

ICTs – Transforming Agricultural Extension?

Report of the 6th Consultative Expert Meeting of CTA's
Observatory on ICTs

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Introduction

This CTA Observatory on information and communications technologies (ICTs) included 20 keynote presentations, regional overviews, and country and technical case studies that provided the basis for an exploration of the subject of the meeting: ICTs – transforming agricultural extension?

Participants drew attention to the fact that extension is being compelled to change from a process of technology transfer (research to farmer) to a process of facilitating and brokering a wide range of communication, information and advocacy services. Participants also noted the trend for extension to shift from agriculture-specific services to broader services to improve rural livelihoods.

Given these trends, participants focused on the following topics:

- Assessing the role and potential of modern ICTs in the context of changing paradigms and emerging new actors involved in agricultural extension
- Identifying challenges to, and constraints on, the increased use of ICTs in agricultural extension, and ways to overcome these constraints
- Articulating common principles, and developing a framework for the application of ICTs to improved pro-poor extension
- Establishing an inventory and state-of-the-art assessment of the use of ICTs in agricultural extension, including a collection of success stories and examples of good practice from ACP countries
- Specifying the implications for CTA's priorities and future interventions.

The programme consisted of:

- Pre-consultation email dialogue, August–September 2003
- Public programme, 23 September 2003
- Closed sessions, 24–25 September 2003.

In terms of integrating ICT within extension – particularly in the rural areas at the frontline of extension – connectivity constraints are still an enormous barrier to the uptake of even basic ICTs such as the telephone. Participants advised that extension has an important role to play in facilitating and brokering the participation of rural and agricultural organisations in a policy dialogue on telecommunications reform, in order to shape national telecommunications policies and programmes to meet the needs of rural areas.

Participants in the CTA Observatory were very cautious about blueprint approaches and 'technology-of-the-day' projects. African, Caribbean and Pacific (ACP) countries each

have location-specific agricultural and rural development opportunities, and country-specific telecommunications constraints. The skills and resources of stakeholders need to be harnessed to determine appropriate ICT interventions to improve rural livelihoods. This is particularly important given the global trend toward decentralising, privatising and pluralising the delivery of extension. Participants recognised that this trend provides opportunities to harness ICTs more effectively for policy, programme and delivery synergies.

For CTA, the meeting generated the following five recommendations:

- Engage in regional ICT policy awareness-raising workshops for managers and senior professional staff involved in extension services in ACP countries
- Produce simple fact sheets on the successful use of ICTs in agricultural extension
- Package multi-stakeholder planning approaches
- Develop ICT problem trees for bottleneck analysis
- Facilitate studies of the current status of the telecommunications regulatory environment in ACP countries.

Scope of this report

This summary report provides an outline of the main issues, developments and trends in agricultural extension, as they relate to ICTs, with a special emphasis on improving rural livelihoods. The report draws on the presentations, case studies and discussions from the CTA Observatory. In doing so, it highlights the potential for, and constraints to, using ICTs for agricultural communication and information exchange, and identifies implications of these issues for CTA.

The report addresses the following issues:

- How has the political environment for agricultural extension changed over the past few years?
- What new extension approaches are emerging?
- Which new groups of actors are emerging in the agricultural knowledge and information system?
- What are the main constraints to using ICTs to improve rural livelihoods and agricultural communication and information exchange?
- What are the main policy issues related to the use of ICTs for agricultural extension?
- What are some initiatives where the skills and resources of stakeholders are being harnessed to create appropriate and sustainable ICT interventions to improve rural livelihoods?

- What ICTs are being used in agricultural extension, and how have they been used in specific agricultural sectors to improve rural livelihoods?
- How can CTA help in addressing the constraints and policy issues within its mandate and thematic niche?

This summary report presents conclusions from the Observatory and highlights future directions and challenges.

ICTs and Agricultural Extension: What for?

Given the trend for extension to shift from agriculture-specific services to broader services to improve rural livelihoods (a trend that Observatory participants confirmed), this report examines ICTs and agricultural extension in the service of improving rural livelihoods. The report also draws attention to the challenge facing extension planners and policy-makers as they consider how to grapple with unfamiliar issues that are not strictly in the domain of agriculture, in order to enable agricultural extension to harness ICTs.

During plenary discussions, participants at the Observatory noted many times that ICTs in the service of improving rural livelihoods cannot be constrained only to agricultural extension. Participants described their objectives for agricultural extension as: having a strong focus on improving the wellbeing of rural communities and rural families; reducing poverty; sustaining environmental resources; and achieving food security. The broader context of improving rural livelihoods was a continuing theme. As Carl Greenridge (2003) noted in his opening address to participants, the important question is how to harness ICTs meaningfully to remedy the many ailments and challenges facing the rural poor.

In her presentation, Clare O’Farrell (2003a) highlighted the importance of a focus on rural livelihoods, noting that ICTs can be used to enhance rural livelihoods because they:

- Can empower rural people by amplifying their voices
- Are enabling tools that can help rural poor women and men to capitalise on emerging opportunities, especially in education and income generation
- Can be used to cushion shocks and disasters, such as disease and hunger.

This focus on rural livelihoods over agriculture-specific extension services was also a key theme of the pre-consultation email dialogue (Ballantyne and Bokre, 2003) which defined extension as aiming to:

- Improve the wellbeing of individuals and communities
- Change production systems so that they improve rural livelihoods and sustain the resource base
- Improve agriculture and the social, economic and political status of rural communities
- Improve the wellbeing of farm families
- Improve productivity and livelihoods for farmers
- Increase and improve farmers’ incomes and productivity on a sustainable basis
- Enhance farmers’ production

- Attain higher levels of efficiency in the farm enterprise
- Attain food security and improve rural livelihoods.

Participants also drew attention to the various trends that are shaping agricultural extension, and how those trends are encouraging rethinking of the aims for agricultural extension. In the past, agricultural extension has been seen as an approach for transferring technologies and practices to farmers, often in the context of commercial agriculture. Participants identified several major trends shaping the delivery of extension services, moving extension far beyond technology transfer:

- Dwindling government budgets for extension, leading to the privatisation of formerly public services
- Emergence of new service providers in the context of privatisation
- Increased differentiation among client groups and issue areas (private demand-driven extension for commercial farmers; public livelihoods-focused extension for poor and subsistence farmers; community management support for environmental and natural resource management challenges)
- User demand for effective and appropriate extension – related to higher expectations of rural communities and farm families, and their growing capacity to voice demands
- Globalisation and liberalisation of agricultural markets
- Increased presence of agri-business and commercialised farming
- Environmental imperatives
- Climate change
- Increased use of biotechnologies
- HIV/AIDS
- Access to new ICTs, including increased telephone and Internet access in rural areas.

Clive Lightfoot (2003) spoke to the Observatory about some of these changes and the challenges faced in addressing them, noting that the high expectations people have for extension today include:

- Efficient, demand-driven extension services based on partnerships between government and private sectors
- Farmers participating in extension programme formulation, implementation, monitoring and evaluation ensuring their needs are met
- Private sector, including non-governmental organisations (NGOs) and community-based organisations (CBOs), participating in extension service delivery in response to farmers' demands

- Farmers empowered through farmers' organisations and CBOs seeking services from both private- and public-sector providers and, over time, developing the ability to pay for such services.

Lightfoot (2003) challenged Observatory participants to develop operational procedures and guidelines, harnessing ICTs where appropriate, to:

- Facilitate multi-stakeholder collaboration and bring together partners – farmers, NGOs, private and public service providers, and local government – for demand-driven extension
- Nurture different approaches so that stakeholders organise demand-driven extension services in their own way
- Prioritise farmers' demands and target groups to maximise impact on poverty reduction
- Build local capacity – for farmers to articulate and communicate their demands; for extension service providers to respond to those demands; and for stakeholders to form multi-stakeholder collaborative partnerships
- Reach the poor – who are rarely well organised, who have little or no voice, and who need services such as health, education and credit that can be coordinated with the assistance of extension managers.

Greenridge, O'Farrell, Lightfoot and other Observatory participants helped to frame the key 'what for?' question resulting from the Observatory:

How can ICTs be harnessed within agricultural extension to contribute effectively and efficiently to improving rural livelihoods and reducing rural poverty?

Using the sustainable rural livelihoods approach to better understand 'What for?' and 'How?'

The concept of sustainable rural livelihoods is central to the discussion of ICTs and extension. The concept was first promoted by Chambers and Conway (1992) in *Sustainable Rural Livelihoods*, and has since formed the basis for many of the programmes of the UK Department for International Development (DFID), and is used by many overseas development agencies to orient their policies and programmes. The approach has been embraced by the UN Food and Agriculture Organization's ICT programmes, because the link between ICTs and rural livelihoods 'facilitates the acquisition and exchange of information by the poor necessary to develop relevant livelihood strategies; improves communication within and between the institutions responsible for making decisions that affect livelihood options; and empowers poor communities to participate in decision-making processes' (Batchelor and O'Farrell, 2003).

The sustainable rural livelihoods approach compels us to think outside the box of agricultural extension as an approach to transferring agricultural technologies and practices to farmers.

The concept of sustainable rural livelihoods provides a way of thinking about the objectives, scope and priorities for sustainable rural development. Sustainable rural livelihoods require that farm families 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
- Ability to maintain and improve livelihoods while maintaining or enhancing the assets on which livelihoods depend

(Adapted from Chambers and Conway, 1992).

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 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.

