



AFRICAN YOUTH FOUNDATION
Afrikanische Jugendhilfe e.V.
Fondation de la Jeunesse Africaine

ORGANISATIONAL

AYF/RS/Misc/2004/1
21 October 2004

ENGLISH

First Session
21 – 23 October 2004
Accra

ESSAY COMPETITION
ANNOUNCEMENT OF WINNERS

Note by the Secretariat

1. “ICT and Agriculture” was the title of the essay competition for the AYF Youth Award 2004. This is a new annual educational scholarship award which will be awarded to an African Youth starting 2004/2005 academic year. The aim of this contest was for the young people to elicit and disseminate their views on the needs and benefits of ICT and Agriculture in Africa.
2. There were 119 papers/projects submitted by young people from different countries in Africa. Each had a contribution as to how ICTs could help the young generation and their nations to create jobs and eradicate poverty, to improve their lives.
3. The selection was a very exigent process as most of the papers/projects were equally good quality. However, the international jury made up of AYF staff and external experts, managed to select the best projects and the winners were:
 - a. Award winner **John Obiechina** (Nigeria), will be participating in AYF’s Seminar on ICT and Agriculture to be held in Accra from 21 – 23 October 2004, where he will receive his award.
 - b. Subsequent best Winners, **Shaka Robert** (Uganda) and **Casius Chuma** (Zambia) will be participating in some of AYF’s events in Germany.

c. **Next Seven best:**

- Samuel Williams Iloegbu (Nigeria)
- Thinatei Sesebo MacNathan (Nigeria)
- Ahmed Ndaula (Uganda)
- Ife Martins (Nigeria)
- Mayowa Adebayo (Nigeria)
- Nnamdi Okoh (Nigeria)
- Chiaha Celestina Amoge (Nigeria)

4. Congratulations! They are the new generation of AYF youth Ambassadors who will Be invited to AYF events (rotationally) to transfer the skills and experience gained from such events to others. They will have access to use the AYF Virtual platform for free for a year.
5. **Honourable winners:**
 - Fidelis Nosa (South Africa)
 - Vida Kesewaa Koranteng (Ghana)
 - Emeka Mojekwu (Nigeria)
 - Chukukwa Thomas Madondoro (Zimbabwe)
6. Congratulations! They are also the new generation of AYF youth Ambassadors. They will receive publications and have access to use the AYF Virtual platform for free for a year.
7. All the contributions will be published in a booklet by the AYF.
8. Thank you all for your interest in participating in this exercise. We look forward to receive more of your contribution in future.

A CONTEST PROJECT ON:

ICT AND AGRICULTURE

DEDICATED TO AFRICA, MY BELOVED CONTINENT AND NIGERIA, MY COUNTRY.

By John Obiechina

INTRODUCTION:

Information and communication technology is a device or an instrument that aids in communication and provision of information for the benefit of man. Agriculture on the other hand is a system that involves cultivation of land, growing of plants, rearing of animals, storing, preserving and marketing of farm produce for the benefit and survival of man.

ICTs have played vital role in the promotion and development of agriculture in Africa. Food is one of the primary needs of man. It sustains life. It is rather painful that most African countries still face the problems of poverty, diseases, malnutrition, unemployment etc because they are still adopting traditional system of Agriculture. They for have failed to accept the use of ICTs which has given rise to food shortage. The rural farmers especially lack the vital information and knowledge that will enhance high agricultural productivity. No wonder most countries in Africa especially Nigeria cannot afford 1 square meal talk less of 3 square meals.

Nevertheless, these problem increases day by day and cannot be solved until we learn to sit down, ask ourselves question and then find answer to combat these problems unless, there will be annual increase in death toll as a result of disease, starvation, malnutrition etc. Thanks to the modern world which have provided us with the answers and also make our system of agriculture simpler and easier. The ICTs such as books, internal, television, radio, telephone etc have provided a tool that will solve our problem of food shortage, unemployment etc.

Most of the food people consume are being grown by the rural farmers. These rural formers face greatest problem of problem of knowledge. According to Food and Agricultural Organization (F.A.O), knowledge and information are basic ingredients of food security and are essential for facilitating rural development and bringing about social and economic change. Also according to Albert waterson, as quoted by Cohen (198:23) the purpose of rural development is to improve the standard of living of rural population- is multi- sectoral including agriculture, industry and social amenities such as school, hospital good pipe borne water etc. Rural farmers require information

on supply of inputs, new technologies, early warning system (drought, pests and diseases), credit, market prices and their competitor etc. Once that knowledge is inculcated in them, ICTs will make way in the development of agriculture in Africa.

In this project, we shall know the importance of ICTs in agriculture; the problems associated with ICTs in agriculture in Africa and also proffer solutions to the problems. Then we have to know how ICTs could create jobs and eradicate poverty in Nigeria.

IMPORTANCE OF ICTS ON AGRICULTURE:

ICTs have influenced positively on agriculture through its provision of information that will enhance efficiency and high production for instance, in Nigeria, the nomadics which are mainly northerners during the rainy season move down to the south to find food for their herds. However, their migrations also cause problems for the environment, themselves and promote risks of animals to diseases. This problem can be solved by tracking the movement of herds and obtain information on the state of different pastures using mobile phones, internet and global positioning system devices, which use prepared maps based on satellite data. These are indeed one of the important of ICTs which most farmers are ignorant of.

In a nutshell, we shall know more of its importance in agriculture and these include:

ACCESS TO INFORMATION:

Most rural farmers in Africa are still adopting the traditional means of agriculture, which have encouraged low agricultural output. The problem lies in the lack of access to information. Lack of access to ICTs especially the Internet. They can access information on the World Wide Web (www.) of many computers to obtain the latest trend in agriculture and as much as is acquainted with the necessary information that will enable them to increase their agricultural produce which will satisfy the high demands of the people.

ACCESS TO EASY COMMUNICATION:

Communication is very important in agriculture. The use of telephones, Internet, or fax has now made it easy for farmers to communicate effectively with fellow farmers, communicate with international agricultural organizations. When there is easy flow of communication, there will also be easy flow of idea knowledge and skills.

CREATION OF EMPLOYMENT:

It creates employment to a large number of people through establishment of agricultural centres where competent employees are employed. People can be trained and those trained can be self-employed themselves through their own establishment of information centres (also employing others).

MEDIUM FOR PRODUCT MARKETING AND ADVERTISEMENT:

Many modern farmers now have website which provide medium for transaction, advertisement and promotion of their agricultural produce. ICTs have provided a medium which is easier, less costly and faster means to trade rather than on telephone, fax, or paper based type. Electronic commerce could enable entrepreneurs to access global market information and open new regional and global markets that will fetch better prices and increase farmers' earnings.

ENCOURAGES DEVELOPMENT:

The presence of ICTs in any region brings with it the fruit of benefit- development. When agricultural information centres are established and communication centres opened in several places in a locality. The areas gradually develops and slowly progressing from the world of primitively to the modern world of civilization. With these points above, we can see that ICTs are of tremendous important in agriculture in Africa.

PROBLEMS ICTS FACE IN AGRICULTURAL DEVELOPMENT IN AFRICA

ICTs face a lot of problems and certain factors have hindered its effectiveness in Africa, such factors include:

UNSTABLE POWER SUPPLY:

Most ICTs require electricity to function. Its instability has posed a problem to farmers in Africa. They find it difficult to access information, communicate and advertise their products. For instance, in Nigeria there is always incessant blackout and power instability and this has affected the efficiency of ICTs.

INADEQUATE INFRASTRUCTURE:

In Africa, most moral areas have no electricity. ICTs cannot thrive is such environment and it constitutes a major problem for them. Telecommunication, is absent in some rural areas and if available, it is poorly developed. Even in urban centres, they are not adequate. This will hinder affective communication.

NATIONAL POLICY ON ICTS SECTOR:

In most developing countries in Africa, the formulation and policies in the ICT sector is still very rudimentary and calls for review and change that will favour the growth of ICT sector. When the policy on ICT sector doesn't favour ICT investors, the industry will not grow and thrive well in such environment. This affects the development of agriculture in Africa because of inadequate information and communication technologies.

LANGUAGE BARRIES:

Language barrier is a major problem that hinders the development of agriculture using ICTs in Africa. Information available through ICTs is mostly English most farmers that have no formal education and as such finds it difficult to understand. Farmers in Africa mostly rural former encounter this problem and it only needs a significant investment to translate the language into its native languages.

ILLITERACY:

Generally, illiteracy level in Africa is higher than any other continent. If the farmers can't read and write, how then can they make effective use of ICTs? They lack the basic skills required to harness the benefits of ICTs.

HIGH COST OF ICTS IN AFRICA:

ICTs in Africa are costly and only few wealthy farmers can afford to provide such technologies. Such technology like internet is essential for the farmers and which also serve as global library is very exorbitant and about 85% cannot afford to have them in their homes unlike other ICTs, like television, radio, telephone.

