers.AREX also is involved in agricultural information production, analysis and promotion. The organisation can be contacted through the links in the following website. The department is grappling with the question of how to exploit ICT's to improve livelihoods. This issue depends on the ability of all stakeholders to address critical issues pertaining to connectivity, electricity and ability of the small scale farmers to access and utilize such innovative services.

Arex needs to strengthen its ties with public, school and community libraries in order to facilitate access to agricultural information. AREX has collaborated with various stakeholders including non-governmental organisations like World Vision, World Links Programme, Practical action and also libraries and schools and colleges among others. The following is the website for Ministry of Lands and Rural development which also hosts the Arex :
http://www.moa.gov.zw/arex%20files/head%20office/Min_AREX3.htm

ICT Driven Projects to Promote Agriculture

ZARNet which stands for the Zimbabwe Academic and Research Network was initiated in1997 by the Research Council of Zimbabwe. This government funded project even though in its initiation UNDP provided seed money to kick start the project. This project was initiated when it was realized since the country was driving towards an information society, access to information and to electronic communications facilities would be critical for the appropriate functioning of research and development. The beneficiaries of this noble project range from academic and research institutions, schools , non-governmental organizations and other disadvantaged communities who cannot afford the current high internet and e-mail connectivity rates charged by commercial (Internet Service Providers).ZARNet has helped to

provide affordable access to Internet to small scale farmers and also information age literacy.

Zimbabwe has a total of twelve internet service providers (ISP's) and these are dependent on ComOne which is a government internet service provider. However currently ComOne has t been inactive and has relied on an earth station of private mobile phone company. The World Bank Report (2007) ranked Zimbabwe in the bottom ten, because internet service is slow rated at 4bits per second per person compared to a sub-Saharan average of 36. However Zimbabwe has a high literacy rate above 80-90% and Zimbabweans are relatively high users of the internet.

e-Hurudza Programme

The other ICT driven programme is the **e-Hurudza** which is an agricultural planning software package developed by a local private company to support the farm mechanization programme. The systematic application of this software package enables farmers to plan their work and to realize the full potential of their investments. This programme aims to provide timeous access to agricultural information to all regions, educational information how to grow crops peculiar to specific regions, information on planting methods and farm equipment inventory management services.

The e-Hurudza project works with the Agricultural Extension Services (AREX) whose mandate is to distribute the software and train the users. The prerequisites for running the e-Hurudza programme are namely the need for a computer and printer and relevant infrastructure, e-literacy programmes and networking. This a locally funded and driven programme which will help to provide access to agricultural information.

Electronic Media

In Zimbabwe radio is widely used as the main communication medium and is used to communicate with a wider audience of listeners even though it is subject to restrictive regulation and it falls short as a channel for sharing knowledge on demand, because of the transient nature of broadcasts. Zimbabwe has also been making greater use of the **radio and television** to provide agricultural information. The country major radio stations runs agricultural programes in the vernacular and these can be accessed by the marginalized people on Short wave frequencies on a weekly and daily basis. These programmes are broadcasted in the country's indigenous languages namely Shona and Ndebele. The programmes are also interactive in the sense that they afford listeners the opportunity to phone in and ask questions pertaining to agriculture, aquaculture and related information.

The main radio stations Radio (2) and National FM and the main television station usually invite experts to share their knowledge and experiences with others through live broadcasts. These programmes equip listeners with knowledge and skills on how to treat plant or animal diseases, planting techniques, agricultural marketing and business management. Agricultural programmes on both radio and television are highly interactive as they provide listeners with an opportunity to contribute to the programme through phone in sessions

Mobile Phones

ICT's have also impacted heavily on access to information relating to markets, weather, and

other essential services because this information can easily be accessed through the use mobile phones. Ilahiane (2007) note that mobile Phones have revolutionalised the way in which farmers access , exchange and manipulate information because they have changed the way farmers interact with markets and cities and they enable farmers to extract current and relevant information critical for decision making.