The efficiency and effectiveness of agricultural extension, in the context of poverty alleviation, is directly related to the achievement of specific and measurable sustainable rural livelihoods outcomes. Agriculture – defined as the production, processing and distribution of food, fish, forest products and fibre – is the sector from which most of the rural poor derive their income. This succinct definition (from the US Department of Agriculture, www.fas.usda.gov) incorporates the important ‘value-added’ dimension of agriculture, through which changes in the physical state of an agricultural product, or the manner in which a product is produced and segregated, help expand the customer base and revenues available to producers, processors and marketers. There will be ICT interventions that directly relate to the agricultural sector and that contribute to sustainable rural livelihoods outcomes. There will, however, be others that are not agriculturally specific, but that have the ability (perhaps even greater ability) to help rural families cope with stresses and shocks, and make use of livelihood opportunities.

Extension is typically seen as a service – public or private – that responds to the needs of farmers and rural people for knowledge they can use to improve their productivity, income and welfare, and to manage the natural resources on which they depend in a sustainable way. Extension brings information and new technologies to farming communities, allowing them to improve their production, income and standard of living. In the past, extension was seen primarily as a public service, institutionalised and organised by national governments. Today governments and public extension institutions are challenged to adopt diversified and pluralistic national strategies to build dialogue and collaboration among a variety of public, private, non-governmental and community-based entities to promote extension to improve rural livelihoods. They are further challenged to adopt a ‘rural extension commitment... whereby other, nonagricultural concerns are addressed – especially those relating to income-generation and the development of micro-enterprise but including health and other issues relevant to the

approximately 40 percent of people in the rural sector who do not work the land' (Rivera and Qamar, 2003: 1).

By focusing on how agricultural extension can use ICT to improve rural livelihoods, we need to move beyond a narrow understanding of agriculture-specific ICT applications. This change in focus causes us to recognise that:

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

The 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 in support of sustainable rural livelihoods and poverty reduction. Extension planners and policy-makers need to be equipped with analysis and arguments to bolster the case for agricultural extension playing a broader approach in adopting and using ICTs.

Beyond agriculture – a broader approach to extension and ICTs

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 improving the general livelihood of the rural poor – lack of health provision, disasters, lack of education, lack of infrastructure, lack of financial services, and many others – will have significant impacts on agricultural production at 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.

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 that help improve family health and wellbeing
- Provide access to household capital which can be leveraged for agricultural production or post-harvest improvements
- Enable rural families to take better advantage of remittance economies, enabling family members to live elsewhere and send capital home to improve agricultural work and other livelihood activities.

Improved access to credit, educational activities, healthcare services, and 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, recognising the clear importance of the rural family as the hub of agricultural production in areas of poverty, and within national economies.

Rethinking organisational end goals in this way could prove a challenge for agricultural extension decision-makers and their organisations – but the challenge must be faced if ICTs are to be used effectively.

Global Trends in Extension: Potential Roles for ICTs

User demand for effective and appropriate extension

Amidst the changes facing extension, there is growing recognition that farmers and members of rural communities have needs for information and appropriate learning methods that are not being met (Greenridge, 2003; Lightfoot, 2003). Louder voices are being heard from rural and agricultural stakeholders, creating interest among governments and donors in supporting demand-driven extension.

Over the past 20 years, the dominant donor-supported extension approach has been public sector provision of the training and visit system (T&V). While the system is supposed to incorporate feedback from farmers, farmers are often passive recipients of didactic instruction. Messages are typically based on perceptions of farmers' needs, or on the requirements or desires of public sector agencies. Evaluation research demonstrates that T&V has not proven itself to be a system that meets the demands of users for appropriate content and learning methods (World Bank, 1999).

Demand-driven extension involves a shift from public sector extension delivery to a negotiated system through which farmers and rural community members determine and identify their own needs, and have some control over the financing of extension services which are delivered by public, private, NGO or farmers' organisation providers. This approach may ensure that the delivery agencies are ultimately accountable to the client. However, 'pluralistic information flows between farmers and providers of agricultural information often experience weak linkages. These have affected communication of agricultural information, consequently causing major "bottlenecks" in national agricultural technology systems and limiting their effectiveness in contributing to agricultural development' (Kiplang'at, 2003: 4).

In some cases ICTs are playing a very important role in supporting and facilitating emerging models of demand-driven extension. Kiplang'at (2003) reports on experiences in Kenya, South Africa, Sri Lanka and elsewhere, noting that there are some important innovations, but there is still a long way to go before a meaningful impact on extension services is seen. He notes that the trend is to integrate conventional delivery systems, such as radio and television, with new ICTs using approaches that run counter to the linear and government-owned flow of information that dominated the T&V approach. The case studies presented by Kiplang'at highlight innovative partnerships, and the increasing role of telecentres run by entrepreneurs and NGOs as conduits for a variety of communications and information flow to and from rural communities.

Trends in extension services complement opportunities to influence national telecommunications policy

There is no single agricultural extension ‘magic bullet’ that will support demand-driven and/or decentralised/pluralistic extension, that also provides better ways to address the changes and challenges facing extension. The increasing diversity of stakeholders in extension programmes places increased importance on coordination and communication, neither of which is possible without access to basic telecommunications services such as the telephone. This widening group of ‘new’ actors in extension systems include:

- Farmers as both extension clients and extension providers
- 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
- Telecommunications players.

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

- Telecommunications service providers (also known as operators)
- Regulators and policy-makers
- Telecommunications policy reform advocates (most often found in, and focused on, urban service issues, and sometimes nascent in rural areas)
- Rural clients (current and potential)
- ‘Last mile’ entrepreneurs – phone shop operators and cybercafé/telecentre operators
- Extension managers and other professionals who deliver rural services.

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

Agricultural Extension: An ICT Broker

Extension organisations play a key role in brokering between communications technologies 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 ensure ICT access includes a diversity of cultures, languages, social strata and age groups, and is gender-sensitive.

Key questions raised during Observatory discussions included the following, with responses from participants that reflected statements from the literature.

Question: What role will the Internet and other new ICTs play in rural and agricultural development, given the changes facing agriculture in general, and agricultural extension specifically?

Response Local organisations and groups require a voice to ‘highlight their judgement on priorities and implementation 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 catalyse and support this voice.

Response Cultural and social sensitivity to the use of ICT tools for educational and informational purposes is 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, in particular how they will take part in decision-making about objects, applications, content, etc. (Michiels and Van Crowder, 2001). Extension can support and advocate for rural stakeholder participation in ICT project planning, implementation and evaluation.

Question: Who will benefit? Who should benefit?

Response Local people and their needs should be the driving force behind ICT projects – 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 communications technologies and methods to employ them can be determined only with the participation of all relevant stakeholders (Ramirez, 1998; Michiels and Van Crowder, 2001; Batchelor and Sugden, 2003).

Response Identifying and supporting local champions who support information sharing is key to the success of communication for development efforts (Richardson, 1998a).

Question: 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 organisations 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.

Response 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 harmonise their efforts (Richardson, 1997).

Question: 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 communications systems of the poor in developing countries (Richardson, 1999; Batchelor and Sugden, 2003). Basic telephone connectivity to rural areas remains a huge need and a 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 and Sugden, 2003).

Question: What types of training, planning and finance are required to advance appropriate ICT access?

Response Local organisations 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 organisations 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 (Richardson, 1997; Michiels and Van Crowder, 2001).

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:

- 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
- Tend to reduce communication costs (often dramatically) in comparison with other available communication choices
- Provide global access to information and human resources
- Rapid speed of communication – locally, nationally and globally.

Key weaknesses:

- Can lead to technological dependence
- Capital cost of technologies, and cost of ongoing access and support, can be high
- Inherent need for capacity-building
- Lack of accessible telecommunications infrastructure in many rural and remote areas severely limits available choices of new ICTs
- Many ICT projects are characterised by poor and non-participatory planning
- Funding agencies often derail potentially useful projects by a continued desire for ‘magic bullet’ solutions, or projects that showcase technologies and agency icons
- 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, local communications methods and traditions
- ICT projects often lack involvement of all stakeholders in planning – especially women and youth.

Cases studies presented at the CTA Observatory, and plenary discussions, revealed some promising trends how agricultural extension stakeholders at all levels are harnessing ICTs for sustaining rural livelihoods and reducing rural poverty. These trends include improvements in:

- Recognition of the need for multi-stakeholder planning approaches for ICT projects
- Accessibility of affordable telecommunications infrastructure, especially in rural areas of developing countries that have undergone telecommunications regulatory reform

leading to increased competition among service providers and the establishment of universal access policies and programmes

- Recognition of collaborative and participatory processes in development, a trend that dovetails well with the strengths of ICTs
- Recognition of agricultural and/or rural development goal/strategy congruence with use of ICTs
- Focus on the sustainable livelihoods approach, which emphasises stakeholders' voice and role in policy/programme formation
- Use among development agencies of Internet- and telephone-based services for one-stop shopping for information and knowledge sharing
- Orientation among development agencies for institutional partnerships around regional development initiatives
- Use of database-driven websites to make information sharing and access easier
- Use of streaming media to make non-text (video and audio) information more widely available to audiences who may not be literate
- Use of interactive applications over one-way communication tools
- Expectations and demand among experienced ICT users
- Use of call centres, telephone-based services (voice information services and text messaging content)
- Attention to ICT training for staff responsible for agricultural and rural development
- Use of private sector cybercafés and private sector telephone systems versus proprietary sites for information access
- Recognition of the Internet as a tool for supporting informal learning.