COST OF MAINTENANCE OF ICTS:

Having and making use of ICTs is good but the problem comes in the maintenance. It needs proper handling and maintenance. Sadly, the cost of maintenance in Africa is high, that is why some ITC's project in Africa doesn't last. "All because of high cost of maintenance".

IGNORANCE OF FARMERS ABOUT ICTS AND ITS USES IN AGRICULTURE:

Many farmers in Africa are ignorant of the usefulness of ICTs in agriculture. People affected are mostly rural farmers.

NETWORK FLUCTUATION:

There is unstable telephone, Internet etc, network in Africa. It hinders effectiveness and sometimes, keeps one frustrated. It is another problem that needs to be adequately taken care of.

UNAVAILABILITY OF SPARE PARTS:

Most spare parts of ICTs cannot be found availability within the environment. In case there is need for maintenance, the parts becomes a problem even if it is been found, is very costly.

HOW CAN THESE PROBLEMS BE SOLVED?

These problems can only be solved if there is only mutual cooperation between governments, non-governmental organisations, co-operative societies, international organization, companies and able individual.

I am quite happy, that the President of the Federal Republic of Nigeria has that as one of his agenda in his second tenure. I am also glad that they have started focusing on modern agriculture making use of ICTs and other technologies. In several other African countries like Senegal that promote the use of ICTs by their pastoralist, Uganda, where International development research centres which is under the Acacia initiative, aims to improve access to agricultural information in rural areas through the use of selected traditional media and modern ICTs such as radio, television, print media and internet to increase agricultural production and other African counties.

African countries need to solve these problems otherwise; we are going to face these problems of food shortage, which can lead to malnutrition, high cost of produce, disease, poverty, and unemployment. Such solutions to the aforementioned problems include:

STABLE ELECTRICITY SUPPLY:

Since most ICTs cannot function without electricity, then electricity should be stable. This can only be achieved through government's intervention or through provision of electric generator that can be use when electricity is taken. When electricity is stable, ICTs can effectively be made use of.

ADEQUATE INFRASTRUCTURE:

Rural areas in Africa should be provided with electricity. This will promote the efficient use of electricity by farmers for ICTs. In Abia State, Nigeria, the state government donated more than 50 transformers to rural villages and right now they are enjoying it. Telecommunication sector should be improved. The government should convince and create favourable environment for foreign investors to invest in ICTs. At this, it will be adequate for the people.

FAVOURABLE NATIONAL POLICY ON ITS INDUSTRY:

The government intervention is highly, needed, they should create a policy that will be favourable to ICTs investors. Once the policy is favourable, the sector will survive and thrive well, then providing a medium for information and effective communication by farmers in Africa.

PROVISION OF TRANSLATORS:

The problem of language barrier can be solved through the help of translators or intermediaries. They are there to translate and to make communication very effective.

TRAINING OF FARMERS:

Since most rural farmers cannot read or write. They should be trained in agricultural ICTs centres to enable them obtain knowledge, ideas and skills that will enable them utilize the best of ICTs. Governments, Non-governmental organization, agricultural banks and agricultural co-operative societies should provide enough centres for the farmers.

ENLIGHTENMENT OF PEOPLE:

Since most people are ignorant, advertisement, seminars, workshops should be encouraged. Seminars and workshops on the ‘important of ICTs in agriculture’ should be organized free of charge. Rural and urban farmers should be encouraged to attend.

AFFORDABLE COST OF ICTS IN AFRICA:

The industry should be advised to make their product affordable. They should also be encouraged to assist farmers by providing some of the products free of charge. They should lower the prices and make it available in rural areas so that the rural farmers will benefit from it.

LOW COST OF MAINTENANCE:

ICTs provided for the rural areas should be cheap in maintenance. Most of them encounter the problem of leaving their phones, computer hardware, television, radio because of its cost of repairs sometimes, the cost of repairs is often more expensive than the price of the phone, the only solution is provision of ICTs that are cheap to maintain.

STABLE NETWORK:

Most African countries still find it difficult to achieve stable network of telephones, internet etc. The government should monitor the industry and always caution them when necessary.

AVAILABILITY OF SPARE PARTS:

Spare parts of ICTs should be made available. Its availability should reach rural areas. It should also be affordable.

These solutions proffered above can solve the problems of ICTs in agriculture. It can also provide a conducive environment for ICTs to think. It only takes courage and determination to effect this change in Africa. Then the problem of poverty, starvation etc. will be checked in Africa.

ICTs, JOB OPPORTUNITY AND POVERTY ERADICATION.**JOB OPPORTUNITIES:**

ICTs are widely known as one of the industries that create employment for a large number of people. In Nigeria, about 75% of the graduate are unemployed talk less of others with only senior school certificate. In deed, unemployment is already a threat to us. Annually, a good number of graduates find it difficult to secure a job.

Nevertheless, one of agenda of the president of Nigeria is to create employment for the masses. We are still waiting anxiously to see that. But I believe that ICTs industries can create job opportunities to Nigeria and below are ways in which it can be achieved. They include:

INVESTING HEAVILY ON ICT INDUSTRY:

Government, foreign investors, able individuals etc should invest heavily on lcts sector. Since it creates jobs for large number of people, so investing on it, will create jobs for millions of Nigerians. Take for instance, in Nigeria, the Mobile Telecommunication Network (MTN), Global com, vodacom, M-Tel have offices in most of the state in Nigeria and they have created jobs for millions of Nigerians. If more of the telecommunication companies are established, it will go a long way in providing employment for Nigerians.

ESTABLISHMENT OF LOCAL TELEVISION AND RADIO STATIONS:

Government should create more television and radio stations in all the states in Nigeria. Private individuals who want to establish any station should be encouraged and it's pollicies favourable. Many thousand of people will be employed.

RETIREMENT:

In most ICTs industries in Nigeria, old employees of 60-75 years of age are still in offices. They are still occupying their position instead of retiring. Once workers in ICTs industries are retired, job opportunities will be created. Then, more Nigerians are employed.

CREATION OF ICTS CENTRES:

ICTs centres should also be established and people trained. ICT teachers shall be employed to train the student. So its establishment will favour ICTs tutors and other disciplines.

RETAILING:

This is the most common type of employment in Nigeria. People can self-employed themselves through selling of telephone recharge cards, making of phone calls and selling of ICTs such as mobile phones, radio, televisions etc.

CREATION OF ICT OFFICES:

Companies, industries, governments should create ICTs department. This department is very essential in communication and obtaining information. Once this office is created, many ICT graduates will be employed.

With the above points, ICTs can create enough jobs for Nigerian and the problem of unemployment will be tremendously reduced to the lowest minimum.

POVERTY ERADICATION:

Poverty and unemployment are inter-related. ICTs can help eradicate poverty through these points explained below.

CREATION OF JOB:

When unemployment level is low, poverty level will also be low. Once ICT industries provide employment to people through the aforementioned ways, the poverty level in Nigeria will be drastically reduced.

INVESTING IN ICT SECTOR:

Foreign investors should invest in ICT sector in Nigeria, once they start investing, the economy of Nigeria will improve, the standard of living will also improve, then poverty will automatically decline to its lowest.

FOREIGN ICT COMPANIES ASSISTANCE:

The companies based in developed countries should assist Nigeria either through financial assistance or otherwise. Their assistance should be concentrated more in rural areas.

Conclusion: Any worthwhile something takes time for it to yield. For Jobs to be created and poverty eradicated in Nigeria will take time but the time will determine how serious we are to solve the problems.

Reference:

www.fao.org/sd/Cddirect/Cdre0055b.htm

www.scienceinafrica.co.za/2004/july/cybersheperd.htm

End

ICT & Agriculture- A tool for accelerating the Momentum for Development in Africa (Uganda)

By Shaka Robert

Project Summary:

There is scarcely a field of human activity today that has not been touched by the dramatic changes in Information and communications technologies (ICTs) taking place over the last 10-15 years. Agriculture and its associated natural resource management are no exceptions. This project examines the impact that new ICTs can have in agriculture, outlines trends and emerging ICT opportunities in the field, and offers some guidance on how international agencies, African governments and their people can build on their considerable experience to take advantage of ICTs in development assistance and community empowerment.

