

How Can Agricultural Extension Best Harness ICTs to Improve Rural Livelihoods in Developing Countries?

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Introduction

Various forces are at work to change agricultural extension from a process of technology transfer (research institution to farmer) to a process of facilitating a wide range of communication, information, and advocacy services (demand-driven, pluralistic and decentralized extension). The focus of this change is on the improvement of overall rural livelihoods versus a specific focus on agriculture.

In the midst of this change, extensionists are grappling with the question of how best to harness information and communication technologies (ICTs) to improve rural livelihoods. This paper attempts to provide some answers.

A key challenge facing extension planners and policy makers is how to grapple with subject matter and policy issues that are not strictly in the domain of agriculture, in order to enable agricultural extension to harness ICTs. To address this challenge, extension planners and policy makers need to be equipped with analysis and arguments to bolster the case for agricultural extension playing a broader role in helping harness ICTs.

ICTs and Rural Livelihoods – More Than Just Agriculture

By focusing on how agricultural extension can harness ICTs for improving rural livelihoods, we need to move beyond narrow understandings of agriculturally specific ICT applications. This change in focus causes us to recognize that:

Any ICT intervention that improves the livelihoods of poor rural families will likely have significant direct and indirect impacts on enhancing agricultural production, marketing and post-harvest activities – which in turn can further contribute to poverty reduction.

There are no blueprint approaches for ICTs or magic bullet ICTs that will automatically improve rural livelihoods. Developing countries each have location-specific agricultural and rural development constraints and opportunities, and country-specific telecommunication constraints and opportunities. The skills and resources of stakeholders need to be harnessed to determine, plan and implement appropriate ICT interventions to improve rural livelihoods. This is particularly important given two important trends:

- the trend toward decentralizing, privatizing and pluralizing the delivery of extension, and
- the trend toward liberalizing telecommunication marketplaces in favour of competitive, multi-service provider, multi-service marketplaces.

These two trends combine to provide opportunities to more effectively harness ICTs for extension and rural development policy, program and delivery synergies, provided that extensionists are able to move beyond an agriculture-specific role. Re-thinking organizational end goals in this way could prove a challenge for agricultural extension decision-makers and their organizations, but that the challenge must be faced if ICTs are to be used effectively.

ICT interventions do not have to be specific to agriculture in order to enhance rural livelihoods or contribute to improved agricultural production. Indeed, a simple ICT intervention such as provision of an accessible rural payphone can play a significant role in enhancing the ability of poor rural families to continue, and perhaps enhance their contribution to national agricultural production and post-harvest activities.

ICT interventions that improve the general livelihoods of poor rural families have the potential to enable those families to:

- free up time for agricultural work through information or services which help improve family health and well-being;
- provide access to household capital which can be leveraged for agricultural production or post-harvest improvements; and
- enable rural families to better take advantage of remittance economies for enabling family members to live elsewhere and send capital home to improve agricultural work and other livelihood activities.

Improved access to credit, educational activities, health care services, or improved non-agricultural rural business activities can also yield significant improvements in the agricultural sector when families are able to enhance their overall livelihood strategies. The end goal of these ICT interventions is not improved agricultural production or post-harvest activities. The end goal is poverty reduction in the context of improved livelihoods, recognizing the clear importance of the rural family as the hub of agricultural production in areas of poverty, and within national economies.

Rural Livelihoods – “New” Actors in Extension Systems

An increasing diversity of stakeholders in extension programs places a heightened importance on coordination and communication, neither of which is possible without access to basic telecommunications services like the telephone. This widening group of “new” actors in extension systems includes:

- Farmer as both extension client and extension provider
- Linkage, learning and knowledge management facilitators
- Private sector players
- Market players and market information providers
- NGOs, CBOs, and private sector providers
- Health, education, environment, and other sector players
- Telecommunication players

Extension organizations have a key role in brokering between communication technologies, providers of those technologies and services, and the client groups they serve. In this role, they must be able to examine the appropriateness of various ICTs, the accessibility of ICTs in rural and remote areas, how to best to reconcile costs and benefits, and how to insure that ICT access includes a diversity of cultures, languages, social strata, and age groups, and is gender sensitive.