Agricultural extension: an advocate for ICT policy and regulatory reform

There is a need to temper enthusiasm about the potential use of new ICTs with a reality check on the availability of basic telecommunications services in rural and remote areas. If there was one clear message from the Observatory, it was this – **rural connectivity is a critical issue.**

One way to improve the situation is for agricultural extension practitioners to become more actively involved in rural telecommunications policy advocacy efforts. Many Observatory participants were supportive of a role for agricultural extension in the domain of rural telecommunications policy, and were keen to learn more.

Evidence shows that even small efforts to put rural telecommunications policy on the national agenda can have notable results. Civil society advocacy efforts to improve telecommunications policy and to 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 liberalisation [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 organisations that best represent rural stakeholders – rural and agricultural organisations, and specifically agricultural extension organisations – are often absent from national policy dialogues that help create and/or shape positive policy change towards universal access. If they are not part of national policy dialogue, universal access policies, programmes 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 organisations are not directly invited to take part in national ICT policy dialogues
- The principals of these organisations have not had the opportunity 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 organisations have not had the opportunity to learn about the advocacy and policy dialogue experiences, strategies and successes of their peer organisations in other countries
- ICT institutional and human capacity-building efforts are often focused on government and regulatory bodies, not on civil society actors
- The modest financing needed for capacity-building efforts that will empower rural and agricultural organisations to take part in ongoing dialogue with policy-makers is often absent from national ICT programmes.

According to the World Bank’s telecommunications group:

‘poverty reduction requires a clear understanding of the needs, priorities, demands, and pressures of the poor. Household and community surveys, and demand studies... are an important means of gaining this knowledge. *This is a first step in developing participatory universal access programmes*, which involve local communities in the design of such

development projects through demand assessments and by allowing them to participate in the decisions about the location of particularly information access outlets.’

However, there is a great deal more that needs to be done to ensure that universal access programmes are developed using participatory processes. Empowered rural and agricultural stakeholder organisations are fundamental to ensuring that policies and programmes meet the needs of the rural poor.

The process of developing universal access telecommunications policies and programmes is an important role for regulators, and for rural and agricultural stakeholders. In order for universal access policies and programmes accurately to 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 programmes and policies are developed with the distinct absence of the rural stakeholders who those programmes and policies are meant to benefit. Their absence often results in telecoms services that do not meet their needs, and therefore generate low revenues – a problem that perpetuates the belief that rural and remote telecommunications service provision is unprofitable. Where rural stakeholders and the organisations that represent them have taken active roles in shaping universal access policies, programmes and services, the expansion of rural telecommunication services has been impressive.

Using the rural livelihoods approach to focus ICT interventions for extension

The 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 towards achieving 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* (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 health indicators* (related to improvements in income and food security attained with relevant knowledge)
- *Family investments in education and training*
- *Reduced vulnerability* evidenced by indicators such as higher enrolment of young girls in school

- *Reduced rural out-migration*
- *Sustainable use of natural resources* evidenced by indicators such as reduced soil erosion
- *Better risk management decision-making at farm level* evidenced by indicators associated with the above outcomes.

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 organisations that serve the rural poor and agricultural producers
- Challenges to farm family access to financial services
- Legislative, policy and regulatory challenges that 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 programmes that may not reflect the interests or extension needs of the rural poor
- Transportation, energy, telecommunication and other sector strategies that neither address the real conditions of rural areas and ecosystem health, nor provide mechanisms for 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 programmes that might reform the supply of services, and improve management of, access to and governance of natural resources
- Lack of, or weak, environmental legislation and enforcement
- Government policies, institutions and programmes that might improve market development efforts and also increase the value of agricultural, fishery and agro-forestry products

- Lack of policy and programme support for improving the internal functioning of rural and agricultural NGOs, CBOs and cooperatives
- Policies that may legally prevent or hinder the formation of rural and agricultural civil society organisations
- Lack of policy and programme support for extending the external (horizontal and vertical) links among organisations focused on enhancing sustainable rural livelihoods
- Lack of government policy and programme attention to consultation with rural and agricultural civil society organisations
- Lack of access to ICTs that supplement and/or enhance face-to-face relationships (horizontal and vertical).

The seven most appropriate ICT project themes for improving rural livelihoods

The rural livelihoods approach yields seven most appropriate ICT project themes for improving rural livelihoods. (See Appendix I for a more detailed analysis of how these project themes are identified.)

- Improving **universal access telecommunications policies and programmes** by empowering rural and agricultural stakeholder organisations so that they can participate in advocacy efforts on behalf of rural people
- **Rural credit and rural financial services** – improvements in access, reach and flexibility
- **Louder rural and agricultural stakeholder voices** yielding improved access to decision-makers to influence policies, regulations and procedures that have a direct impact on rural livelihoods
- **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
- Improvements in **efficiency and effectiveness of rural service delivery** across areas of health, education, agricultural extension, training and knowledge resources
- Improved **ICT planning capacities** among civil society organisations – to plan, implement and integrate ICTs into their overall services
- Application of ICTs in **land surveys and registration systems** for more efficient recording of land titles, and registration and transfer of land holdings.

The rural livelihoods approach emphasises 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 smallholding 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 of and production of ICTs, and in rural areas of ACP countries women are likely to be furthest removed from opportunities to harness ICTs (O'Farrell, 2003a). Priority areas for gender, ICTs and extension reflect the above development interventions, while shedding light on ways to incorporate gender (O'Farrell, 2003a):

- Training that uses local resource people, such as women entrepreneurs who are interested in, and use, ICTs
- Opportunities to develop leadership capacity within farmers' organisations 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 NGOs 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 following case studies provide detail on some specific extension ICT project ideas and approaches which, when tied to best practices for ICT project interventions, can help improve rural livelihoods. These examples illustrate the benefits of a focus on people and their strengths; on taking time to plan initiatives by benefiting from multi-stakeholder input; and on 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.

Best Practice Examples: ICTs Harnessed for Improving Rural Livelihoods

The following examples of rural and agricultural development projects illustrate how people are harnessing of unique features of ICTs, incorporating best practices. Examples are provided from the NGO, government and private sectors. Examples that relate to ACP countries are coded with an asterisk (*).

Creating and improving universal access policies and programmes

***Women’s network undertakes National Consultation on universal access – Trinidad & Tobago**

The Network of Trinidad & Tobago NGOs for the Advancement of Women (APC, 2003b; Richardson, 2003) undertook a National Consultation relating to universal access; women in the ICT sector; the regulatory framework associated with the proposed Telecommunications Bill 2000; and training and human resource development. The consultations introduced the concept of sustainable human development values as a central element for policy debate. The virtual exclusion of women from the telecommunications decision-making process, related to the liberalisation of the national telecommunications sector, was a primary impetus for this National Consultation. The participants of the consultation and the network will continue to work as an advocacy group for telecommunications. Advocacy work around the National Consultation included a publicity and communications programme to bring the consultation to the attention of the wider public. A number of radio and television interviews were held, and television and newspaper advertisements and press releases were used to attract as wide participation as possible. The NGO also identified and wrote to over 200 stakeholders, sharing information with them about the consultation with a view to building alliances that would produce the desired outcome. Key outcome policy statements included:

- Governments should endeavour to develop the telecommunications infrastructure and services providing a liberalised and competitive environment, with open entry to stimulate the introduction of an increased range of services using state-of-the-art technology
- Governments should encourage investment in the sector from all appropriate sources by developing an enabling legal and regulatory framework, making it possible for the public and business users to obtain telecommunications services at fair prices that reflect economic cost and efficiency
- Integrating gender considerations into national ICT policy and implementation will not be achieved without strong, effective leadership from the state

- The concept of ‘tele-accessibility’, not ‘teledensity’, should now be embraced as a developmental indicator for the telecommunications sector
- Define and specify measurable goals and objectives for the sector, including contributions to achieving poverty alleviation, improvements in healthcare, food security, environmental protection, technological advances and human resource development.

The report on the National Consultation was formally presented to the Prime Minister of Trinidad & Tobago, and presented at the Summit of the Americas in Quebec City. Anecdotal information indicates that the National Consultation has had a significant influence on the Telecommunications Bill and the formulation of universal access programmes. The process used by the Network of Trinidad & Tobago NGOs for the Advancement of Women is well documented in its report, and elements of this process might be replicable in other countries.

***Association for Progressive Communication – support for civil society ICT policy advocacy**

The Association for Progressive Communication (APC) supports a number of initiatives for civil society ICT policy advocacy, including the following:

- The ‘APC Africa ICT Policy Monitor’ (www.apc.org/english/rights/africa/research.shtml), which has researched and published a series of country reports examining the role of civil society in advocating for improved national ICT policies, with special attention to universal access and rural coverage. The Policy Monitor’s primary goal is to enable civil society organisations to engage in ICT policy development. The project conducts research, and collects, interprets, produces and disseminates ICT policy information; builds the awareness and capacity of civil society to understand these issues; and assists civil society organisations to formulate their interest in ICT policy and to support their lobbying and advocating for policies. Among its initiatives, the Policy Monitor provides an extensive website for ICT policy resources (categories include gender, ICT policy, local content, and telecommunications); an email list; a quarterly *Chakula* newsletter on African ICT policy news, analysis and events; and links to detailed ICT statistics for several African nations
- ICT Policy for Civil Society Training Curriculum (APC, 2003a: www.apc.org/english/capacity/policy/curriculum.shtml). This is a set of well crafted training materials which allow trainers to build up their own workshops from the components provided. Materials include workshop handouts, lists of additional resources, trainers’ notes, PowerPoint presentations for workshop sessions, workshop exercises and workshop evaluation tools
- *APCWNSP Policy Guide for Gender and ICTs* (APC, 2004: www.apcwomen.org/summit/policy/wnsppolicyguide.html). This is a clear and succinct 10-point policy guide

- Significant publications, including *Involving Civil Society in ICT Policy* (APC/CRIS, 2003). Building on the experience of the ICT Policy for Civil Society Training Curriculum, APC and the Communication Rights in the Information Society Campaign (CRIS) published this key book for the World Summit on the Information Society, 2003 (www.apc.org/books/policy_wsis_EN.pdf). The book highlights the work of APC members in Asia–Pacific countries, and the work of the APC Women’s Networking Support Programme which has been participating in national, regional and international ICT policy work since 1993. Recommended actions include: (i) all stakeholders must promote equal opportunities for women and girls, and enable their active participation in agenda-setting and decision-making processes in the ICT field; (ii) donors, governments and the private sector must actively seek to support and build on the innovative practices and lessons of civil society actors, especially women’s organisations, that have sought to use ICTs to build a platform for women’s voices, for information sharing, to mobilise women, and to empower women by expanding on their livelihood strategies; (iii) the participation of civil society in the information society at all levels should be ensured and sustained, from policy planning to implementation, monitoring and evaluation.