ICTs can help *mobilize science and technology for agriculture* by linking agricultural specialists into virtual communities and accelerating agricultural research exchange between developing and developed countries. They can also help *develop trade opportunities for farmers* by linking smallholders into increasingly globalized production chains. ICTs can *bridge the knowledge divide* by permitting geographically distributed organizations to work together more effectively, allowing them to provide mutual mentorship and support. Finally, ICTs can support *taking the long term view*, with tools for understanding and planning the future effects of today's economic and land use decisions. (Moyal, 2001)

Understanding the place of ICTs in developing country agriculture depends on four key concepts: that *knowledge is an increasingly significant factor of production*; that all actors in the agricultural sector are part of *an evolving agricultural knowledge system (AKS)*; that ICTs accelerate agricultural development by *facilitating knowledge management* for AKS members; and that ICTs are essential *coordinating mechanisms in global trade*. Expanding the use of ICTs in developing country agriculture will demand a more active and empowered role for rural intermediate organizations. These organizations will increasingly act as local knowledge brokers: they will identify client needs and suitable knowledge management methods, and provide feedback on the quality of existing agricultural knowledge services as well as identify new ones. (Gramen, 1999)

Effective ICT applications in the rural developing world face significant hurdles, especially in access provision for off-grid or remote areas. Rural telecenters have a poor sustainability record, but they remain critical tools and have potential for future improvement. Alternative models of connectivity ready for pilots utilize shared and inexpensive cell phones, pagers, DVDs, and personal digital assistants, combined with CD-ROMs or server-side internet processing models. Sustainability needs to consider dimensions other than the survival of telecenters organizations: *digital content, ICT training and awareness, and demand for ICT services* may continue even where specific telecenters fail, and emerging technologies may start to address those needs.

Research has it that the World Bank, FAO and other multilateral & bilateral organizations are taking similar approaches to ICT opportunities-connectivity provision, capacity building for users, agricultural content development and aggregation, as well as a conducive policy advocacy. African governments have not yet shown their full appreciation of the benefits that comes with ICTs. Governments in the developing world will have to take a strategic lead position for their people to adopt the use of ICTs. The vast majorities of ICT applications in agriculture today are still in pilot stages and are distinguished more by the agricultural development themes they address by the donor funding them. (World Bank, 2000)

Defining ICTs & significance of the Digital Revolution & Agriculture.

Information and Communications Technology is defined as a combination of hardware, software, and the means of production that enable the exchange, processing, and management of information and knowledge. ICTs thus include technologies and methods for storing, managing, and processing information (e.g, computers, software, books, PDAs, digital and non-digital libraries) and for communicating information (e.g, mail, email, radio and television, telephones, cell phones, pagers, instant messaging, “the web,” etc.).

In every speech, ICTs commonly refer to electronic and digital services and the software used for storing, retrieving, and communicating information. However, the poorest and most vulnerable populations with whom many international agencies and local Non governmental organizations work with may have little opportunity or capacity to use or benefit from ICTs so narrowly defined. Broadening the definition to include some older, more traditional technologies and methods (e.g, accounting ledgers, couriers, radio, television, face-to-face training) allows the discussion to focus on the needs of agricultural communities and applicability of the new technologies while simultaneously including more technology available to the rural poor.

Agriculture is defined as both the traditional activities of agriculture (e.g, planting, harvesting, marketing, and animal husbandry) and the natural resource management activities associated with agricultural work (e.g, water management, soil fertility, agro forestry, fisheries management (Goyal, 2002)

The Digital Revolution and digital ICTs.

The renewed interest in ICTs for development arises because of the opportunities that digital technologies enable. The ability to record text, drawings, photographs, audio, video, process descriptions, and other information in digital formats means that exact duplicates of such information are possible at significantly lower costs than before. Moreover, digital and analog communications networks such as telephones and the internet can transfer that information rapidly over large distances-around the globe if necessary. In many cases, the ability to transfer information via telecommunication networks can increase the value of producing information, lower the cost of delivering it to audiences, and improve the capacity to remote communities to review the quality of services they receive.

If information is time-sensitive, the increased delivery speed possible through digital communications networks can raise its value tremendously. With information duplicable and globally transferable at low costs, information in digital form can be drawn from countless sources-local and remote- and repackaged to suit a user’s needs. Digital ICTs can thus be more *interactive than their non-digital counter parts*-they can respond more easily to a user’s specific

requirements, often through automated or artificially intelligent processes that allow for efficient use of limited human resources.

Continuing Importance for Non-Digital ICTs

This project concentrates on trends, applications, and use of digital ICTs in agriculture because they are newer and may be less familiar to readers. Nonetheless, traditional or non-digital ICTs continue to be important. In many situations, rural farming communities have greater access to or familiarity with non-digital ICTs (e.g, radio) than digital ICTs, to which access may be entirely lacking. These constraints, although they can be overstated, represent significant challenges to the effective deployment of digital ICT for agriculture in areas where many government departments, national NGOs, CBOs and other international agencies work in my Country Uganda and Africa in general.

Traditional or non-digital ICTs continue to be important and demand particular attention in three cases:

- When the present use of non-digital ICTs indicates ways in which digital ICTs could add value, cut costs, improve quality, or scale up the benefits of an activity.
- When the use of non-digital ICTs offers a baseline to compare costs vis-à-vis a digital approach.
- When a smooth interchange between the digital and non-digital world is important, so that information rural farmers need and supply can travel across the digital /non-digital boundary (e.g, rural radio, information pamphlets).

ICTs in the Developed & Developing Country Agriculture.

Information and Communication technologies are rapidly transforming the face of agriculture in the industrialized world. Many if not most activities in the agricultural marketplace are now mediated by the web-linked databases specifying prices, qualities, and quantities demanded. Electronic communication and websites enable farmers to access credit, government programs, and technical assistance under a variety of finance modes. Livestock semen, transgenic crops, and business development services can be located, bought, and paid for over the internet, often delivered by the next courier. Access to knowledge and information in many forms has become a key element in of agricultural competitiveness at household, regional, and international levels. Information about agricultural products themselves and the conditions under which they are produced account for an increasing proportion of the final price, as demonstrated by the premiums attached to organic and fair –trade products(Rusten,2001).

In short, the face of developed agriculture has changed as ICTs have become increasingly critical to farmers and agricultural planners in the developed world. In economic terms, *information has become so critical that it needs to be recognized explicitly as a fourth production factor in agriculture after the traditional three factors of production; land, labor and capital.*

The transformation of agriculture in the developed countries has taken place in a context of high literacy rates, well-functioning telecommunication systems, readily available electricity, an established and regulated credit banking system, well-developed transportation networks, high labor costs relative to the computing equipment, and reasonably easy access to ICTs. In the

developing world where many International and National interventions seek to make an impact, only some-if any-of these conditions may apply. Some might argue that these limitations make investment in ICTs for agricultural development too costly to be useful for genuine poverty alleviation or economic growth in rural communities.

The above argument if followed will deny farming families or communities that cannot connect to global information networks taking advantage of opportunities they offer to reach high-value regional and global markets. Aside from the lost development impact, such isolated communities characteristic of Africa-will likely resent the effects of globalization and many may associate them-as many do-with the policies of the Developed world and the United State in particular, adding fuel to international security concerns. Further more, integrating ICTs into projects may help improve the performance of bilateral funded agricultural development efforts. One of the advantages of digital information and communication technology networks is that information can flow quickly in many directions. This means that ICTs can lower barriers to community feedback and empowerment, as well as provide central managers with tools to better monitor project progress and assess community needs. (Patel, 2001)

The Importance of Agriculture to Development and Contributions of ICTs

In most developing countries, the agricultural sector is the largest and most critical economic sector. More than 50% of Africa's population lives in rural communities and is economically dependent on the performance of Agricultural production. Agriculture provides food, is generally the largest market for labor, provides tradable goods-hence foreign exchange-for the national economy and contributes to government budgets through taxation. A weak agricultural economy producing insufficient food is frequently associated with weak or non existent democracy and may lead to migration, civil unrest, an unhealthy and unproductive labor force, and mismanagement or abuse of the environmental resources (Green, 1997).

Women and the youths are the majority of the world's food producers. Worldwide, women and youths produce more than 50% of the food, and in some regions such as Sub-Saharan Africa, they grow as much as 80% of the food crops. Universally, women and youths are responsible for preparing food for family, and thus for the nutritional quality of food for children. As primary caretakers women also have the greatest influence on the level of education and training of that children in rural communities receive (Kenton, 2002).

African communities and the development community are confronted with the enormous task of stimulating growth in rural areas where 75% of the poor (90% in Africa) reside, while meeting the food needs of the growing world population without intensifying environmental degradation, social inequity, or adverse consequences for human health. These challenges require more than increased financial resources, which are also important-they require the development and dissemination of locally appropriate agricultural innovations, many of which may be discovered and refined in developing Countries. ***ICTs are the highways that can facilitate the trade and exchange of innovations to address these pressing agricultural challenges.***

Historically, technology improvements have had great impact on increasing food production and lowering food prices. Information and Communication Technology, if adopted, will reduce the cost and increase the spread of communication, reduce previous barriers of time and location, and accelerate the integration of national production and finance systems into global systems. They

are key catalysts in the present and largely unstoppable process of globalization. At the same time, there is increased threat and reality of marginalization in countries and national economies that will not be able to compete effectively on the world market in the global systems that ICTs enable, widening the gap between wealth and poverty.