In Zimbabwe mobile phones services are provided for by Econet, Telecel and the government owned Netone.On the 28th August, 2009 the country's leading mobile operator Econet launched the 3G technology that will allow subscribers to access internet on their mobile phones. This technology will enable farmers to engage in e-business and e-agriculture. Currently a national fibre –optic ring is due to go online and this is likely to provide a solution to transform Zimbabwe's economy from poor agriculture to high –tech economic innovator in sub-Saharan Africa and a major hub for ICT's in sub-Saharan Africa.India is already using mobile phone to monitor and switch on irrigation pumps.
Phiri (2010) notes that with the stabilization of the economy the ration of people with mobile phones has increased from one in every ten to three inn every ten in 2010.At present the price of a SIM Card has gone down from US$100 to as low as US$4 and this development has helped to enhance access to mobile phones. This technology is slowly being adapted by Zimbabweans as the country moves towards an information technology driven economy.

Agrometeorological Services

Agrometeology is viewed as panacea to weather sensitive problems, for example, floods, and drought, Hammer (et.al) (2002) notes that rainfall forecasts are critical because if they are inaccurate they can cause catastrophe on the part of bankers who will not want to risk funding poor farmers who will be viewed as high risk. This scenario creates a great opportunity for agrometeorologists who use meteorological information and knowledge to deal with weather-responsive challenges in agriculture. This critical section of the Meteorological service of Zimbabwe works with various stakeholders who help in assessing and advising agricultural national agricultural services with reference to farming. The Meteorological Department works with other International organisations like Computer Aid in the area of conducting in-house analysis and issuing forecasts and advise to local farmers so that communities are forewarned of impending drought or other serious climatic conditions.

The Department is critical to agriculture because it generates relevant information pertaining to seasonal forecasts, weather updates, crop yields analysis, weather forecasts, timing of planting operations other data. The meteorological service also publishes information on weather trends in both the print and electronic media as well as providing extension services to farmers to assist them in dealing with weather problems. It provides accurate and reliable weather information to farmers. The Meteorological Department has computerized its operations in an attempt to provide effective and timeous information services and products to its clients in the farming section.

The following is a website of the Meteorological Service of Zimbabwe:

Zimbabwe Meteorological Services Department

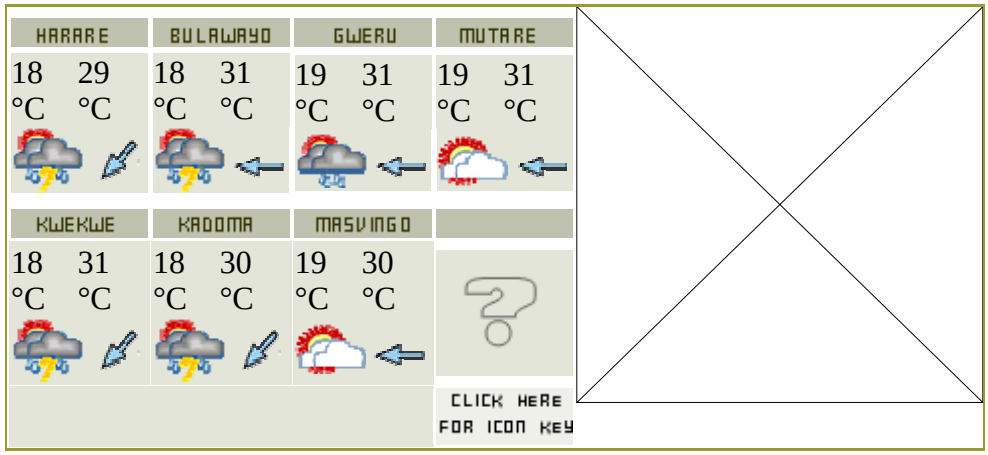
About Us | Weather | Aviation | Agro-met | Seismology | Training | Instruments | Publications | Contact Us

Sunday, January 03, 2010

National Forecast

ZIMBABWE EVENING WEATHER REPORT AND FORECAST ISSUED AT 1600 ON 31/12/09 VALID UNTIL 02/01/10: : :more:

published: Thu,31,Dec,2009



Forecasts	
5-Day Forecast	Weekend Outlook
10-Day forecast	Monthly Forecast
3 Monthly Forecast	

Weather for PILOTS

This Section provides a complete source of aviation weather information.

Weather for FARMERS

Agromet provides information that is relevant to those in the farming community. :more:

Weather for TOURISTS

Get weather for the top tourist resorts and fun spots in Zimbabwe :more:

Weather Hazard ALERT

:more

Get Weather Now!