Rural credit and financial services

***Uganda Women’s Finance Trust (UWFT)**

Clients of the Uganda Women’s Finance Trust are able to access their accounts at post office outlets across the country using a software package that was customised for UWFT. The LOAN PERFORMER programme was initially developed as the ‘Trust Information System’ and started as a DOS-based client data-entry programme in 1995. Later the client module was rewritten for Windows NT and Windows 2000 operating systems, and new modules were added. The Kampala Branch now has almost 15,000 clients and has registered over 150,000 savings transactions and 6000 loans in its database. Development at UWFT took about three years, from 1995 to 1998.

Established as a trust in 1984, UWFT began operations in 1987. The mission of UWFT is to economically empower low-income women by providing a consolidated package of products and services that include savings and credit. All of UWFT’s clients live below the poverty line, and 80% of them are rurally based. The majority of UWFT’s clients are in commerce (64%), with a smaller percentage in services (15%), agriculture (14%) and manufacturing (8%).

Development of the software product continues, and increasing numbers of organisations want their requirements incorporated in the program. Towards the end of July 1998, LOAN PERFORMER became available as a commercial product. Since then, many other Ugandan and non-Ugandan micro-finance institutions have started working with LOAN PERFORMER. The installed base to date is about 50 organisations with more than 100 sites. LOAN PERFORMER is now used by the Consultative Group to Assist the Poor (www.cgap.org) as one of 10 major off-the-shelf software packages for micro-finance institutions.

e-Choupal

www.echoupal.com

e-Choupal is a commercial agricultural communication and information dissemination network for Indian farmers. It was developed by ITC, one of India's leading private companies, with annual revenues of over US\$2bn (Annamalai and Rao, 2003). The model is designed to assist lead farmers (who act as local extensionists) at the frontline (the company providing the service) of the ITC supply chain with a variety of agricultural extension and market information.

Rural agricultural systems in India and elsewhere have traditionally been unfair to resource-poor agricultural producers. Middlemen extract significant profits, leaving farmers to accept very low prices for their produce. Farmers often have little information about real market prices, price trends and market conditions. 'As a result, traders are well positioned to exploit both farmers and buyers through practices that sustain system-wide inefficiencies.' (Annamalai and Rao, 2003)

Farmers access e-Choupal at village Internet kiosks, and use the system primarily for e-commerce. The word choupal means 'village gathering place' in Hindi. Farmers recruited by the company act as kiosk operators. According to one report (Sawhney, 2002) the results have been impressive:

'Within two years of its launch in June 2000, e-Choupal services reached 600,000 farmers in 6000 villages through 1000 kiosks. ITC, which exports \$140 million worth of agricultural commodities, sourced \$15m worth of soybeans from e-Choupal in the past year. By purchasing directly from farmers, ITC can source better quality produce that commands high prices in the international market. By avoiding intermediaries for conducting transactions, ITC saves \$5 per ton on soybean procurement. The sanchalaks (kiosk operators) receive a commission for every transaction they process, which translates into healthy earnings for them.

The farmers gain from better prices and lower transaction costs. Traditionally, farmers had to wait as long as two days to dispose of their produce at local auctions. They also had to pay for bagging, loading and unloading their produce in the local market. In the e-Choupal system, farmers take only a sample of their produce to a local kiosk and receive a spot quote from the sanchalak. If the farmers accept the quote, they can drive their produce directly to ITC's collection centres and be paid within a couple of hours. The average farmer saves between \$8 and \$10 per ton of soybeans. Farmers also benefit from improved information and price discovery. With help from their sanchalak, they can access real-time information on crop prices, weather and scientific farming practices online.'

The expansion of the network has been equally impressive. By mid-2003 the network was reaching more than 1 million farmers in about 11,000 villages through 2000 e-Choupal kiosks (Annamalai and Rao, 2003).

The system is focused on e-commerce transactions, but it also includes weather forecasts by district, agricultural market price information, agricultural news, news on

entertainment and sports, local news, agricultural extension information and best practices by crop, and a two-way farmer question-and-answer service where farmers can post questions and receive specific answers. The kiosks also act as village Internet cafes where users access their Yahoo and Hotmail accounts, use chat rooms, get the latest cricket news, and download music from the Internet.

An important aspect of e-Choupal is that it leverages existing assets and relationships (Annamalai and Rao, 2003). ITC's strong relationships with farmers and intermediaries, and its existing distribution and purchasing systems in rural India, have enabled it to make significant improvements in the agricultural supply chain.

According to the World Resources Institute (Annamalai and Rao, 2003), the key lessons from e-Choupal are:

- The e-Choupal model demonstrates that a large corporation can play a major role in recognising markets and increasing the efficiency of an agricultural system, while doing so in ways that benefit farmers and rural communities as well as shareholders
- Information technology can help in bringing about transparency, increased access to information, and rural transformation.

Critical factors in the apparent success of the venture are ITC's extensive knowledge of agriculture; the effort ITC has made to retain many aspects of the existing production system, including maintenance of local partners; the company's commitment to transparency; and the respect and fairness with which both farmers and local partners are treated.

ITC is expanding e-Choupal services in the areas of credit and insurance. Access to credit is a primary poverty alleviation strategy in all developing countries, and India is no different. New e-Choupal services are expected to include the following (Annamalai and Rao, 2003):

- *Credit report profiles* – ITC is working to create a database of information on farmer holdings and transactions to create a source of credit profiles. The absence of such profiles is a primary obstacle to accessing credit
- *Non-cash loans for farm inputs* – partnering with financial institutions, ITC will facilitate the purchase of farm inputs by financial institutions in the form of a loan that farmers pay back to the financial institution that purchases inputs on their behalf
- *Loans to sanchalaks* – kiosk operators will act as local loan officers, receiving loans from ITC and providing smaller loans directly to farmers. Because the kiosk operators have a better understanding of the credit-worthiness of local farmers, they are more likely to be able to reduce lending risks
- *Direct loans to farmers based on sanchalak recommendations* – where farmers receive direct loans, kiosk operators will receive commissions based on loan recovery as a way of reducing lending risks

- *Insurance and risk management services* – ITC plans to use the e-Choupal network to provide simple insurance products and facilitate premium payments.

The telecommunications systems in rural India are notoriously poor. Telephone systems, where they exist, are virtually incapable of providing Internet services due to antiquated telephone switches, power cuts, and a variety of transmission quality problems. To overcome this problem, ITC chose to use satellite-based ‘very small-aperture terminal’ (VSAT) technology. This is an expensive solution costing over US\$2000 for the capital cost of each installation, but it provides broadband Internet access at affordable operating rates. Solar battery chargers and uninterruptible power supply (UPS) systems provide power supply.

Louder Rural and Agricultural Stakeholder Voices

Networking

***Women of Uganda Network (WOUGNET)**

www.wougnet.org

WOUGNET is an NGO with a mission to ‘promote and support the use of ICTs by women and women’s organisations in Uganda, so that they can take advantage of the opportunities presented by ICTs in order to effectively address national and local problems of sustainable development.’

WOUGNET members face several challenges in developing strategies for the inclusion of Ugandan women:

- Access to the Internet is limited, especially for rural women
- Connectivity is still low across rural Uganda, and can be expensive
- Lack of electricity in rural areas
- Relevance of information to illiterate women
- Limited forms of information dissemination
- Language is an obstacle to some women
- Technophobia among some women, who feel that technology is for men
- Lack of technical skills
- Lack of computer equipment.

WOUGNET members are working to adapt the following creative strategies to address these challenges (WOUGNET, 2003, 2004):

- Face-to-face networking with local municipal councils
- Face-to-face networking with local CBOs
- Collaborating with local radio stations for announcements and discussions of issues (tapes can be used in other forums by NGOs and CBOs)
- Better use of the postal system
- Focal point volunteers in rural areas

- Print-outs of relevant information for local noticeboards, in local languages
- Redirection of emails in print form for distribution of relevant information to other organisations
- Public dialogues that are recorded and shared online
- Participatory theatre that promotes dialogue on issues discussed online
- Posters that promote awareness of issues discussed online
- Community mobilisation for action
- Training of volunteers to train others, especially women and girls, in the use of ICTs
- Use of alternative power sources, e.g. solar
- Community-based research to ensure provision of relevant information
- Advocacy for reform of government telecommunications and ICT policies to promote universal access
- Regular meetings within member organisations for information sharing.