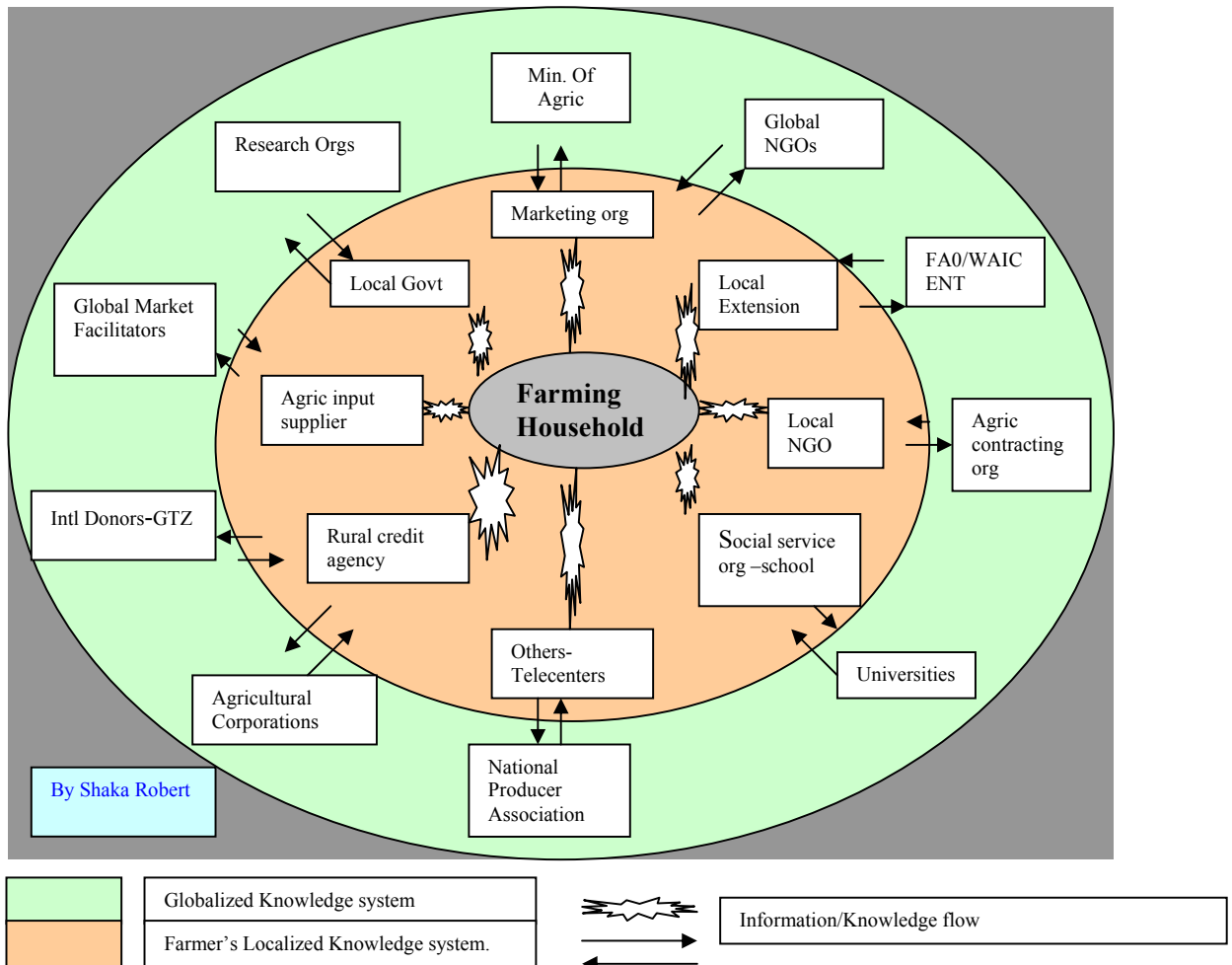
Long-term improvements in living standards for the rural poor require both resources and innovations in addition to a ***Global political commitment*** to facilitate access to new markets and improve production capacity in Africa. ICTs have important roles in each of these areas. Improving agricultural performance is also a prerequisite for economic growth and creation of a stable environment for democracy. In poor countries, even a modest growth in agriculture output can significantly affect the national economy, and advances in agricultural science and technology have historically played pivotal roles in alleviating hunger and poverty. Agricultural innovation is understood today to be the result of an interacting constellation of agricultural actors: not just public agencies such as the extension network, but also private firms, NGOs, farmer associations, national governments, and others. In this context, ICTs are more than simply a tool to make each entity individually more productive; ICTs offer methods for weaving agricultural actors together into networks that can collectively identify, modify, act on, and implement relevant innovations.

ICTs, Critical Information Flows, and Agricultural Knowledge System:

The variety of new tools for agriculture is impressive, but the tools need to be placed in an overall context of agricultural information and communications needs. By looking at the critical information needs of agriculture and farming communities, the focus can move away from a compendium of “neat gargets” and their individual applications toward understanding of their overall role in promoting productive, equitable and sustainable agriculture. The key frame work for this is the ***Agricultural knowledge system (AKS)***; consisting of organizations, source of knowledge, methods of communication, and behaviours surrounding an agricultural process. Knowledge is not the same as information: it includes information, understanding, insights, and other information that has been processed by individuals through learning and thoughts. For many national and international interventions, ***AKS approach should be centered on meeting the needs of small farming households.***

As farmers make critical decisions throughout the year, (e.g. credit application, crop selection, tillage methods, pest control, harvesting, post-processing, marketing), a typical household will rely on its own accumulated experience and the support of local organizations (e.g. producer associations, input suppliers, rural credit agencies, extensions services, NGOs, schools and others). The household may also receive radio and television broadcasts from more distant sources. Together, these form the ***local knowledge system (LKS)*** accessible to small farmers. The LKS represents information sources that are relatively accessible to a farming family and generally include an understanding of the farmer’s specific context and needs through repeated and often reciprocal interactions. Often there is a higher degree of trust between farmers and the entities in their local ***AKS*** than between farmers and more distant entities, such as national ministries or global organizations.

Figure 1.1 Globalized and Localized Agricultural Knowledge Systems Surrounding a Typical Farming Household.



Information Exchange in the local knowledge system is generally by non-digital means: Face-to-face discussions, printed pamphlets, videocassettes, radio broadcasts, and etc. Local communities lack affordable power and communication systems to drive ICTs, and they need investments in human capacity to maintain them. Increasingly, some communities will begin to have access through such services as cellular phones, rural use of battery or solar-powered personal digital assistants (PDAs) or local telecenters/cybercafes run out of local organizations.

The farmer's household is connected to a more globalized AKS, depending on the speed and degree to which needed information can pass between the two. The Global knowledge system consists of National and international organizations in agriculture and rural development such as ministries, USAID, GTZ, and local NGOs. These institutionalized knowledge sources typically have technical, policy and market information that smallholders may not be able to access

directly because of distance, expense, or literacy constraints, or because the material is in another language or pitched at an overly technical or academic level. Today, many institutions in the global knowledge system already have basic connectivity to the internet, websites, and other digital media, and many use ICTs to partner and coordinate their activities and research. Several global NGOs, the World Bank, and agricultural ministries are setting up internet websites to deliver services to each other and more local organizations. Many regional development banks, including the African Development Bank and the World Bank, are also supporting government efforts to build statistical and ICT-enabled information dissemination capacity with in agriculture and other ministries.

Agricultural knowledge and information needs to be managed like any other key business input. Advances in ICTs have helped create an entirely new discipline, termed *knowledge management*.

Effective knowledge management means that an organization or network of partners gets the right information to the right person at the right time in a user-friendly and accessible manner so that they can perform their jobs efficiently.

Development efforts must improve the capacity of agricultural knowledge system to manage and disseminate knowledge effectively, particularly to small farming families, women and youths. ICTs can play an important role in linking knowledge seekers to knowledge sources. Agricultural research, extension, and development organizations-public or private, for-profit or non-for profit- are all part of an overall Agricultural Knowledge System (AKS) linked by information and communication. These organizations are in business of providing knowledge as a product or service.

A helpful approach, which GTZ has already applied in some contexts in Uganda, is to map out information and communication needs of clients with in their agricultural economic/social system and help key elements in that system find information they need, when they need it, in accessible terms and language, and at prices that are realistic given available resources and organizational sustainable development objectives. These objectives need to incorporate growth, equity, and environmental dimensions. From this starting point, an effective ICT strategy can take a *knowledge brokering approach*: Identifying who needs information, who can supply the information, what formatting and delivery mechanism will allow the knowledge provider and consumer to communicate and share information and what institutional/market structure will provide the appropriate incentives for such sharing to take place.

Any successful approach to ICTs in agricultural development will have to focus on knowledge management and knowledge brokering techniques to ensure that the **AKS** will address the needs of small farmer households as it evolves. In some cases, this will mean connecting organizations in the local agricultural knowledge system to each other and to the global knowledge system. In others, it will involve forming partnership with government agencies, local organizations, and the private sector to ensure that the knowledge and content in the global realm in fact meets the needs of the local farmers. This will help in the application of an Agricultural strategic package Involving:

- a) *Mobilizing science and technology for Agriculture.*
- b) *Building trade opportunities for farmers*

c) *Bridging the knowledge divide*

By ensuring that the evolving agricultural knowledge system includes relevant natural resource management entities, it can also help promote long-term planning and taking the long-term view.