Email address

News Flash

WORLD CLIMATE CONFERENCE-3 - Major Outcomes of WCC-3;Statement of the Expert Segment...

Prediction of the 2009 and 2010

Rainfall for Zimbabwe - The forecast presented here is based on a combination of dynamical and statistical methods, numerical weather prediction models and expert judgment. The Outlook reviewed current and projected state of the global climate system and its implications for the rainfall season. Among the principal factors considered included the evolving sea surface temperatures (SSTs) observed over the tropical Atlantic and Indian Ocean, the emerging weak to moderate El Nino.....

Southern African Regional Forecast 2009-2010 Season - From October to December 2009, most of the western parts of Southern Africa Development Community (SADC) will have an increased chance of receiving normal to below-normal rainfall with the exception of.....

more news flash

The following is map of Harare provided through a link from the Meteological Service Department:

Geographical Location of Harare

Interactive 3d learning objects (i3dlos)

This is an initiative of a South African Company **NALEDI3D** factory and World Links Zimbabwe. This partnership led to the development, localization and implementation of a range of **I3Dloson** to promote the development of agricultural skills. This project targets small scale farmers who benefit from literacy and knowledge which is critical for socio-economic development. Lockwood and Kruger (2008) note that virtual reality is critical for development because it affords farmers the opportunity to learn through visually interactive media. The **Interactive 3d** learning objects model aims to empower local farmers so that they can improve their yield through sustainable agricultural methods. The project incorporates

Africa concepts based on indigenous knowledge so that farmers will adopt farming practices that best modernize without westernizing their farming practices.

Telecenters as Conduits for Disseminating Agricultural Information

Latchem and Walker (2008) that telecenters are now viewed as the solution to development because of their ability to provide access to information and ICT's.These technologies have helped in bridging the digital gap between technologically endowed people and technologically starved people in Zimbabwe.These technologies are anchored on a combination of telecommunication services including telecommunication, internet , e-mail and also office equipment including computers, printers , CD-ROM and multimedia technology like radio and television which is strategically located to provide access to information through utilizing ICT's .

In 1999 the first telecenters project the Gutu World Link Telecenters Project was initiated through the collaboration between the government, non-governmental organisations, local communities and other stakeholders. This project was a plot project funded by the World Bank and it helped to improve the lives of the local communities by providing the locals with affordable access to information through ICT's.The project became popular not only with farmers but administrators , teachers and others interested inn accessing information. Currently there are eleven telecenters in the country and they are indispensable tools in transforming the lives of the local people in both urban and rural areas.

Podcasting Agricultural Information

Gudza (2010) notes that podcasting has been adopted as a media to disseminate agricultural information amongst rural farmers. This is an innovative way of using ICT's to disseminating information those areas that have limited road networks and poor communication infrastructure. Podcasts are being used as an alternative to distribute audio and video content particularly on the internet.Podcasting project has already taken off in Mbire district and it has proved that it can help to transform the lives of small scale farmers despite the impediments of lack of electricity and poor communication.

Traditionally the agricultural extension officers who work under AREX would provide agricultural information to farmers orally and through brochures, posters and pamphlets even though the local people did not have an input in the development of the content. However with podcasting the local people are able to develop their own content because the concept is dependent upon people, technology and content.

The podcasts are in local or indigenous languages and all stakeholders collaborate to develop the podcasts.These podcasts will have information covering a variety of themes on crop and livestock production and management. The podcast are played on MP3 players which are powered by rechargeable batteries. These podcasts are indispensable tolls in disseminating knowledge on agriculture to disadvantaged farmers. This project involves collaboration between government, non- governmental organisations like Practical Action and local community leaders. The project has made the farmers more knowledgeable and it has helped them to generate and share knowledge that improves productivity through using ICT's.

Roles of Universities in Promoting Agriculture

The University of Zimbabwe also provides vital information through its interactive website **http://www.uz.ac.zw/library/.**This website provides information agricultural information through its links for the Technical Centre for Agriculture and Rural Cooperation CTA's Question and answer Services. The University of Zimbabwe is the national coordinating center for CTA QAS and it aims to remain the leading center in providing quality agricultural information to promote and achieve sustainable food security.