More informed rural people and farmers

***Solomon Islands People First Network**

www.peoplefirst.net.sb

The Islands People First Network aims to facilitate equitable and sustainable rural development by enabling better information sharing and knowledge building among and across communities forming the Solomon Islands.

The project has established a connectivity system that permits remote locations to have Internet and email access using a computer, short-wave radio and solar power. The purpose of this telecommunications and information network is to assist the country, particularly low-income groups, in taking in charge of their own development through improved logistics, information and knowledge. The network also enables discussions around issues including gender rights and constitutional reform. Siosiua Halavatau, of the Secretariat of the Pacific Community, reported to the CTA Observatory that the network is enabling better rural and agricultural information sharing across the communities that form the Solomon Islands.

Organisationally, the Solomon Islands People First Network is established as a not-for-profit organisation within the Rural Development Volunteers Association (RDVA) through the Ministry of Provincial Government and Constituency Development. The project also plays a leading role in raising the profile of ICTs and telecommunications for development, and in assisting the government in formulating a national ICT strategy.

Evaluation research on the project indicates that it is having the following impacts:

- Providing affordable, sustainable communications to the rural population (85% of the 450,000 population) where no commercial penetration has yet been possible beyond the nine provincial centres
- Using the communications network, website and partnerships to enable better networking and information sharing, especially related to rural development and peace building
- Promoting the use of ICT in development at a national level.

The People First Network is a multi-stakeholder effort that links stakeholders in government, NGOs and private telecommunications service providers. Community participation is mobilised through the formation of management committees with membership drawn from all sections of the society, including education and health workers, women's group leaders, church elders, traditional chiefs, business people and others.

The project's monitoring and evaluation efforts reveal that 'the maximum appropriation/participation occurs when the communities have identified their own needs first, and then this need has driven the demand to participate in the People First Network project'.

A key resource provided by the project is an online database of over 300 rural micro-projects. The database is designed to enable project proponents, funding agencies and development support workers to leverage synergies between projects and promote collective project funding.



Figure 1: A People First Network community email station

*Manobi – Senegal

www.manobi.net

Manobi was highlighted at the Observatory by its Director, Daniel Annerose (2003). Manobi uses basic cellphones with wireless access protocol (WAP) and short messaging service (SMS) technology to provide members of Senegalese fishing communities, and fruit- and vegetable-grower farming communities, with up-to-date weather and market price information (Batchelor *et al.*, 2003). The goal of users is to secure higher prices from middlemen and improve the timing of entry to markets when demand is high and supply is low. Users are also able to reduce spoilage by locating buyers while goods are still fresh. The project has also contributed to the expansion of mobile telephone infrastructure in targeted towns (Batchelor *et al.*, 2003). The service integrates a variety of existing technologies, including voice telephone, web and personal data assistants (PDAs) to create a real-time data and information processing network (Annerose, 2003).

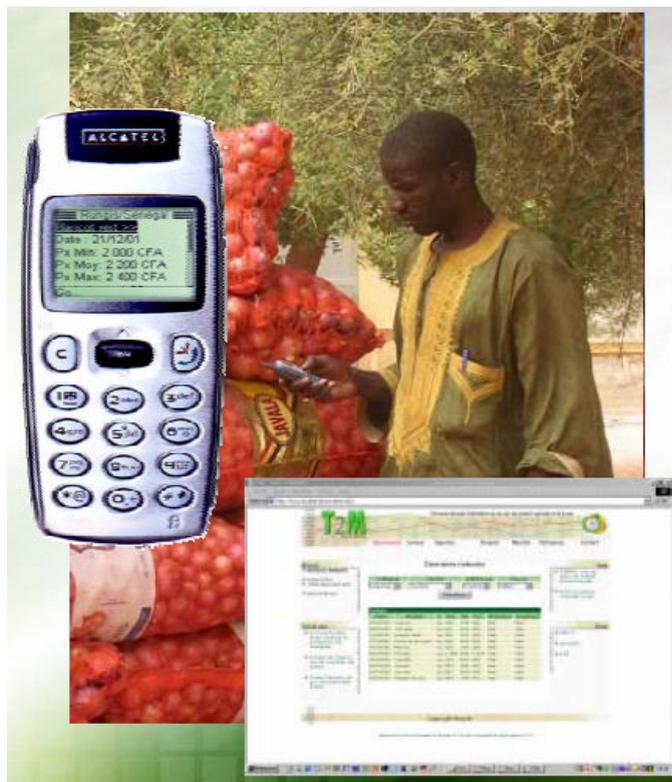


Figure 2: Manobi tools and user in Senegal

PestNet

www.pestnet.org

PestNet is a simple, low-cost email network that helps people in the Pacific and South-East Asia obtain rapid advice and information on plant protection, including the identification and management of plant pests. Founded in 1999, the network has over 500 participating members. It links the Pacific and South-East Asian regions with plant protection specialists worldwide. The network is free to members. PestNet has members from government and NGOs, universities and the private sector, as well as farmers and students. Any organisation, group or individual can join.

PestNet makes use of Yahoo's free 'Yahoo! Groups' feature, which links all participants in an online discussion group that includes facilities for uploading and downloading photographs and documents. Members can send digital photos of insects, weeds or affected crops for identification and diagnosis by experts. They can also view photos of pests with expert information on management practices. The website also provides a comprehensive database of plant protection resources, with links to the organisations' websites.

Improvements in efficiency and effectiveness of rural service delivery

***Virtual Extension and Research Communication Network**

www.vercon.sci.eg

<http://waicent.fao.org/tour/tour/Demos/vercon/default.htm>

The Egyptian Government established a pilot Virtual Extension and Research Communication Network (VERCON) in 2001–02, in four centres, with the support of FAO's Technical Cooperation Programme (O'Farrell, 2003b). The facility was officially launched in April 2003. The pilot was aimed at addressing the needs of small-scale Egyptian farmers through information exchange between agricultural research and extension and, indirectly, the farmers themselves (Richardson, 1998b). Now government researchers and extension workers based in rural villages can communicate with colleagues and experts in the other pilot locations and in the capital, in seconds rather than days.

Based on the success of the initiative in Egypt, FAO is working with several countries in the Middle East, Asia–Pacific, Africa, Latin America and Eastern Europe to develop VERCON projects. ACP countries with VERCON projects in formulation or in the pipeline include Cameroon, Kenya, Tanzania, Sudan and Uganda.

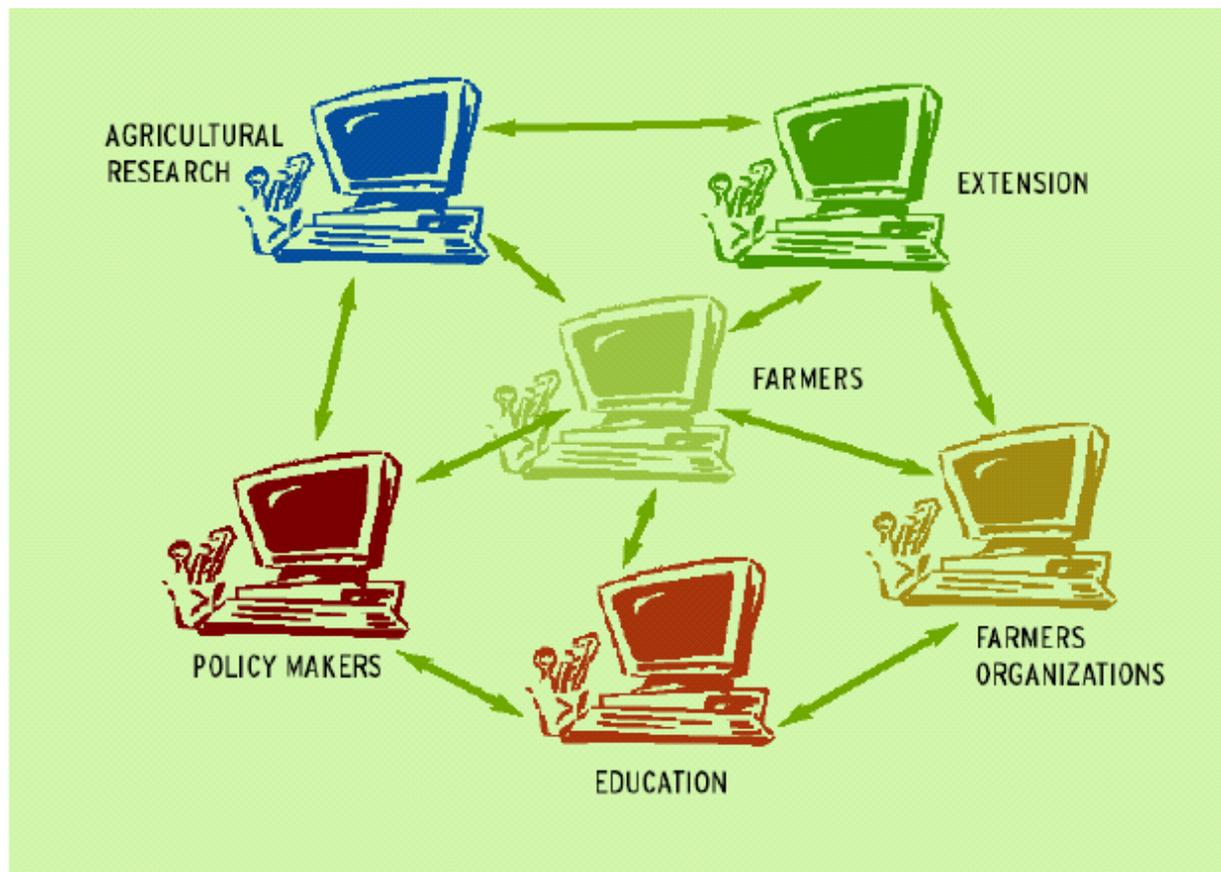


Figure 3: Virtual extension and research communication network – illustrative diagram (source: O’Farrell, 2003b)

The first step in establishing VERCON was to engage groups – including government ministries (agriculture, science, energy, water resources); national agricultural research centres; providers of extension services (public and private); agricultural education institutions; and farmer organisations – in a multi-stakeholder dialogue about the concept (Richardson, 1998b).