Finally, disseminating important agricultural information to farmers has been an integral part of agricultural development strategies for years. In an ICT-enabled approach, information dissemination from institutionalized knowledge sources will continue to be important, but the real information that ICTs make possible is to allow feed back and “return flows” of information from users that tell information suppliers whether the information they supply is useful or relevant and offer guidelines to improve it. Promoting knowledge feed back from rural communities does not necessarily require a connection to the internet; paper surveys, mailed floppy disks, telephone voice menus, PDAs, and other methods are also options.

ICTs can promote feedback in the AKS by:

- Facilitating two-way transmission of data and knowledge from local to global knowledge centers (e.g.;internet connections, cell phones, floppy disks, mobile storage devices, PDAs, digital cameras)
- Providing methods for central agencies to capture and analyze large quantities of feedback or requests from distributed field sites (e.g., databases, telephone call logs, web surveys, statistical analysis, website “hit analysis,” web logs, discussion groups, automated decision trees, artificial intelligence)
- Reducing the effort involved in producing new information and knowledge that responds to feedback(e.g.,lower creation costs vis-à-vis print materials, fewer if any print runs required, distribution more easily targeted, techniques for distributed research).
- Linking remote users into mutual support networks so that they can both provide and benefit from their own accumulated experience and expertise (e.g., discussion groups, some commodity portals, electronic networks).

The feed back that ICTs enable has the capacity to facilitate continuous improvements in the quality of local AKS services and empower communities, but *programs must include explicit plans to take advantage of feedback potentials*; they do not happen automatically just because a digital technology is used. Processes must be designed and people given specific responsibilities to analyze and respond to feedback in order to take advantage of the opportunity. Presently many information sources use ICTs to make information available. Few if any provide client-friendly opportunities to provide feedback on the content of the information posted.

Examples of “return flows” of information include evaluations on the applicability of good practices advocated via the internet or local price and market information supplied from remote/distributed sources, aggregated at a central location. In such cases, it is important to ensure that local communities have the capacity and opportunity to produce and publish their own content, and that they have some control over information they divulge about themselves. ICTs may also offer opportunities for users to sell information about themselves if it is valuable, presenting an additional revenue opportunity for smallholders and their organizations. The diversity of ICT delivery mechanisms and capacity of internet-connected-servers to repackage

digital information to other devices can assist in overcoming many obstacles to cost-effective rural feedback promotion.

Information choice and source diversity are key to making feedback real and meaningful. A farming household should have several sources for the information they need to make key decisions, as well as their own knowledge and accumulated experiences. For instance, rural credit may come from terms that larger suppliers make available, or organizations that contract small farmers and their associations may offer both credit services and technical assistance in a bundled contract to help communities meet yield and quality standards. Empowerment ultimately comes from a farmer's ability to exercise choices among meaningful options. Connecting one organization to global knowledge networks is not sufficient; it is essential to promote a diversity of quality information services that a community can choose among and access.

Rural intermediate organizations should become critical knowledge brokers.

The presence of ICTs that facilitate choice and feedback will change the role of local intermediate organizations such as NGOs, extension workers, producers' associations, and input providers that work closely with farming families. For many regions, particularly in Sub-Saharan Africa and Uganda in particular, direct use of ICTs by farmers-with exception of cell phone- may take decades. On the other hand, local intermediary organizations are significantly more likely to have the organizational capacity, human capacity, and access to the necessary infrastructure to take advantage of ICTs to deliver needed services to the rural poor. Their role will increasingly change from disseminating information sent to them by official knowledge sources to acting as *knowledge brokers* comb various sources to help clients find information and resources they need and place that information in a local context.

Intermediary organizations are the lynchpins of a well functioning agricultural knowledge system, trading system, straddling the dividing line between the digital, globalized knowledge and trading system interlinked by digital ICTs and the community's local system, which will often rely on non-digital ICTs.

Effective Intermediate organizations must have capacity to:

- Know about and search *global knowledge sources and their own experience* for answers to pressing farmer needs. This includes searching digital sources via ICTs, but not excluding traditional and non-digital sources.
- *Contextualize global knowledge* so that it applies to realities of the local community. This may involve a translation of material into less technical language, addition of information about local conditions (e.g., soil types, market conditions)
- Pro-actively *assess and articulate present and future information needs* of clients, including *feedback on availability of and usefulness of locally accessible knowledge*.
- *Provide objective feedback to national and global knowledge sources*, which may include the *production of locally developed content on lessons learned*, preferably developed through participatory methods.

The role of intermediate organization is that of a knowledge management organization whose purpose is to introduce change for the benefit of the clients. These organizations generally avoid issuing prescriptive recommendations; rather, they play an advisory and facilitating role. In short, intermediate organizations are organizations that provide management of information, communication, and knowledge that allow farmers and farmers' groups to make better management decisions that will improve their long-term livelihoods.

The critical point is that these knowledge processes do not occur automatically. This will be a new role for many support organizations and their staff. Intermediate organizations need training and support in problem diagnosis, problem solving, participatory decision-making, organizing, convening, and motivating—all attributes of a successful facilitator. This is a focal point where the youth in Uganda and other African Countries with ICTs skills can buttress themselves effectively. Such Training should include how to seek information via the Internet, how to take that information and modify it for their (farming) clients, how to interact with farming households and facilitate knowledge use, and how to follow-up, gather information regarding farmer's experiences, and relay this back to the original information providers and institutionalized sources.

Some rural intermediary organizations that can benefit from ICT empowerment.

Local government	Farmers' unions/Associations	Agro-processors
Chambers of commerce	Development NGOs	Agricultural Input providers
Local Extension services	Vocational schools	Rural Credit Organizations
Community Radio Stations		

Designing ICT-enabled knowledge flows between these actors in any specific case requires careful considerations of the types of ICTs accessible by each group and the technological and conceptual packaging of information so that it can flow effectively from one user to the other. Effective ICT deployment explicitly considers the appropriate interfaces between the digital and non-digital worlds, so that those without access to digital ICTs can still benefit from an improved local information environment. From the perspective of the smallholder farmer, the key question should be how to gain access to information and resources. These farmers need local support groups that will act as brokers between the available knowledge system and the individual needs of farming households. Developing economical local access for rural poor and ensuring appropriate content is the essence of bridging the digital divide.

Information that can or should be communicated through ICTs

ICTs can accelerate agricultural development by providing more accessible, complete, timely, or accurate information at the appropriate moment to those making key on-the-ground decisions. Examples of such decisions are: *What and when to plant; where to locate agricultural inputs (and at the best prices); how to identify and respond to disease, pests, and drought; where to sell products; what new technology options exist for productions, post-harvest, and soil fertility control; what agricultural credit programs are available; and how to access relevant government programs, including land titling.*

Digital ICTs can add value over traditional methods when:

- Information is time sensitive (e.g., prices)

- Information requires significant customization to satisfy a client’s need (e.g,soil content, local policies)
- The information needed involves standardized calculations (e.g., credit evaluations)
- Knowledge requires significant back-and-forth interactivity over distances (e.g., locating a remote specialists for disease/pest diagnosis and treatment)

Figure 1.2 captures the typical sets of information and knowledge flows that are important to the farming households as they make key agricultural decisions throughout the year. These include knowledge and information about agricultural technologies and methods; the local natural resource base geography; the policy environment, laws, regulations, and market information. Some illustrations appear in table 1.2

Table 1.2 Sample of key info and messages exchanged within the agricultural knowledge system.

<p><u>Agricultural Technologies</u> Best practices Demonstration Results New Varieties Technical Assistance</p>	<p><u>Natural Resource Based & Geography</u> Climate & weather Soil Information Rainfall & Water sources Physical Infrastructure (e.g,roads,irrigation,structures)</p>
<p><u>Policy Environment, Law& Regulations</u> Land titling Labor laws Water Access Rights Arbitration & Dispute settlement Environment Regulations Entrepreneurial Rules & Off-farm Income Options.</p>	<p><u>Market Information</u> Prices, Quality Requirements Input Provision Credit Availability Selling Options Labor Supply and Demand Distribution & Other Logistics</p>
<p><u>Others</u> Communication with migrant family members, remittances, etc.</p>	

International and national researches do admirable jobs of making their research findings available. For instance; The National Agricultural Research Organization-Uganda (NARO) has developed a comprehensive set of Data banks with exceedingly valuable information on species and care for forestry, farming, and biodiversity. And important consideration is to ensure such data banks are demand-driven and verify whether the information is useful to the majority of farming households. Facilitating partnerships with intermediary organizations to test, vet, and refine these services is an area with high impact for agricultural development.