It thus becomes important to better understand the specific actors who play (or should play) a role in establishing basic telecommunication services in rural areas. Identifying the actors can help orient projects and programs that would lead them to effectively and collectively engage in dialogue around telecommunications policy reform and other ICT policies and programmes. These actors include:

1. telecommunications service providers (also know as operators);
2. regulators and policy-makers;
3. telecommunications policy reform advocates (most often found in, and focused on urban service issues, and sometimes nascent in rural areas);
4. rural clients (current and potential);
5. “Last Mile” entrepreneurs – phone shop operators and cybercafe/telecentre operators; and
6. extension managers and other professionals who deliver rural services.

Addressing Connectivity Constraints in Rural Areas – Key Policy Role for Extension

The call for demand-driven extension opens the door for examination of how ICTs can be cost-effective and practical tools for facilitating and channeling farmers’ demands, and addressing those demands. But when so many rural areas of developing countries lack basic telecommunications services that support so many key ICTs like the telephone and the Internet, this examination is severely challenged. Any resulting programs and projects remain totally dependent on the strength of national policies and programmes that support universal access to telecommunication services. Telecommunication policy rises to the surface as a primary enabler - or obstacle – to improving agricultural extension services.

While there are many uses for ICTs for facilitating communication, information and advocacy services in the context of improving rural livelihoods, connectivity constraints

in rural areas of developing countries are still an enormous barrier to the uptake of even basic ICTs such as the telephone.

In that regard, extension has an important role to play in facilitating and brokering the participation of rural and agricultural organizations in policy dialogue on telecommunications reform in order to shape national telecommunications policies and programs to meet the needs of rural areas. This is a very new role for extension.

Questions Facing Extensionists with Regard to ICTs

There are many ICT related questions that extensionists are now addressing. Some of these are listed below, with responses drawn from the literature:

- What role will the Internet and other new ICTs play in rural and agricultural development given the changes facing agricultural in general and agricultural extension specifically?
 - Response: Local organizations and groups require a voice to highlight their judgement on ICT priorities and implementation of policies, programmes and projects so as to negotiate on equal footing with outsider institutions in choices of communication for development approaches and media choices (Ramirez, 1998). Extension can play a role in helping catalyze and support this voice;
 - Response: Cultural and social sensitivity to the use of ICT tools for educational and informational purposes are critical. The launching of ICT projects needs to be accompanied by advocacy so that communities are aware of the purposes and people have a clear understanding of their roles, and in particular how they will part of decision making about objects, applications, content, etc. (Michiels & Vann Crowder, 2001). Extension can support and advocate for rural stakeholder participation in ICT project planning, implementation and evaluation.
- Who will benefit? Who should benefit?
 - Response: Local people and their needs should be the driving force behind ICT projects and not the projects, or the technology (Richardson, 1996). Participatory extension planning techniques have a very important role to play.
 - Response: ICT programme design should reflect an understanding of the different ways in which individuals and groups learn, communicate and use information; without incorporating this understanding, programmes are likely to fail (Anderson et al., 1998);
 - Response: Choices of communication technologies and methods to employ them can only be determined with the participation of all relevant stakeholders (Michiels & Vann Crowder, 2001; Ramirez, 1998; Batchelor & Sugden, 2003);