The VERCON project is supported by two principal partners: the Central Laboratory for Agricultural Expert Systems of the Agricultural Research Council, and the Central Administration of Agricultural Extension Services. The tools and methodologies were developed in close collaboration with the American University of Cairo.

A multi-stakeholder VERCON Steering Committee has helped to develop links with other ministries and NGOs active at the community level. Following the completion of the pilot phase, training, computers and Internet access have been provided to more than 50 government institutions. With funding provided by the Italian Government as well as contributions from the Egyptian Government, FAO is helping to expand the initiative to include agricultural training centres and the private sector across the country. As a result, the VERCON pilot is poised to become more than a network for public sector extension and research, and may emerge as a system that enables village-level stakeholders to

communicate with national and regional counterparts, and to share and access information across the Arabic-speaking world.

VERCON's innovation is in its capability to achieve effective linkages by connecting geographically dispersed people, and to enhance two-way communication, managing large volumes of data, and rapidly collecting, processing and dispersing information in a variety of forms. The human component is a network (e.g. staff of research and extension institutions, faculties of agricultural education, NGO workers and agricultural producers) committed to strengthening collaboration, communicating, sharing information and supporting improved agricultural production (Richardson, 1998b).

Improved ICT planning capacities among civil society organisations

African Connection Centre for Strategic Planning – *Rural ICT Toolkit for Africa

The African Connection Program draws attention to telecommunications and ICT strategies and activities that will assist poorer African countries. The *Rural ICT Toolkit for Africa* (African Connection Program, 2003) brings together a compilation of essentials, best practices and checklists for planning, financing and implementing telecommunications and ICT projects in the rural African context. The toolkit includes:

- Glossary of ICT elements, technical and non-technical terms and project types
- Principles of the African Connection Program's rural ICT development programme
- Best practice for rural ICT policy
- Country market situation – what kind of rural ICT projects are appropriate to, and possible in, a country's stage of policy, infrastructure and market development?
- Basic introductions to technology niches and applications
- Market dynamics and demand analysis
- Business planning
- Establishing the socio-economic impact
- Funding principles and processes
- Monitoring and evaluation.

The toolkit is a key resource for the African Connection Program's funding and promotional activities, which include the following:

- Rural public calling offices (PCOs)
- Regional 'next-level' Internet points of presence to encourage local Internet access in rural district centres. At these points, intermediate agencies with active rural

programmes, social infrastructure institutions, vanguard schools, health institutions, and small and medium enterprises will be able to gain access to the Internet

- Networks for rural intermediate agencies to enable and support the implementation of computer networks and other ICT needs. These agencies include NGOs, micro-credit, local government and social infrastructure agencies (education, health, development, etc.) that have direct activities in rural areas
- Small-scale telecentres – instead of financing and owning the installation and infrastructure for large multi-purpose community telecentres, the programme will operate through small business matching grants or loans and provision of business plan assistance. The aim is to facilitate the bottom-up expansion of already existing and successful PCO businesses into the next stage of ICT service provision to become info kiosks or mini telecentres; and to maximise existing potential for privately owned and operated telecentres to expand their activities into training, capacity-building and rural community outreach through partnership with donor agencies underwriting demand for these services
- ICT content – support the development of relevant and appropriate content to promote ICT diffusion in rural areas
- Policy and regulatory support – promote and support policy and regulatory initiatives that can act as a catalyst or provide leverage to achieve the above.

Application of ICTs in land surveys and registration systems

Participatory 3D mapping in the Philippines

www.pafid.org

The Philippine Association For Intercultural Development (PAFID) is an NGO that assists indigenous communities to regain and secure ancestral domains (PAFID, 2004). In Mindanao the Government of the Philippines has recognised some ancestral domains, but the boundaries have not yet been properly identified and mapped. This situation has caused frustration in the process of settling ancestral domain claim applications. In partnership with the International Fund for Agricultural Development (IFAD), PAFID is engaging in participatory community mapping to help bring about full recognition of the rights of indigenous communities over their ancestral domains.

PAFID is using an innovative participatory 3D mapping process that marries sophisticated ICTs with common household tools. The process begins with community consultations to access information about ancestral territory, and needs and obligations with regard to the land. Participants draw rough maps that identify territorial boundaries, land-use histories and patterns, and significant geographic and ecological features. The locations of these boundaries and features are verified by global positioning system (GPS) ground surveys, resulting in refinements of the rough maps. Using cardboard, paint, yarn, push-pins and other simple modelling tools, participants sculpt topographic maps to create 3D geographic models that illustrate elevations, contours, natural resources, land cover, settlements, infrastructure and administrative boundaries.

The 3D geographic models, created with cardboard and other household tools, are digitally photographed and the photographs are joined into a geographic information system (GIS). The images are corrected using GPS ground survey data and combined to produce 2D thematic maps of land cover, natural resources and other significant features. The maps are validated by the communities, and then presented to the National Commission on Indigenous Peoples for review within the ancestral domain claim application process.

PAFID and its community partners have mapped over a million hectares of ancestral domains, and the resulting maps are now accepted by the government as proof of claims for legal recognition of ancestral land rights. The success of the participatory 3D mapping approach is based on its ability to generate an ongoing and mutually beneficial political dialogue between indigenous communities and government authorities.



Figure 4: Photo from a PAFID training programme held in India. Vegetation, land tenure and forest cover patterns are colour-coded and given specific markers and symbols. With support from IFAD, a PAFID team travelled from the Philippines to the north-east region of India to conduct training and exchange information

Areas for Action

The following recommendations flow from the CTA Observatory and other resources compiled for this report. Each represents an area for action in which extension can or should play a more effective role.

Priority 1: extension advocacy for basic voice telephony for improving rural livelihoods

Several Observatory participants noted instances where access to ICTs, especially a basic voice telecommunications service, where available, is improving rural livelihoods. Where telephone systems do reach rural areas, they generate significant economic ‘consumer surplus’ for users. Real savings for rural phone users can range from twice to 20 times the cost of a single telephone call, in the range of US\$2 to over US\$10 per telephone call. Telephones have a primary function of enabling family members to discuss financial matters and make decisions about household, agricultural and other livelihood expenditures.

Within agricultural activities, telephones are commonly used to gather information about market prices, market trends, and availability and cost of inputs, and for making market transportation and sales arrangements. Telephones enable farmers to take advantage of market information, increase profits, and reduce productive expenses. Telephones are also a critical tool to reduce the risks involved with remittance transfers, and to enable farm family members to obtain accurate information about foreign currency exchange rates.

The telephone can also be an important tool in financial processes and transactions, and the example of their use in remittance payment systems is indicative. Where available, the use of telephones to facilitate remittances and reduce risks is a significant element in the livelihood strategies of farm families. At the micro-level, remittances tend to be used for daily household expenses such as food, clothing and healthcare. Remittances are thus an important factor in meeting household subsistence needs, and can make up a significant portion of household income. Remittance funds are also spent on capital items, including building or improving housing, buying cattle or land, and buying consumer goods such as portable radio/tape/CD players and televisions. Once subsistence needs are met, remittances tend to be used for productive investments in the agricultural sector, or in other family business activities, or for savings.

Extension can play a key role as an advocate for ICT policy and regulatory reform focused on basic voice telephony.

Rural telecentres – a key access tool when driven by entrepreneurs

Based on the author's rural telecentre work in Thailand and Sri Lanka, and on analyses of telecentre initiatives in Africa (African Connection Program, 2003), the Caribbean and Latin America, it is easy to conclude that donor-funded telecentres (e.g. those that have been supported by large donor agencies to date), while able to provide some temporarily useful services, are generally unsustainable (African Connection Program, 2003).

The telecentres that are sustainable are generally operated by entrepreneurs or entrepreneurially oriented NGOs or CBOs, and focus on provision of basic services such as voice telephony, basic email access and computer training.

Any programme that provides core capital and/or operational funding for rural telecentres should be approached very cautiously. However, there are important roles for entrepreneurially driven telecentres as:

- One tool in a universal access policy or programme (especially one that has involved rural and agricultural stakeholders in its design)
- A focus for micro-credit loans – entrepreneurs who operate rural telecentres have significant difficulty in accessing credit
- A rural location for practical ICT access to financial services – an opportunity to provide 'win-win' service offerings between the financial sector and telecentre operators; or for financial sector services to expand to include basic ICT access; or for telecoms operators to expand their services to include financial services
- Excellent vehicles to facilitate louder rural and agricultural stakeholder voices
- Excellent vehicles for improving rural and agricultural stakeholder access to, and dissemination of, training and knowledge resources.

Support for telecentres should emerge as a by-product of work designed to achieve rural livelihoods outcomes, and which is tied to parallel, multi-stakeholder objectives and activities. 'Silo' telecentre initiatives, developed in the absence of a focus on poverty alleviation or sustainable rural livelihoods, will be fraught with sustainability problems.