Through this programme the University of Zimbabwe library will strive to be the nerve center of agricultural activities in Zimbabwe by providing relevant information and training to institutions and individual farmers. The University of Zimbabwe library also offers its online resources to be accessible to various institutions and farmers engaged in agriculture. The libraries services are assessed on the basis of usage patterns and also by the number of requests that are received for online resources. An assessment of the number of visits to the online library and physical visits are also used as an indicator of the role the library plays in promoting access to agricultural information.The other measurement is done through quantifying and qualifying the number of people who enroll to train in various short courses relating agriculture.

Extension Services, Schools and Libraries in Facilitating Information Transfer

The extension services to utilize schools and community gatherings to disseminate information through word of the mouth, posters and publications in various ethnic languiages.The roles of libraries , schools and extension services in promoting acces to agricultural information are measured by their impact on agricultural production, information literacy, environmental awareness, and the quality of education acquired by the farmers However it is sad to note that community or public libraries in both rural and urban areas have not yet embraced ICT's and social advocacy for promoting access to agricultural information to farmers. Public libraries are indeed effective conduits for the dissemination of agricultural information and this requires a paradigm shift among librarians so that they innovate synergies withy agricultural institutions to promote access to agricultural information by small scale farmers.

ICT4D Challenges and Constraints

ICT's are critical vehicles for agricultural development because they permeate every aspect of life and if fully and effectively utilised .Agricultural farming in Zimbabwe faces many challenges with reference to the use of ICT's , for example, the connectivity density is still very low and the continued energy crisis in Southern Africa impacts heavily on the supply of electrical energy. There is also the lack of adequate financial resources and ICT facilities including communications infrastructure. The other challenge is the need to promote and sustain mutually beneficial synergies between the public and private sector in the development of and integration of ICT's in agriculture, health and education in order to develop e-agriculture, e-learning and e-health. It is also important to consider human resources development with regards to the critical role of ICT's in critical areas like health, education, agriculture and commerce.

The ICT for development project (ICT4Dprocess) has the immense potential to contribute towards the development of an ICT Driven economy whereby ordinary small scale farmers will have access to affordable and effective ICT tools for conducting business. The other challenge is the need to develop telecenters, repackaging agricultural information and knowledge and ensuring that agricultural research and extension services utilize libraries and community resource centers as conduits to provide for easier access to information on agriculture. It is impossible to realize the goals of the United Nation's Millennium Development goals with priotising agriculture because agriculture is the backbone of society and through it nations can overcome hunger and poverty and contribute meaningfully to sustainable development.

Agricultural Information Services to Farmers

In Zimbabwe the agricultural information services are available through print and electronic means , for example , the Herald , the Sunday Mail, The Zimbabwe Standard, the Independent, Kwayedza among others media do provide articles on developments in agriculture. The latter is a weekly published in the local language and is relatively affordable US$1.00. Radio and television stations namely Radio 2 and 4 and National television do also provide agricultural programmes for agricultural farmers on a regular basis. The other medium of communicating agricultural information is through AREX programmes and services, for example , the word of the mouth, use of printed material like brochures , pamphlets, flyers, posters , films, drama and song.AREX also provides agricultural information through liaising with other information agencies like schools and colleges and community centers. It also collaborates with other resource endowed institutions to deposit its material in institutional repositories of universities and colleges like the University of Zimbabwe.

However with the advent of modern technology and modern media for information storage and retrieval, agricultural information can now be accessed online through the internet and mobile services. This has been made easier by improvements in internet connectivity due to wireless broadband (WiBro) or the use of fibre optics technology. The nature and quality of agricultural information services has improved because of new technology in the form of ICT's.The other method is through repackaging information into song, drama and dance, and this is very effective because people relate to the themes.

Conclusion

ICT's have impacted heavily on agriculture in Zimbabwe to the extent that e-agriculture has now become a buzzword. There is immense potential in harnessing ICT's for disseminating agricultural information thereby allowing small scale farmers to share knowledge and experience through utilizing social media, telecenters and other ICT driven communication devices. The use of ICT's will also help farmers to develop local content through engaging in virtual reality projects. The stabilization of the economy after the formation of an inclusive government has resulted in mobile communication devices being affordable thus enabling farmers to buy and communicate business through mobile phones.Overally Zimbabwe is set to regain its position as the leading agricultural producer especially if more resources are channeled towards the integration of ICT's and agriculture.

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