ICTs enables farmers and their associations to collaborate more effectively and equitably
ICTs can bring about transformation because they facilitate communication between and among previously disparate groups. As a result, many agricultural development initiatives should involve

larger numbers of stakeholders acting on greater and more detailed information, and facilitate more responsive or democratic governance. ICTs are able to improve stakeholders inclusiveness, implementation transparency, and accountability though:

- Declining transaction costs in the form of reduced communication costs (e.g., email, voice mail, instant messaging) New ICT techniques to organize and manage participation from greater and more geographically dispersed sources (e.g., discussion boards, chat rooms, virtual collaborative environments, web logs)

Several types of communities are candidates for improved ICT Inclusion.

Virtual networks to support subject matter specialists. These are strong and mutually accessible virtual communities for specialists critical for generation and dissemination of agricultural knowledge among research and knowledge centers in developing and developed Countries. They are also potential information resource that intermediate organization can access to put that knowledge in the service of communities and family farmers. ICTs facilitate, though not exclusively, the process considerably through electronic discussion boards, list servers, email, and common websites. Good examples are found in the scientific communities.

Virtual communities are extremely useful in knowledge sharing and research dissemination among recognized specialists, national and international researchers, biotechnologists, and agricultural professionals. Through internet connectivity, experts should identify mechanisms and appropriate incentives to facilitate rapid research dissemination using ICTs. From a technology stand point, such strategy should involve setting up digital library systems, list servers, and networks for research exchange, or identify existing mechanisms and providing access to the appropriate persons. From the incentives stand point, those specialist & experts must be able to see financial, professional, and other gains from contributing their knowledge to such a system.

Although ICTs can help eliminate technical and financial barriers to greater participation, inclusion, and information exchange, it is important to recognize that some barriers are political or social in nature, and may continue despite the technical feasibility that ICTs enable. Distinguishing situations of technical from political exclusion up front will make ICT deployment for greater inclusiveness more effective.

Virtual networks that support layperson expertise. Subject matter specialists often have greater access to the social and technological infrastructure that can support electronic and non-electronic communities. However, the most locally applicable innovations are likely to emerge as ordinary laypersons and community intermediary organizations form their own virtual networks or communities and share their own knowledge and experience. In practice, an enormous share of householder technical assistance in developing Countries like Uganda-probably a majority- is accomplished by neighbouring farmer's associations or similar entities can accelerate this process by effectively broadening a farmer's "neighbourhood", tracking the most common sets of questions, and creating a library of responses, as well as providing a mechanism to identify key issues that small-farmer friendly agricultural research agendas should address.

Providing ICT access to and building the capacity of agricultural cooperatives, small-scale businesses, women's groups, and trade associations—all examples of intermediary organizations—are always to ensure that the increased availability of knowledge that ICTs facilitate can reach and benefit the most vulnerable and most remote segments of the agricultural value chain—youths and women. ICTs can enable or help scale new models of access and technical assistance, such as “knowledge stockists”—input suppliers who also provide access or act as intermediaries to ICT networks of knowledge. ICT availability could permit greater competitiveness in privatized technical assistance networks, keeping prices low for end users of the service. To be effective, vibrant virtual communities of any frequently require a trusted facilitator or moderator with a stake in keeping the community active and valuable for its members.

Mentor networks and field-research linkages. Virtual communities and “communities of practice” can serve subject matter specialists, such as biotechnologists, or support communities of experienced laypersons, but the capacity of ICTs to connect communities to mentors in a form of “distributed technical assistance” is equally significant. Mentor networks seek to bridge the divide between specialists and laypersons by placing a person with specialist knowledge at the service of a group of persons with less specific knowledge. Several techniques exist for facilitating these types of specialists-practitioner linkages, including specialized websites (e.g., askjeeves.com, askme.com), discussion groups moderated by thematic leaders, topic oriented list servers, or even ordinary email and telephone. For example, in its development Gateway design, The World Bank uses “thematic and regional guides” as moderators.

Overtime, one of the most important effects of ICT advances in Uganda and the developing regions will be to enable poor communities to connect more effectively with sources of assistance, knowledge, financial resources. Virtual communities of laypersons, combined with effective networks connecting to laypersons and intermediary organizations with subject matter specialists, will be a powerful combination that can place a relatively small supply of specialist knowledge at the service of large numbers of needy youths and women (farmers) distributed in many locations. Specialists shall provide useful innovations and suggestions through their participation in such communities, and if successful, the communities themselves can diffuse lessons learned widely without significant effort on the part of the specialist.

Linking specialist and researchers to communities of laypersons or intermediaries such as extensions agents or NGOs shall help resolve a perennial issue in agricultural research and extension: how to ensure that agricultural research can benefit the smallholder and how to disseminate the results of that research as rapidly and accurately as possible.

Commodity networks or “vertical portals”. Within a specific industry or commodity, vertical portals can assist the members of a production chain in locating each other and coordinating the exchange of goods up and down the production chain. These portals are “vertical” because they explicitly target the needs of industry linked by a vertical production chain. As agricultural production chains become increasingly global, the capacity of vertical portals to serve as local market facilitators and sources of technical assistance will increase substantially, as will the importance of allowing information about production methods (organic, socially responsible, etc.) to follow products as they move from original producer to the end consumer.

The Brazilian government has helped produce an excellent example of vertical portal from the Brazilian cashew industry, linking together key organizations (input suppliers, transporters, and labour unions), keeping a common calendar of events, and disseminating industry news letters. The site is currently developing classified section for cashew products and the labour market. Since its inception, the site has averaged more than 500 visits per months (15-20 per day), a substantial number given the challenges in internet access that many of the site's users face. Moreover, the site is financed sustainably by the commodity association. (<http://www5.prossiga.br/caju/index.html>)

Gender and social Equity Issues.

It is important to recognize, as with any technology transfer objective, that early access to technologies such as ICTs confers political and economic advantages to the groups that have them. It can also create or exacerbate conflicts or inequities when access or information content is limited along gender, geographical, ethnic, or economic lines. Intelligent phasing and targeting of ICT access can empower key actors such as local intermediary organizations and help to manage or resolve conflicts, as well as promote more equitable development outcomes.

Rural youths and women are key actors in agriculture, biodiversity conservation, and rural economic development, but investing in youths and women is an overlooked strategy for increasing agricultural productivity. Many programs with good intentions overlook youths and women's needs, mainly because researchers, policy-makers, and planners lack adequate data, information awareness, and methodologies to address them. Another important reason for this neglect is that the vast majority of researchers, extensions agents, and other intermediate technology transfer agents have been male.

A survey by **FAO** showed that female farmers receive only 5% of all agricultural extension services worldwide, and only 15% of the world's extension agents are women. (<http://www.fao.org/gender/en/edu-e.htm>).

This, in spite of data showing that women account for over 70% of domestic food production in Africa and 80% in Uganda and more than half of the agricultural labour force elsewhere. Part of the reason is that extension services generally focus on commercial production rather than subsistence crops, which are the primary concern of women & youth farmers and key to food security in the developing world particularly Uganda. In many cultures the information flow between men and women is limited, further blocking access to extension agents, most if not all of whom are male.

Males dominate the ICTs industry today and special actions are therefore paramount to reach female clients. Finally, the availability and relevance of women & youth-centered content is essential for generating ICT demand and delivering value to women and youth users. One mechanism is to help the youth and women develop their content, either by promoting virtual communities, special women's and youth's community content-generating projects, or by having female extensions identify ,design, or otherwise select key items for users. (http://learnlink.aed.org/publications/gender_book/home.htm)

ICTs confer significant market advantages to those who have access to them and who have relevant content available. Youths and women should take the risk to adopt to the technology and

should be allowed to reap the rewards of their risks and investment, by ensuring that international development spending creates equal opportunities and levels the playing field in order to ensure rural security.

Literacy and computer literacy in many agricultural communities in Uganda and the bigger Africa and present challenges in the effective use of ICTs. With proper attention to user interface design, ICT kiosks can use multimedia to communicate through pictures, sound and video. The Development Alternative Group in India has produced a site for its Technology and Action for Rural Advancement “TARahaat.com,” designed for low-literacy users to help stimulate appropriate technology transfer and use in rural villages. This site is still in a growth transition and still not perfectly suited to an entirely illiterate audience, but it provides proof-of-concept sufficient to justify current and future investment in the outlines approach. A combination of government commitment to a robust education system with international development partners to reduce the literacy rates and initiative like the “TARahaat.com,” is indeed the approach that will lift Ugandan and many African youths and women out of biting poverty through Agriculture. (<http://www.tarahaat.com>)

Ad-hoc collections of market, natural resource management, or instructional information can be placed on MP3 format or burned onto DVDs for use in cheap community players. Young people are particularly capable of absorbing the visual keys and metaphors used in computer interfaces. Illiterate youths, for instance, encounter little trouble mastering video games that may not even be published in a language they understand. Although an agricultural ICT application may require more abstract thinking skills than a video game-its proof that new technologies are not necessarily inaccessible to illiterate or traditional language communities. Another strategy for low literacy communities is to work through literate intermediaries. Overall in an ICT-networked age, general literacy will become more important than ever as a key to development. And the role of women and young people is critical. A number of studies have concluded that mothers and women have much greater impact on children than their fathers on literacy and education.