The e-Sri Lanka initiative funded by the World Bank illustrates a positive break in the tendency for donors to fund rural telecentres directly. This programme is rolling out more than 200 rural telecentres across the country (World Bank, 2004; author's involvement in the project), using a competitive approach to selecting entrepreneurs who will operate the equivalent of village telecentre franchises. The programme has been developed from the bottom up, with extensive consultation with and participation of rural community leaders from across the country. The approach to this initiative is based on a pilot programme established in Thailand to determine the most appropriate telecentre operational model and programme for government support (Wong *et al.*, 2003). In the case of Thailand, the most appropriate and financially viable model was a telecentre owned and operated by village entrepreneurs.

Extension needs to work more closely with rural telecentre operators and the programmes that support them. Telecentres are a basic conduit for a huge variety of communication and information sharing, a conduit that is seriously under-utilised.

Planning for effective application of ICTs in agricultural extension

ICTs have unique features that provide opportunities to harness them in ways that are different from how the traditional media have been used for development. According to Michiels and Van Crowder (2001), in comparison with traditional media ICTs can achieve the following:

- Offer opportunities for two-way and horizontal communication, and for opening up new communication channels for rural communities and the intermediaries and development organisations that support them. Once mastered, they potentially allow every user to be a sender, receiver, ‘narrowcaster’ and broadcaster
- Support bottom-up articulation of development needs and perceptions, and facilitate the merging of global and local knowledge and information
- Support, create and strengthen interactive and collaborative networks that enable information to flow to and from rural communities; facilitate dialogue between communities, intermediaries and development organisations; foster coordination of national and local development efforts; and overcome physical barriers to knowledge and information sharing. ICTs can also enhance the capacity of grassroots organisations to make their voices heard. This is especially true of ICT projects that are managed by local communities, such as community-owned media and community telecentres
- Support policy and advocacy by meeting the information needs of elected officials, decision-makers, interest groups and grassroots advocacy organisations. They can be activated for social networking and mobilisation, to build up public awareness around development issues, and for upward pressure on policy decisions
- Help build consensus through the provision of information on government programmes, policies, decisions and issues to advocates. Many governments are making such information available online. On the other hand, opponents can also seize the same tools for Internet campaigns to support their own agendas. Such online ‘checks and balances’ of political agendas potentially can contribute to political debate and democratic processes
- Enhance partnership with the media. They are particularly relevant for community media that have limited human and financial resources.

Michiels and Van Crowder (2001) challenge us to harness new ICTs, especially for rural and agricultural development:

‘Until people start to capitalise on the various experiences in experimenting with, adapting, and “transforming” the new technologies, community-based ICT projects may

not be seen to offer any real or direct benefits. Benefits are even more difficult to reap given that ICTs are found mainly in urban centres and thus are largely out of reach of people living in rural areas.'

Good planning for rural livelihood ICT projects

Good planning is imperative. Several Observatory participants pointed out that developing agricultural extension applications of ICTs often involves gaining institutional or organisational support. Gaining such support is not without its challenges. It is critical to ask whether the initiative you are developing dovetails with your organisation's core business. If it does not, your prospects of success are limited.

The individuals involved within an organisation must see direct benefits in applying their time and resources to a communication for development effort. This is especially true if they are being asked to support time-consuming multi-stakeholder planning. Organisations that already have a track record of supporting such planning will be more predisposed to support the planning required for communication for development efforts (Richardson, 2001).

Multi-stakeholder planning is very important in ICT projects. Given the extensive range of networking enabled by new media, dialogue with like-minded agencies and with agencies working to achieve similar goals or working in the same contexts, can yield many benefits. Benefits of multi-stakeholder planning include shared capital and/or operating costs, optimised strategies, economies of scale, and improved policies and programmes.

The rural livelihoods approach provides some specific programming directions based on appropriate outputs for ICT interventions that will enhance sustainable rural livelihoods and the agricultural sector. These recommendations, combined with best practices for project planning and implementation, provide an excellent entry point for agricultural extension planners and decision-makers. The discussion below draws from the latest literature in the field of ICT for development.

Curtain (2004), in a paper that draws on a database of 100 ICT-based projects in developing countries, provides some important orientation:

- Start with a broad definition of ICTs that includes both old and new forms of available technologies, and recognise that newspapers, radio and TV offer considerable unrealised potential, including potential that can be realised through the marriage of old and new ICTs
- Start with an assessment of readiness to use ICTs – in this case at national and rural levels, and with prospective organisations at the appropriate level of intervention
- Determine whether you are proposing an ICT-driven project or an 'ICT-supported mainstream project'; Curtain (2004) points out that the planning questions you need to address for each approach are very different.

Based on FAO's experience with the Virtual Extension and Research Communication Network (Richardson, 1998b) and FarmNet initiatives, and IFAD's experience with its Electronic Networking for Rural Asia-Pacific project, the following recommendations supplement Curtain's:

- Be very cautious about supporting ICT-driven projects that are heavily focused on technical solutions to human problems. These 'magic bullet' solutions are prone to failure because they tend to neglect to deal with governance, financing and other sustainability issues
- Begin by addressing the involvement of the full community of ICT users, not just half of the community: ensure women and girls are at the decision-making table from day one
- The user community must have a financial commitment/investment in the project and, ideally, has already identified appropriate uses for ICTs and is making financial commitments in this direction
- Conduct communication and information-sharing readiness assessments that focus on human and organisational dimensions, as opposed to technical dimensions. In other words, find out how well people are currently communicating, and why. Organisations that are predisposed to open and transparent communication are more likely to adopt and adapt ICTs to gain further advantages. Those organisations that do not like to disclose or share information are not likely to gain the full value of ICTs, and will probably not perform well in multi-stakeholder initiatives. Rigid managerial control over ICT access is a common phenomenon
- Focus initial project management attention on sensitising organisational decision-makers to the importance of their strategic direction-setting, project governance, and the likely need to modify organisational policies and procedures to gain full value from ICTs
- ICT projects are multi-stakeholder in nature and must include multi-stakeholder governance, management, and monitoring and evaluation. This parallels a fundamental IT planning principle – participation of the user community in design and management of the IT solutions that have an impact on their work
- Unless a project has a clear local 'champion' organisation or individual, do not provide support
- Trusted partners and major influencers of the farm/rural family often have better access to IT, are a smaller, more cost-effective target group, and can have greater economic impacts than ICT projects aimed directly at the farm/rural family
- ICT projects inserted into the agriculture supply chain must demonstrate tangible economic benefit for all stakeholders involved.

Curtain supplies two checklists of questions to address for ICT and development

projects:

- one for ICT-driven projects
- one for ICT-supported mainstream development projects.

Both are available at www.developmentgateway.com.au/ict/assesstool/index.html. The checklist for ICT-supported mainstream projects is as follows:

- Define project objective – in terms of poverty reduction, what aspect of poverty does the project address?
- Who are the poor to be targeted by this programme? To what extent is it possible to identify the poor in terms of rural/urban location, region, gender, age, education attainment and health status?
- What are the likely causes of the aspect of poverty the programme is focusing on? Try to rate the likely causes in order of importance. Is poor communication one of the causes?
- What types of intervention are most likely to be effective in breaking the causal linkages? Need to distinguish between direct, indirect and supporting interventions.
- What are the information and communication needs of the targeted poor in relation to the project's objectives, and how important are they to the success of the project?
- What role can ICT and other media play in delivering the information and providing channels of two-way communication?
- Is there an appropriate form of ICT which can be deployed in terms of cost, support, maintenance and compatibility with existing information flows?
- Does an enabling environment exist for the ICT to provide the proposed support?
- What measures can be devised to assess progress towards the poverty reduction objective?
- Is there a methodology in place to assess how effective the proposed intervention is in achieving the operational objectives of the programme?
- What unexpected events or situations might arise? What should be done to manage these?

(Adapted from: www.developmentgateway.com.au/jahia/Jahia/lang/en/pid/274)

Multi-stakeholder planning and other considerations

Because new ICTs are generally dependent on access to telecommunications services, it is important to attempt to involve telecommunications service providers, software vendors and equipment vendors in multi-stakeholder planning for ICT projects. Given

the challenges of supporting ICT projects in rural areas, any ‘win-win’ collaboration between development agencies and technical service providers that expand rural telecommunication services will yield multiple benefits to rural communities.

Organisations must also be oriented towards open and transparent communication. People need to be able to freely, openly and creatively express and share their personal and professional goals, in ways that allow all stakeholders to learn about one another’s goals. Multi-stakeholder planning also involves internal participants and external stakeholders in identifying, refining and ranking goals for improving relationships, partnerships and networks. Organisations with experience in multi-stakeholder planning will have an easier time supporting communication for development efforts than those that do not have this experience (Richardson, 2001).

Measurement frameworks are critical to fostering and determining the success of any communication for development effort. Measurement frameworks must be relevant and meaningful to stakeholders. To this end, frameworks must be developed by the participants, and the tracking of measurement indicators must also be done with and by participants. This will help ensure that participants take responsibility for the evolution of tools and processes that work. Again, organisations with experience in using participatory techniques to develop measurement frameworks will have an easier time supporting communication for development efforts than those that do not have this experience (Richardson, 2001).

It is also important to recognise that organisational incentives to use communication for development approaches are often weak. Other criteria (e.g. securing funding, rewarding supports) may be more important in determining the success of a manager or a policy-maker than the outcomes of a specific communication for development project. Organisations that tend to reward managers and policy-makers for the development outcomes of their projects will be more inclined to support communication for development initiatives.

Finally, organisations may not always provide smooth budgetary and technical support for some of the basic features of communication for development efforts that involve new ICTs. Support for access to telecommunications services (e.g. monthly phone bills and Internet service provider bills), and support for software and hardware, are absolutely necessary. There is a need for budgetary planning awareness and integration of initiatives within budgetary cycles and strategic planning.

