How ICT can make a difference in agricultural livelihoods

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Agriculture is an important sector with the majority of the rural population in developing countries depending on it. The sector faces major challenges of enhancing production in a situation of dwindling natural resources necessary for production. The growing demand for agricultural products, however, also offers opportunities for producers to sustain and improve their livelihoods. Information and communication technologies (ICT) play an important role in addressing these challenges and uplifting the livelihoods of the rural poor. This article explores the potential contribution of ICT to the livelihoods of small-scale farmers and the efficiency of the agricultural sector in developing countries.

In recent years, the International Institute for Communication and Development (IICD) in the Hague, the Netherlands, has been engaged in projects that focus on the use of ICT in the agricultural sector. The experiences of IICD and other organisations form the basis for the recommendations for future action in Commonwealth countries.

Opportunities and challenges in the agricultural sector

The agricultural sector is confronted with the major challenge of increasing production to feed a growing and increasingly prosperous population in a situation of decreasing availability of natural resources. Factors of particular concern are water shortages, declining soil fertility, effects of climate change and rapid decrease of fertile agricultural lands due to urbanisation.

However, the growing demand, including for higher quality products, also offers opportunities for improving the livelihoods of rural communities. Realising these opportunities requires compliance with more stringent quality standards and regulations for the production and handling of agricultural produce. New approaches and technical innovations are required to cope with these challenges and to enhance the livelihoods of the rural population.

The role of ICT to enhance food security and support rural livelihoods is increasingly recognised and was officially endorsed at the World Summit on the Information Society (WSIS) 2003-2005. This includes the use of computers, internet, geographical information systems, mobile phones, as well as traditional media such as radio or TV. Although it is a relatively new phenomenon, evidence of the contribution of ICT to agricultural development and poverty alleviation is becoming increasingly available. Since 1998, IICD has been involved in projects and policy trajectories and consistently monitors the progress and impact of the use of ICT.

Enhancing agricultural production

Increasing the efficiency, productivity and sustainability of small-scale farms is an area where ICT can make a significant contribution. Farming involves risks and uncertainties, with farmers facing many threats from poor soils, drought, erosion and pests. Key improvements stem from information about pest and disease control, especially early warning systems, new varieties, new ways to optimise production and regulations for quality control.

Improving market access

Awareness of up-to-date market information on prices for commodities, inputs and consumer trends can improve farmers' livelihoods substantially and have a dramatic impact on their negotiating position. Such information is instrumental in making decisions about future crops and commodities and about the best time and place to sell and buy goods.

In many countries, initiatives have appeared that seek to address this issue. Simple websites to match offer and demand of agricultural produce are a start of more complex agricultural trade systems. These sites tend to evolve from local selling/buying websites and price-information systems, to systems offering marketing and trading functions.

Typically, price information is collected at the main regional markets and stored in a central database. The information is published on a website, accessible to farmers via information centres. To reach a wider audience, information is broadcast via rural radio, TV or mobile phone, thereby creating a 'level playing field' between producers and traders in a region. In Sri Lanka, the Govi Gnana project displays prices on light boards at major markets.

The sustainability of these systems requires attention, with an important role for the private sector and organised producer groups. Web-based trading platforms offering one-stop shop facilities are emerging, especially for main commodities. In India the private sector-led Agriwatch (www.agriwatch.com) and eChoupal programme (www.itcportal.com/ruraldevp_philosophy/echoupal.htm) support several million farmers with price information, tender and transaction facilities. In recent years, short message and text services have taken up and effectively deliver prices and trading information via mobile phone to farmers, for instance in Senegal, Benin, and Zambia.

The set-up of price and market information systems has been piloted by IICD in Bolivia, Uganda, Tanzania and Ghana. Partner organisations are supported in adding ICT to core processes. In Ghana, IICD supports the Social Enterprise Foundation of West Africa (SEND) in linking rural soybean producers to mills, through the use of satellite, databases and mobile phones, thereby ensuring a fair income for producers and a steady supply of raw materials for the mills.