- Response: Identifying and supporting local champions who support information sharing, is key to the success of communication for development efforts (Richardson, 1998).
- What is the role for agricultural extension as a broker between rural and agricultural client groups and telecommunication infrastructure providers, regulators, and policy makers?
 - Response: External institutions seeking to enable local organizations and groups to participate in ICT initiatives need to establish a rapport with the local groups to enable a trustful, learning relationship to emerge (Ramirez, 1998). *Extension is well placed to play the role of convener in the establishment of ICT infrastructure.*
 - Marry the use of new ICTs with existing technologies, especially rural radio (Richardson, 1997).
 - Response: Collaboration among agencies supporting traditional media and new ICTs can achieve important multiplier effects as agencies harmonize their efforts (Richardson, 1997).
- Are there adequate software and hardware, and support, available in the countries or regions we serve?
 - Response: Simpler technology often produces better results. Telephone access and use can add considerable value to the communication systems of the poor in developing countries (Batchelor & Sugden, 2003; Richardson, 2003). Basic telephone connectivity to rural areas remains a huge need and priority;
 - Response: Using Internet technologies as a stand-alone communication medium is not usually a cost-effective choice for effective communication for development initiatives (Batchelor & Sugden, 2003).
- What types of training, planning, and financing is required to advance appropriate ICT access?
 - Response: Local organizations and groups capable of acting on rural and agricultural development plans require new skills and knowledge to make informed choices about communication for development approaches and media choices. Capacity building and institutional strengthening for intermediary organizations that serve rural and agricultural development is necessary so that they can make the most appropriate and creative use of traditional media and new ICTs (Michiels & Vann Crowder, 2001); (Richardson, 1997).

The use of ICTs in extension provides for several key benefits in relation to traditional media. However, ICT projects also come with a range of weaknesses. A brokering role for agricultural extension could help balance strengths and weaknesses. Potential strengths and weaknesses are listed below.

Key strengths:

- a new range of additional media that can be part of the communication for development “mix” of traditional and/or appropriate media;
- where accessible, these new media have features that enable bottom-up articulation and sharing of information on needs and local knowledge;
- can increase efficiency in use of development resources because information is more widely accessible;
- can result in less duplication of activities because information is more widely accessible
- they tend to reduce communication costs (often dramatically) in comparison to other available communication choices;
- they provide global access to information and human resources; and
- rapid speed of communication - locally, nationally and globally.

Key weaknesses:

- can lead to technological dependence;
- capital cost of technologies, and the cost of on-going access and support can be high;
- there is an inherent need for capacity building;
- lack of accessible telecommunication infrastructure in many rural and remote areas severely limits available choices of new ICTs;
- many ICT projects are characterized by poor and non-participatory planning;
- funding agencies often de-rail potentially useful project by a continued desire for “magic bullet” solutions, or projects that showcase technologies and agency icons;
- there is a funding agency orientation to “proprietary” technological solutions when available tools and applications can yield better and cheaper results;
- funding agencies often want to showcase tangible capital projects over less tangible, but more meaningful communication processes;
- ICT projects often lack attempts to integrate with existing media, and local communication methods and traditions; and
- ICT projects often lack of involvement of all stakeholders in planning - especially women and youth.

Cases studies presented at the Technical Centre for Agricultural and Rural Cooperation’s (CTA) 6th Consultative Expert Meeting of its Observatory on ICTs (held in the Netherlands in September 2003) (CTA, 2003) revealed some promising trends in the way that agricultural extension stakeholders at all levels are harnessing ICTs for sustaining rural livelihoods and reducing rural poverty. These trends include:

- increasing recognition of the need for multi-stakeholder planning approaches for ICT projects;
- increasing accessibility of affordable telecommunication infrastructure, especially in rural areas of developing countries that have undergone telecommunication

- regulatory reform that leads to increased competition among service providers and the establishment of universal access policies and programs;
- increasing recognition of collaborative and participatory processes in development, a trend which dovetails well with the strengths of ICTs;
 - increasing recognition of agricultural and/or rural development goal/strategy congruence with use of ICTs;
 - greater focus on the sustainable livelihoods approach which emphasizes stakeholder “voice” and role in policy/program formation;
 - increasing use among development agencies, of Internet and telephone based services for “one-stop shopping” for information and knowledge sharing;
 - increasing orientation among development agencies for institutional partnerships around regional development initiatives;
 - increasing use of database driven websites to make information sharing and access easier;
 - increasing use of streaming media to make non-text (video and audio) information more widely available to audiences who may not be literate;
 - increasing use of interactive applications over one-way communication tools;
 - higher expectations and higher demand among experienced ICT users;
 - increasing use of call centre, telephone-based services (voice information services and text messaging content);
 - increasing attention to ICT training for staff responsible for agricultural and rural development;
 - increasing use of private sector cybercafes and private sector telephone systems vs. proprietary sites for information access; and
 - increasing recognition of the Internet as tool for supporting informal learning.