Geo-political order reconfiguration: The world is divided between the rich and the poor and the division is increasing almost exponentially and deliberately by corporate economic planners. It will require good will on the part of the global political players to reconfigure an equitable Global Trading system where the rich and the poor make a radical shift or deliberate transition from donor support to equitable and balanced Trade as partners thus giving an almost diplomatic Trading license to African farmers as a boost for lost economic benefits and development due the impact of Agricultural subsidies and closed markets in the corporate Economies(C.Peter Timmer,1986)

For Ugandan and African youths to make a break through, government and international efforts in development assistance need to look at the following recommendations.

Recommendations for Project design in Agriculture and ICTs.

- Empower agricultural and rural intermediary organizations such as extensions agents, local NGOs, and producer associations through ICTs in order to increase their effectiveness at understanding and servicing farmers 'needs.
- Improve rural access to ICTs through support of multi-use telecenters and piloting of emerging alternative technologies that foster inexpensive, low-power alternatives to PCs.
- Develop and adapt relevant agricultural content for digital dissemination, using localintermediate organizations to evaluate the relevance and technical accessibility of information from institutionalized sources or created by intermediaries themselves.
- Ensure that women and girls as well as youths can participate effectively and equitably in emerging knowledge networks by ensuring women's access to ICTs, availability of women-oriented content (e.g., subsistence as well as cash crop information), and selection of intermediaries with women and youths in meaningful positions as key partners.
- Use ICTs to strengthen community feedback mechanisms for democratic governance, research and extension feedback, and project impact assessment.

Recommended Pilots and Continuation of current work

- Mobilizing science and technology for agriculture: Uganda government and Africa should partner other International Development agencies to ensure agricultural science and technology can be translated into media and language (including technical language) accessible to rural groups and intermediaries.
- Developing Trade Opportunities for farmers: Firstly, the corporate world must show political will in its development assistance by openly discussing agricultural subsidies in Europe, Japan, and the United and its impact on Agriculture in the developing world. In addition, the political will to create balanced global trade by removing international bottle-necks to Trade such as tariffs that create inaccessibility to potential markets through the WTO and other trade organizations.
- The Ugandan government and other African governments and development partners should sponsor vertical commodity portals and wired marketplaces to facilitate farming inputs and market opportunities, including technical support to improve smallholder bargaining power in contracts farming.
- Bridging the knowledge divide: Pilot new models of distributed technical assistance and small farmer support services to compensate for declines in extension support in Uganda and Africa.
- To increase training support and exchange programs for youths and women in technical agricultural institutions as a model of exposure for replication.
- Identify local or regional teams of rapid mobilization ICT-agricultural specialists so that governments and international agencies have easy access to the technical skills necessary for ICT planning and use in projects.
- Improving rural governance through:
 - a) Training and support for local government with new roles following decentralization
 - b) E-Government assisted by or accessed by internet or CD-ROM
 - c) Local land titling registries
 - d) Improved transparency

- e) Community resource management and monitoring.

References & Websites:

<http://www.worldbank.org/poverty/voices/globcoal/webguide/ict.htm>

World Bank's Global Coalition for voices of the Poor Web guide for ICT

http://www.ifpri.cgiar.org/2020/focus/focus07/focus07_06.htm

Appropriate technology for sustainable food. IFPRI recommendations for Agriculture-oriented ICT investments.

<http://www.developmentgateway.org/>

Website of Development Gateway Organization.

<http://www.pinoyfarmer.com>

<http://www.simputer.org/>

Other Bibliography

See D. Goodman and M. Redclift, ed., The International Farm Crisis (1967); G. L. Cramer, Agricultural Economics and Agribusiness (1979); C. Peter Timmer, Getting Prices Right: The Scope and Limits of Agricultural Price Policy (1986); W. P. Browne, Private Interests, Public Policy, and American Agriculture (1989).

Project Author:

Shaka Robert, Bsc. (Hons) (MUK), MCP, MCSA, MCSE
Shaka Robert is a 28 year Old Ugandan Citizen. He is a graduate of Biochemistry from Makerere University Kampala-Uganda. He is also a Microsoft Certified Systems Engineer (MCSE) and Cisco Certified Network Associate with four years experience in Microsoft windows & Cisco Products in a busy Research Environment. He is currently working as LAN/WAN Administrator for CDC-Uganda, an International Public Health Agency based in Atlanta Georgia.

END

A Writing Contest

On

ICTs and Agriculture

A Case Of Zambia

**The Complementary Role Of ICTs In Improving Rural Livelihoods
through Agriculture**

Submitted

To

AYF

info@ayf.de or ayf-info@t-online.de

Submitted

By

Casius Chuma

Lusaka, Zambia

Email: chumc@mail.ru

+260 95 751002

P.O. Box 32270, Lusaka, Zambia 10101

AUGUST 2004

TABLE OF CONTENTS

1.0	The Complimentary Role Of ICTs in improving rural Livelihoods through Agriculture.....	2
1.1	Background Information On Zambia.....	2
2.0	Agriculture In Zambia	2
3.0	ICTs in Zambia	3
4.0	Rural Youth In Agriculture In Quest For Improved Livelihoods- The Approach	3
4.1	ICTs -its role in improving rural youth livelihoods	4
5.0	Conclusion	5
	Author’s Biographical Data	5

1.0 The Complimentary Role Of ICTs in improving rural Livelihoods through Agriculture

1.1 Background Information On Zambia

Zambia can be best described as a youthful nation with about 45.2% of its population under the age of 15 while those between 15 to 24 years of age constitute 22.3% of the 10.3million people living in Zambia. All in all young people constitute approximately 67.5% of the total population¹. Therefore this paper will mainly focus on youths and how agriculture can improve their livelihoods, complimented by a greater role of ICTs in enhancing development.

Over the years Zambia has undergone serious economic transformation including structural adjustment (leading to liberalized markets & privatization of public institutions). This has seen Zambia move from a quasi-socialist economy to a “capitalist” economy.

One of the biggest challenges that youth are facing as a result of this transformation is unemployment (about 67 percent of the unemployed are youth) coupled with the high HIV/AIDS infection rates and a deteriorating education system. Majority of people in urban areas constitute youth, who are migrating from rural areas to urban cities in search for employment and better life. Unfortunately, the cities are not growing and developing at a rate to provide employment and better life aspired for by youths. Results are youths getting frustrated and engaging in illegal activities such as drug abuse, prostitution and other petty crimes, while others are thrown on the streets, creating a serious social problem. In short, in the absence of means of earning a living, the poverty levels in both rural and urban areas have soared. However there is still hope to ameliorate the situation. Zambia classified as a third world country could be disadvantaged in some way but it is one of the richest countries in the world in terms natural resource base.

Zambia has favourable climatic conditions and vast portions of land most of it ideal for arable agriculture. By engaging young people in sustainable agriculture and other income generating activities the present picture of unemployment and misery among young people in rural areas can be corrected, therefore contributing to poverty reduction in Zambia.

2.0 Agriculture in Zambia

Agriculture in Zambia drives the wheels of rural economy and to some extent even the urban economy as the urban dwellers depend on rural farmers for food. Rural farmers whom the majority are small-scale farmers contribute about 80% to the nation’s food basket. However these farmers are faced with constrained market access, which includes physical access to markets and lack of information. Small-scale farmers usually have little ability to effectively or favourably compete in agriculture input and output due mainly to insufficient information about the markets, lack of business skills & high transaction costs. It is difficult for the farmers to market and achieve commodity exchanges if communication is encumbered.

Limited access to market due to lack of information on available market is retarding development in rural areas. Other impending factors are barriers created by the international communities. For example the United States of America provide subsidies to its farmers; by doing so the production costs are low, allowing the farmers sell at a competitive price. Therefore it becomes very difficult for small-scale farmers in developing countries to penetrate the international markets. In short the big markets determine the price without considering the high production costs incurred by the less advantaged subsistence farmers in developing countries.

¹ The latest Zambia population census

3.0 ICTs² in Zambia

Zambia has always lagged behind in terms of technological advancement. Communication technologies such as Internet and mobile communications are just slightly a decade old in Zambia. For a long time, only accessible to those living along the line of rail and the latter now available in selected outlying areas of Zambia. Zambia has five Internet Service Providers (ISP) namely; Zamnet, Coppernet, Zamtel, Microlink and UUNet. Zamnet, Coppernet and Zamtel are large providers of Internet services with about 3500, 1800 and 1500 respectively.