Capacity-building and empowerment

Communities and farmer organisations can be helped through the use of ICTs to strengthen their own capacities and better represent their constituencies when negotiating input and output prices, land claims, resource rights and infrastructure projects.

ICT enables rural communities to interact with other stakeholders, thus reducing social isolation. It widens the perspective of local communities in terms of national or global developments, opens up new business opportunities and allows easier contact with friends and relatives.

A role is also played by ICT in making processes more efficient and transparent. It helps in making laws and land titles more


VSAT inspected by local Ghanaians for SEND Foundation, Ghana.

Manobi and IICD working together on market price information, Senegal.

accessible. Global Positioning Systems (GPS) linked to Geographical Information Systems (GIS), digital cameras and internet, help rural communities to document and communicate their situation.

Rural communities benefit from better access to credit and rural banking facilities. Recent mobile banking initiatives offer further scope to reduce costs and stimulate local trade. The Indian AMUL programme automates milk collection and payments for its 500,000 members, thereby enhancing transparency of the milk volume and quality collected and ensuring fair payments to farmers.

Conditions for a conducive enabling environment

For information and knowledge to be effectively used by rural communities several conditions should be met:

ICT in agriculture sector plans

Increasingly governments realise the necessity to link ICT and agriculture and incorporate ICT in agricultural sector policies and programmes. IICD has been supporting policy processes in Bolivia, Ghana and Jamaica in which national ICT for Development (ICT4D) networks play a key role.

Need for relevant agricultural information

It is generally accepted that information to sustain and increase agricultural production is spread over different agencies, notably farmers, universities, research institutes, extension services, commercial enterprises, and non-governmental organisations (NGOs). However, this knowledge is often poorly documented or hard to access. IICD promotes documentation of local agricultural practices in indigenous communities in Bolivia. Other organisations attempt to capture local knowledge, such as the Honey Bee programme in India.

If the information does not exist, intermediary organisations can help to generate it, make it accessible and influence research agendas. The TeleSupport project active in two Indian states collects farmers' questions. Answers from local research institutes and universities are then repackaged on video and in local language, stored online (www.telesupport.org) and fed back into the local community.

Timely information available in appropriate formats

Information on technologies is predominantly only available in hardcopy form or in stand-alone databases. Data are often incomplete or not compatible with other sources. Local knowledge on good practices and lessons learned about innovations is generally not captured.

Economies of scale can be realised through the use of shared platforms using common standards. Information should be presented in an appropriate format in order to be effectively used by rural communities. Messages through videos in local languages have proved to be effective. At this point in time, combining old and new media is most successful, such as videos of good practices, rural theatre, TV and radio broadcasts, which all provide input for local innovation. For example, a Ugandan IICD partner project effectively uses a drama group to convey messages to rural communities. IICD also supports the Zambian Ministry of Agriculture and Co-operatives in making research information available by combining textual and visual media in English and local languages. As information is increasingly stored online, it is accessible time and again.

Institutional mechanisms and human capacity to link rural communities

There is a huge gap between information residing in agricultural knowledge centres and rural communities. At local level, multi-stakeholder mechanisms are important to make relevant information accessible to end users. Intermediary organisations have to connect rural communities to available knowledge. Users will increasingly want tailor-made, quality answers to their questions. In the Agricultural Clinics in India and Chile's online advisory service, customers get answers within one to two days. Mobile Q&A services are being piloted in India.

At national level, mechanisms need to be in place to ensure learning and information sharing. In nine countries, IICD supports national ICT4D networks that play an important role in knowledge sharing, bringing various stakeholders together, and engaging in policy dialogue.

Rural access and exchange mechanisms: connectivity and telecentres

The type of ICT used by local communities is subject to rapid change. However, broadband internet access is seen as central for societal innovation because storing of large datasets and live communication requires good connectivity.

Until recently, connectivity in rural areas was limited to slow dial-up lines. Satellite connections now make broadband access possible in remote areas. Use of mobile phones has seen an enormous increase in recent years, especially in rural areas in Africa. Nevertheless, big differences still exist in broadband access between developed and developing countries, with Africa having only three per cent of global broadband users. New wireless technologies such as MESH and WiMAX, and new-generation mobile phone networks, will provide high speed internet services at sharply reduced costs, thereby dramatically increasing internet coverage in rural areas. Various access tools

are converging, becoming cheaper and more flexible. New mobile phones and laptops provide omnipresent access with ample functionality for communication, transactions and transfer of data.