There is a need to temper enthusiasm about the potential use of new ICTs with a reality check on the availability of basic telecommunication services in rural and remote areas: rural connectivity is a critical issue.

One way to improve the situation is for agricultural extension practitioners to get more actively involved in rural telecommunication policy advocacy efforts.

Evidence shows that even small efforts to put rural telecommunication policy on the national agenda can have big results. Civil society advocacy efforts to improve telecommunication policy and bridge the digital divide in El Salvador, Guatemala, Trinidad & Tobago, Canada and Australia have yielded impressive results (Richardson, 2003).

However, as a recent Panos report (Shanmugavelan and Wariock, 2004) states:

“In the midst of the current enthusiasm for ‘ICTs for development’, it is often forgotten that most rural Africans do not yet even have access to telephones... In most of rural Africa, there is only one telephone for every thousand people. It is true that the number of phones in Africa has risen enormously in the past decade, especially since liberalization [of telecommunication markets], but most of the new telephones are mobiles, and they

are mostly in cities. For rural people, buying and using a mobile phone is very expensive – a single call can cost as much as half the daily wage of an agricultural worker.”

The organizations that best represent rural stakeholders - rural and agricultural organizations, and agricultural extension organizations specifically - are often absent from national policy dialogues that help create and or shape positive universal access policy change. If they are not part of national policy dialogue, universal access policies, programs and regulatory reform initiatives risk neglecting the needs of the very people the initiatives are meant to serve. There are several possible reasons for this absence:

- rural and agricultural organizations are not directly invited to take part in national ICT policy dialogues;
- the principals of these organizations have not had the opportunities to learn about effective universal access policies and regulatory instruments that, if implemented by their governments, would significantly benefit their members;
- the principals of these organizations have not had the opportunities to learn about the advocacy and policy dialogue experiences, strategies and successes of their peer organizations in other countries
- ICT institutional and human capacity building efforts are often focused on government and regulatory bodies, and not on civil society actors; and
- the modest financing needed for capacity building efforts that will empower rural and agricultural organizations to take part in on-going dialogue with policy-makers is often absent from national ICT programs.

According to Charles Kenny, an infrastructure economist with the World Bank (Kenny, 2001),

“Local communities need to be involved in the design of universal access programs by participating in decisions about particular information access outlets. Indeed, most studies find that the most effective way of ensuring the economic success of ICTs in rural areas is to encourage local participation and create social institutions in support of the new technologies. This can be achieved through a participatory approach, to complement technical and economic calculations of telephone placement.”

However, there is a great deal more that needs to be done to insure that policies and programmes for universal access to telecommunication services are indeed developed using participatory processes. Empowered rural and agricultural stakeholder organizations are fundamental to insuring that policies and programs meet the needs of the rural poor.

The process of developing universal access telecommunication policies and programs is an important role for regulators, and for rural and agricultural stakeholders. In order for universal access policies and programs to accurately reflect the needs farm families, rural stakeholders themselves must be engaged in meaningful dialogue with regulators and

government officials. The latter point cannot be stressed enough. And herein lies a critically important role for extension.

Too often, universal access programs and policies are developed with the distinct absence of the rural stakeholders those programs and policies are meant to benefit. Their absence often results in telecom services that do not meet their needs and therefore generate low revenues: a problem that perpetuates the belief that rural and remote telecommunication service provision is unprofitable. Where rural stakeholders and the organizations that represent them have taken active roles in shaping universal access policies, programs and services, the expansion of rural telecommunication services has been impressive.