Whilst Microlink and UUNet have subscribers in hundreds, it is expensive for those living in rural areas to connect to Internet for they are required to use a dial up system, which is equivalent to a trunk call. The rate differentials the ISPs charge is between US\$23 and US\$30 per month in Zambia, whilst Internet cafés charge from approximately US\$1 for 15 minutes for use of Internet or sending emails. Altogether there are about 40,000 Internet users and only 7,500 subscribers all using Internet for commercial, academic, research, personal emails etc³.

On the other hand Zambia for a long time hasn't had an ICT policy in place to guide the nation. However to address this concern an ICT policy is currently undergoing development (currently in draft form). Information technology devices such as computers and mobile phones are so expensive for an average Zambian. However the government's decision to cut tax on computers to 5% is going to enable many Zambians own computers. While the advantaged few are enjoying the fruits of technological advancement and globalization process, the rural majority continues to be marginalized ("the digital divide" between the developed and developing nations is widening far faster than globalization process). Most of the parts of Zambia are either cut off from television or experience poor reception, hence denied access to public information critical to decision making.

4.0 Rural Youth In Agriculture In Quest For Improved Livelihoods- The Approach

Zambia like many other developing countries is working towards reducing poverty amongst its citizens by implementing strategies highlighted in its Poverty Reduction Strategy Paper (PRSP). Therefore the main objective of this idea is to contribute towards poverty reduction in Zambia. The immediate objectives being; improved livelihoods and increased income among the rural population through high agricultural productivity, agribusiness and farm employment. However, improved access to markets (Box 1) is crucial, hence the need of ICTs.

Box 1: Development and information needs

"Recent development thinking has been based on the assumption that markets work well enough to ensure development and alleviate poverty. Our growing understanding of information constraints suggests that markets alone are often inadequate; societies also require policies and institutions to facilitate the acquisition, adaptation, and dissemination of knowledge, and to mitigate information failures, especially as they affect the poor".

Source: Robert Champman and Tom Slaymaker

In Zambia for a long time now farming has never been considered as a business but growing just enough to feed the family. On the other hand young people benefit very little from farming activities

² ICTs are those technologies that can be used to interlink information technology devices such as personal computers with communication technologies such as telephones and their telecommunication networks. The PC and laptop with e-mail and Internet provides the best example. Source: ICTs and Rural Development: Review of the Literature, Current Interventions and Opportunities for Action- Working Paper (2002) by Robert Chapman and Tom Slaymaker.

³ The e-Brain Forum, Issue No. 9, January 2004, Lusaka, Zambia.

as most of them work on their parents or guardians farms where they are not remunerated for their labour. To empower young people economically there is need to support young people in agriculture through capacity building, easy access to financial services (such as loans) to enable them procure farming inputs such as seed, draft power, fertilizer etc. But the aforementioned support is incomplete without modalities put in place to facilitate easy communication and market accessibility among young farmers, hence the need of ICTs. Rural youth also need entrepreneurship skills to enable them run their own enterprises in areas such as agro-processing. For example instead of selling unprocessed groundnuts they could further add value to it by further processing the nuts into peanut butter and cooking oil. This again will be incomplete without proper communication tools to facilitate marketing of the finished products. ICTs would therefore play a very critical and complimentary role in improving the livelihoods of rural youth engaged in agriculture and agribusiness.

4.1 ICTs -its role in improving rural youth livelihoods

ICTs are a critical tool in rural development. The strategic use of ICTs for poverty reduction will depend on the appropriate economic undertaking, for social and human development to occur, hence the great emphasis on agriculture in this paper. The rural poor depend primarily on agriculture and related activities for their livelihood. Agriculture does not only provide the source of nutrition but the bulk of their income⁴. Improved systems for the management and communication of agricultural information can help poor farmers make informed choices about the opportunities and constraints associated with agricultural development strategies⁵. While the assertion that information is an important focus for the future rural development strategies is not particularly contentious, defining the role that information should play is somewhat more challenging. Therefore the presence of ICTs in rural areas will therefore assist rural youth access, store and share information with other people using multiple devices and multiple media for purpose of

- ✓ Accessing information on potential buyers for their farm produce: ICTs could link farmer groups or agricultural cooperatives to larger markets and it would assist the rural youth in agriculture to standardise their prices. Therefore the potential of using ICTs to promote rural development through agriculture lies largely in increasing market efficiency through addressing information gaps and blockages. Access to markets and market information will help to improve choices for the sale goods both on local and international markets according to enhanced information on prices, comparative supply and demand for products. In the longer-term new markets, techniques and processes for production, processing and marketing of products, both farm and non-farm can be explored.⁶
- ✓ Accessing information on economic trends in terms of prices and demand for a particular farm produce. Now that markets are liberalized in Zambia this will save the farmers from being exploited by unscrupulous dealers.
- ✓ Accessing information on weather projections- this will assist the farmers plan well for the season, taking in consideration external factors such as weather conditions. The appropriate knowledge on weather conditions for a particular season will enable them know exactly the suitable seed to plant.
- ✓ Accessing information on farm implements (of which they can also order online)
- ✓ Accessing information on how to grow certain crops and post germination management. This will compliment the current agricultural extension systems. How there is need for easy to use and more interactive programmes.

⁴ IFAD (2001) Rural Poverty Report 2001: The Challenge of Ending Rural Poverty, Oxford: Oxford University Press.

⁵ Communication for Development Report by FAO (1998)

⁶ Chapman, R., Slaymaker, T and Young, J., The role of information in support of sustainable Livelihoods. Report prepared for FAO, Rome.

- ✓ Accessing information on animal husbandry and diseases highly prevalent in livestock. The ICTs will link the farmers to service providers such as veterinary, drug suppliers and NGOs.
- ✓ Accessing information on best farming practices and training in agriculture and entrepreneurship (complimenting the current extension system). ICTs will also enable young people study online without interfering their farming and business activities)

ICTs will improve and enhance social networking at community, regional and national levels, bringing about reduction in the cost and time taken travelling pursuing markets and potential buyers for their farm produce. Reduction in spending definitely will have a positive impact on household livelihoods since their savings will improve.

Despite the challenges identified in section 3.0 such as cost, access to information in rural areas through the use of ICTs can still be enhanced and affordable through the involvement of the rural communities themselves. One classical example is Swaminathan's e-villages in India where villages have information centres run by group volunteers. The centres provide information services and run training courses to the villagers. In this case farmers are expected to contribute (pool their resources together) to facilitate smooth running of the information centres. It is even much cheaper and affordable if more villages are connected and contribute towards the cost of running the information hub. Since the farmers themselves know their information needs the e-village concept is ideal as it enables the villagers' access to information that is useful to their daily lives and discover opportunities for improving their income generation.

5.0 Conclusion

In this age of technology it is very difficult to compete in any form of business undertaking if one is not up to date with technological advancement. For example today to do business effectively one needs an email address and good access to Internet, phone etc. Therefore the need for ICTs in improving the livelihoods of rural population cannot be over emphasized. Engagement of the rural young people in agriculture with full utilization of ICTs will improve their livelihoods eventually reducing poverty levels. Give the above scenario in 4.1 ICTs will assist the rural based small scale farmers and entrepreneurs to enter the mainstream economy (access to the global market) and become sustainable exporters contributing to economic growth. With the envisaged high productivity and increased income more jobs will be created in the rural areas through on farm employment and rural entrepreneurship. All in all ICTs will ensure that imbalances in terms of market accessibility and information are addressed.

However the government should play its part in terms of good policies, by ensuring that ICTs are accessible and affordable in rural areas so as to meet their information needs in agriculture and agribusiness. The ICTs will reduce the information gap that currently lies between the farmers and the potential markets. There is therefore need to assist build local capacity among farmers to support Internet connectivity.

Author's Biographical Data

CASIUS CHUMA, Mr.

AGE: 28 Date of Birth: 2nd October 1975

NATIONALITY: ZAMBIAN

ADDRESS: P.O. Box 32270, Lusaka, Zambia TEL: +260 95 751002

Email: chumc@mail.ru

CASIUS CHUMA^{*} holds a Bachelor of Science degree in Natural Resources from the University of Zambia. He has 3 years experience in developmental work and currently is the Executive Director and Development Consultant for Travaillant Vers Une Economie (TEL) Ltd (committed to providing consultancy services in rural development). He is the co-founder and owns 50% shares of TEL Ltd. He has over 5 years experience in youth work, having had played a critical role in youth development both at local and international levels. He is currently the **chairperson for the Youth Employment Summit Zambia Network and the Local Events Team Leader for the International Young Professionals Foundation (www.iypf.org)**. He has excellent background in computers (Ms Word, excel, access & PowerPoint), Statistical Analysis (SPSS), Project Design, Project Management, Youth work, Leadership, and Gender & HIV/AIDS. He has expertise in Facilitation (including Visualization in Participatory Programmes), Monitoring & Evaluation, Environmental Impact Assessments (EIA), project proposal development and report writing.

^{*} The author wishes to postgraduate studies in Rural Development