The National Alliance for Mission 2007 and the Common Service Centre Scheme to establish telecentres country-wide in India are clear examples of the government's dedication to enhance rural access. In Ecuador and Bolivia IICD has supported NGOs to set-up telecentres in remote areas based on very small aperture terminals (VSATs) with shared cost of access. This is replicated and upscaled at national level.

Ensuring sustainability is a major challenge. Cost-sharing arrangements between local stakeholders, such as health centres, farmers' organisations, schools and local governmental bodies, are taking place. Also, payments for local services can generate revenues to sustain telecentres. Price information projects in India report that farmers are willing to pay for price information from the gains made through access to it. Rural information centres also provide a learning environment for farmer groups on the use of ICT but also on jointly solving problems in their livelihoods.

Lessons learned and recommendations

The social and political environment within which ICT projects operate is crucial and supportive policies and measures are required. Awareness-raising, developing functional systems and capacities of stakeholders are processes that require time. A general lesson from initiatives that employ ICT for agricultural development is that successes are possible, but that programmes must be designed and implemented with care. Success is not derived automatically from inserting ICT into isolated, poor communities.

In a 2006 survey IICD analysed the use of ICT in agriculture in over fifty supported projects. End users clearly indicated that awareness-raising and training are highly valued and lead to empowerment. Rapid impact in terms of increased income is registered in projects on price information and market access whereas more indirect impact was found in projects focusing on agricultural production, which is to be explained by the time needed to generate relevant content and integrate this into the production process (www.iicd.org/articles/booklet-impact-agric).

There is ample potential for effective use of ICT in agriculture and initiatives are promising. However, much still remains to be done. Several future trends of great importance are:

- Converging of media and tools for communication
- Increased web-based storage of agricultural information
- Cheaper and improved connectivity for rural communities
- Increased recognition by governments of the importance of the use of ICT in rural development
- Increased tailor-made, quality agricultural information services.

Based on experiences and trends, the implementation of these following recommendations can help realise the full potential of ICT in agriculture and improve rural livelihoods:

Foster strategies and programmes with a long-term perspective. ICT should be integrated into agricultural sector policies and lead to supportive programmes.

Create multi-stakeholder mechanisms for learning. Institutional mechanisms, especially multi-stakeholder networks, should be in place to foster learning and exchange of information at various levels: 1) at local and sub-national level, linking rural communities with universities, research agencies through intermediary organisations, and, 2) at national levels to share knowledge and lessons learned and support the policy process.

Raise awareness on the role of ICT4D in poverty alleviation. Since the use of ICT in agriculture is still a new and rapidly changing area, there is a need to raise awareness among governments, other national stakeholders and the international donor community on the potential.

Ensure availability and access to relevant information:

- Put policies into place that systematically capture local knowledge, ensure appropriate research agenda setting and support the functioning of intermediary organisations
- Digitise information of various stakeholders and stimulate the use of shared web-based platforms
- Foster the adaptation of information into formats and languages relevant for rural users
- Foster public-private partnerships to make market and business information accessible.

Enhance rural access:

- Ensure low prices for broadband internet in rural areas
- Foster combined public-private efforts and cost sharing arrangements to ensure sustainability of rural information centres
- Foster awareness-raising and capacity-building of rural communities to use and maintain ICT
- Support technical innovations for rural connectivity, such as wireless broadband connections or solar powered systems.

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The **International Institute for Communication and Development** (IICD) creates practical and sustainable solutions that connect people and enable them to benefit from ICT. As an independent not-for-profit foundation, it puts knowledge, innovation and finance to work with partners from the public, private and not-for profit sectors. IICD is active in Africa, Latin America and the Caribbean, where it creates and enhances development opportunities in education, good governance, livelihoods, health and the environment. The approach includes linking local, national and international organisations as well as formulating and implementing ICT-supported development policies and projects.

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