With regard to the development of specific rural ICT programmes and projects, the “sustainable rural livelihoods” approach is a valuable conceptual tool. The concept of sustainable rural livelihoods requires that farm families at the basic level:

- Have the *capability* to perform basic functions to cope with stresses and shocks (financial, natural, health, etc.) and the ability to find and make use of livelihood opportunities, and in addition
- Have livelihoods and the assets on which their livelihoods depend.¹

The sustainable rural livelihoods approach helps draw attention to the fact that in order to improve the efficiency and effectiveness of the agricultural sector *and* contribute to poverty alleviation, ICT project investments should be directed to achieve the following measurable development **outcomes**. These outcomes will enhance the livelihoods of the people whose labour, skills, knowledge and resources make the agricultural sector function:

- ***increased farm family income*** (which is spent on agricultural livelihood improvements, investments in small businesses, shelter, and improvements in access to basic rural infrastructure such as electricity, potable water, telecommunications and waste management),
- ***increased farm family savings*** (which can be invested in livelihood strategies that directly or indirectly improve the efficiency and effectiveness of agricultural production)
- ***improved family health*** (related to improvements in income and food security, and relevant knowledge),
- ***greater access to education and training***,
- ***reduced vulnerability*** to unexpected losses and the effects of natural disasters
- ***reduced rural out-migration***,
- ***sustainable use of natural resources evidenced by the implementation of land ownership policies and procedures***

¹ The concept of sustainable rural livelihoods was first promoted in a book by Robert Chambers and Gordon Conway – “Sustainable Rural Livelihoods: Practical Concepts for the 21st Century” (1992), and has since formed the basis for many of the programs of the UK Department for International Development (DFID), and is used by many overseas development agencies to orient policies and programs.

- ***improved risk management decision-making at the farm level*** (where, for example, access to accurate information on market trends might encourage a farmer to invest in storing or processing a crop to yield a higher margin on the sale of the crop).

There are many bottlenecks that can impede the achievement of these livelihood outcomes. Investments in ICT infrastructure, services and projects should acknowledge and address these obstacles:

- challenges to the effectiveness and efficiencies of financial service organizations that serve the rural poor and agricultural producers;
- challenges to farm family access to financial services;
- legislative, policy and regulatory challenges which can impede the reach of financial services or impede their effectiveness with the rural poor;
- lack of, or poor quality, health, education, and agricultural extension training resources;
- policies, institutions or processes that impede the delivery or availability of health, education and training resources;
- government policies, institutions and programs which may not reflect the interests or extension needs of the rural poor;
- transportation, energy, telecommunication and other sector strategies which do address the real conditions of rural areas, ecosystem health, and provide mechanisms for the participation of the rural poor in the articulation, implementation, management and evaluation of strategies;
- rural community capacity to design, implement and manage community-based infrastructure;
- lack of private sector alternatives to public sector infrastructure provision;
- poor access to services and inputs for agricultural production, fishing and agro-forestry;
- impediments to local efforts to conserve resources and enhance biodiversity through direct actions;
- government policies, institutions and programs which might reform the supply of services, improve management, access to and governance of natural resources;

- lack of or weak environmental legislation and enforcement;
- government policies, institutions and programs which might improve market development efforts and also increase the value of agricultural, fishery and agro-forestry products;
- lack of policy and program support to improving the internal functioning of rural and agricultural NGOs, community based organizations, and cooperatives;
- policies that may actually legally prevent or hinder the formation of rural and agricultural civil society organizations;
- lack of policy and program support for extending the external (horizontal and vertical) links among organizations focused on enhancing sustainable rural livelihoods;
- lack of government policy and program attention to consultation with rural and agricultural civil society organizations;
- lack of access to information and communication technologies that supplement and/or enhance face-to-face relationships (horizontal and vertical).

A recent analysis (Richardson, 2005) of the fit between the sustainable rural livelihoods approach to determine specific ICT project themes yielded 7 appropriate project themes for improving rural livelihoods:

1. **Improving Universal Access telecommunication policies and programs** by empowering rural and agricultural stakeholder organizations so that they can participate in ICT and telecommunication advocacy efforts on behalf of rural people.
2. **Rural credit and rural financial services** - improvements in access, reach and flexibility through ICTs.
3. **“Louder” rural and agricultural stakeholder voices** using ICTs to yield improved access to decision makers to influence policies, regulations and procedures that directly impact rural livelihoods.
4. **More informed rural people and farmers** who can use information to make relevant decisions about livelihood strategies, thereby reducing disaster impact (flood, disease, drought warning and mitigation), and increasing income diversification
5. **Improvements in efficiency and effectiveness of rural service delivery** through strategic and multi-stakeholder ICT initiatives that cross the domains of health, education, agricultural extension, training and knowledge resources.
6. **Improved ICT planning capacities among civil society organizations** - to plan, implement and integrate ICTs into their overall services.

7. **Application of ICTs in land surveys and registration systems** to more efficiently record land titles, and register and transfer land holdings.

The rural livelihoods approach emphasizes analysis of gender roles in the maintenance and enhancement of family livelihoods. For example, at an international scale, women are twice as likely as men to be involved in agricultural activities. Women have principal roles in small holding subsistence farming, agri-business, and food processing. In most developing countries, women's income is significant to the rural household, and women are often the heads of rural households, especially where remittance economies are strong.

With regard to ICTs, there is a clear gender bias. Women significantly lag behind men in their access to, use and production of ICTs, and in rural areas countries, women are likely to be furthest removed from opportunities to harness ICTs. (O'Farrell, 2003a). Priority areas for gender, ICTs and extension (ibid) reflect the above development interventions, while shedding light on ways to incorporate gender:

- training that uses local resource people, such as women entrepreneurs who are interested in, and use, ICTs;
- opportunities to develop leadership capacity within farmers' organizations and rural women's and youth groups by engaging in ICT policy debates;
- local development and testing of content oriented to women and their needs;
- training of agricultural workers government and non-government organizations in gender issues and their application to the use of ICTs in agricultural extension and rural development;
- networking with other communities, countries and regions to share information and develop strategic alliances for advocacy and action.

The sustainable rural livelihoods approach applied to ICTs focuses on planning toward people and their strengths, on taking time to plan initiatives by benefiting from multi-stakeholder input, and taking a broader approach to harnessing ICTs that includes concerns about policies, institutions, and processes that may either help or hinder the rural poor in their attempts to enhance livelihoods.

Conclusion

The rural poor are the engines of agricultural production in developing countries. Agricultural production and post-harvest activities account for the primary livelihood assets and strategies available to the rural poor. Any bottlenecks to the general livelihood of the rural poor - health, disaster, education, lack of infrastructure, lack of financial services, and many others - will have significant impacts on agricultural production at the household, regional and national levels. ICT interventions that improve the general livelihoods of the rural poor may also yield significant agricultural development investments on the part of rural families.

ICTs can be harnessed to have a direct impact on enhancing both rural livelihoods and the agricultural sector in which the rural poor are immersed. However, ICT project investments driven by the “technology of the day”, or by approaches that neglect to analyze how ICTs can truly enhance rural livelihoods, are to be avoided. A full range of rural livelihood assets and strategies should be examined in to enable us to better understand the relationships between ICTs, agriculture and poverty reduction.

A variety of fairly straightforward rural ICT interventions may have greater impact on agricultural production and post-harvest activities than those that are strictly focused on agriculture. This is especially true of ICT interventions focused on extension of various financial services, provision of basic telephone access, and improved multi-stakeholder dialogue and louder rural/agricultural voices in the national policy and program context.

If extensionists equip themselves with analysis and arguments to bolster the case for agricultural extension playing a broader role in helping harness ICTs, they will be better able to harness information and communication technologies (ICTs) to improve rural livelihoods.

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