Where organisations lack the dimensions described above, champions of communication for development initiatives involving new ICTs will probably have to engage in internal advocacy efforts to improve specific situations. Armed with good research that ties an initiative to an organisation’s goals and objectives, champions will have a much better chance of succeeding in accessing the support they require.

Planning: best practices and lessons learned

More important than the role of specific technologies or applications is the adoption of best practices in the field of ICTs for development. The following best practices build on

lessons learned from the field of communication for development, and are focused on ICTs for rural and agricultural development:

- Build on existing technical and organisational systems before attempting to create new ones –how can the efficient use of ICTs lubricate or enhance systems that are already working?
- Ensure multi-stakeholder governance in project management and monitoring and evaluation – because ICT projects are, by nature, multi-stakeholder projects. If an ICT project is supposed to benefit the rural poor, make sure the beneficiaries have some stake in project governance
- Ensure participation of the user community in the design and management of ICT solutions that affect their livelihoods and work processes. If you are introducing ICTs into an agricultural or rural system, remember it is not only the technology that needs to communicate – project planners and implementers need to communicate and engage with user communities
- Exploit the full range of existing media, including both old (e.g. rural radio) and new ICTs (e.g. Internet kiosks, PDAs). It is always useful to look at what actually works well, and is financially sustainable, in the developed world context: newspapers, magazines, community meeting halls, coffee shops and telephones are still the ‘killer’ ICT applications for farm families in developed countries such as Canada. There is no reason to expect that rural farm families in Thailand will leapfrog those ICTs for high-tech devices that are not frequently used elsewhere
- Recognise that, in the context of ICTs and agriculture, women are twice as likely as men to be involved in agricultural activities, and that women have principal roles in smallholding subsistence farming, agri-business and food processing. This means involving the full community of ICT users, not just the male half of the community of users, in developing and implementing ICT projects.

Richardson (1997) suggests 12 common elements among successful communication for development efforts that involve new ICTs:

- Preliminary participatory communication and information needs assessments with intended users
- Awareness-building campaigns designed to sensitise decision-makers to the possible uses of ICT services
- Executing agency commitment to participatory rural and agricultural development
- Local champions identified and supported
- Open participation of user community in design, implementation and management of communication and information services
- Institutional and user commitment to managing and sustaining ICT services
- Involvement of the full community of users, including women and youth

- Ongoing provision for technical training, user support and outreach within the user community
- Combination of centralised and decentralised information production, analysis and distribution
- Ongoing provision for technical support and system maintenance/upgrading
- User community financial commitment in communication and information systems (e.g. ownership of hardware, user fees, salaries, infrastructure, etc.)
- Social service orientation of local private sector or not-for-profit (university or NGO) Internet and ICT service providers.

The 'functional map' below provides a detailed overview of specific project tasks common to communication for development efforts. While not specifically focused on new ICTs, the map provides an excellent orientation to a sound approach to planning.

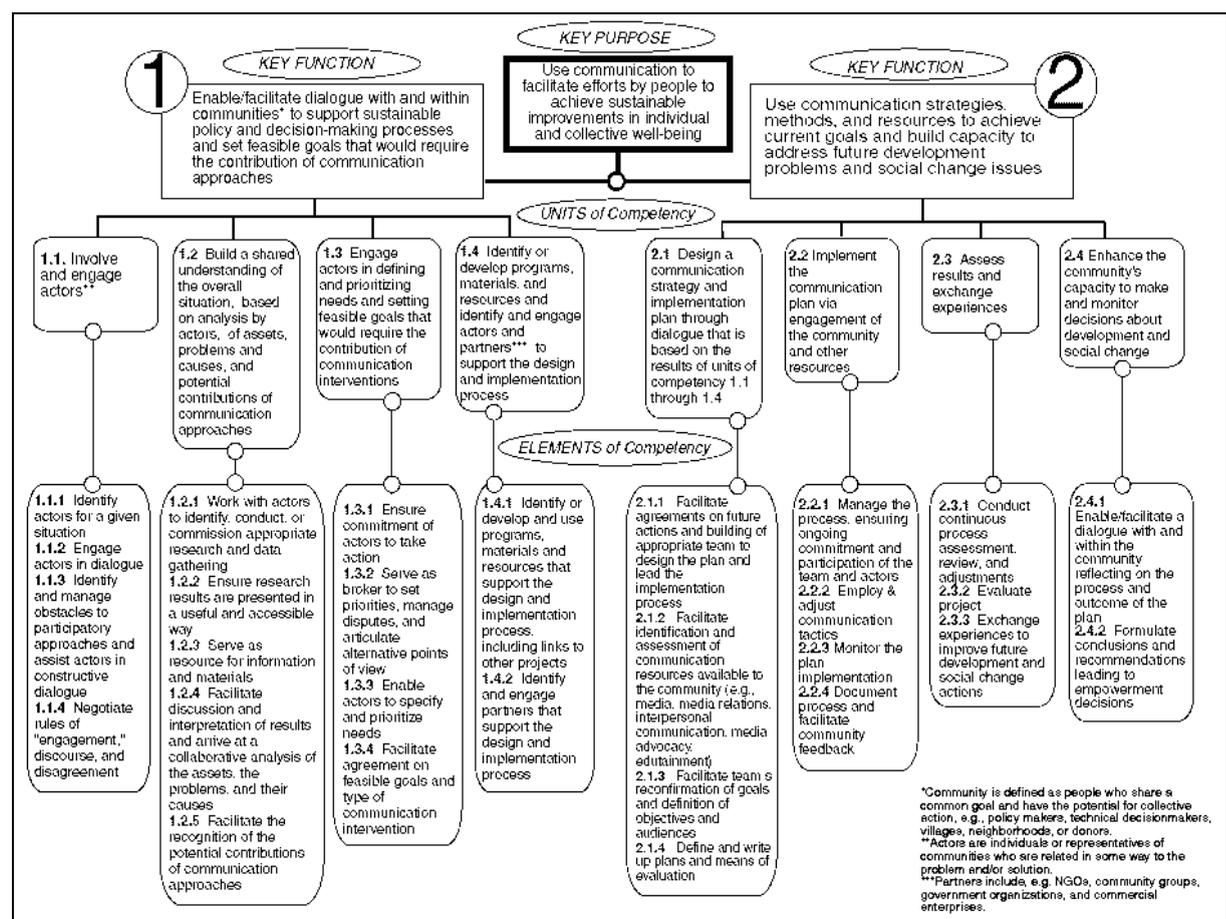


Figure 5: Functional map, communication for development and social change (source: Irigoin et al., 2002; www.comminit.com/pdf/Competencies_Flow_Chart.pdf)

Conclusions from the Observatory

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 analyse how ICTs can truly enhance rural livelihoods, are to be avoided.

Several Observatory participants were clear that no ICT project should commence before there is a commitment to achieving real development outcomes, and the links between those outcomes and the role for ICTs have been thoroughly assessed.

Some participants felt that a full range of rural livelihood assets and strategies should be examined to enable a better understanding of 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 programme context. This conclusion echoes many of the conclusions suggested from the country case studies presented during the Observatory.

Five key recommendations were derived from the CTA Observatory:

- **Engage in regional ICT policy awareness-raising workshops for managers and senior professional staff involved in extension services in ACP countries**

Possible strategy for CTA – one strategy is to form partnerships with existing bodies that already have ICT policy awareness programmes in place. These include the Association for Progressive Communication and its members in ACP countries, and regional programmes such as the African Connection Program. The tools, experiences and lessons learned from these bodies would enable CTA to move quickly into this area. Conversely, these bodies would benefit from CTA’s and its member countries’ first-hand knowledge of local issues and context, and CTA’s experience with rural livelihoods approaches.

- **Produce simple fact sheets on the successful use of ICTs in agricultural extension**

Possible strategy for CTA: again, partnering with existing bodies that have a focus on this topic, such as FAO, would enable CTA quickly to produce and provide fact sheets to organisations in member countries.

- **Package multi-stakeholder planning approaches**

Possible strategy for CTA: there are few existing resources in this area that are immediately appropriate to organisations in ACP member countries. There are some existing resources available through organisations such as IFAD (e.g. Richardson and

McConnell, 2000; FAO, 2003), but these would require tailoring and strategy for dissemination and uptake.

- **Develop ICT problem trees for better bottleneck analysis**

Possible strategy for CTA: this is a relatively new concept that has great merit, especially if tied to the rural livelihoods approach. Some effort has been made through infoDev (Batchelor and Sugden, 2003; Batchelor *et al.*, 2003), resulting in an initial conceptual framework that ties the sustainable livelihoods approach to ICTs (Batchelor and Scott, 2001); however this is not primarily rurally focused. The author has attempted a similar analysis with a rural livelihood focus (Appendix I).

- **Facilitate studies on the current status of the regulatory environment in ACP countries**

Possible strategy for CTA: the example of the Association for Progressive Communication's 'APC Africa ICT Policy Monitor' (www.apc.org/english/rights/africa/research.shtml) could form the basis of a template for CTA work in ACP countries. Alternatively, CTA could investigate a partnership with APC to establish a parallel resource focused on ACP countries.

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Appendix I: Draft Analysis of ICTs through a Rural Livelihood Lens, with Consideration of Bottlenecks

Sustainable rural livelihoods and roles for ICTs

[This analysis benefits from a forthcoming report produced for the Canadian International Development Agency: Richardson *et al.*, 2005.]

A version of the sustainable livelihoods framework is shown below.

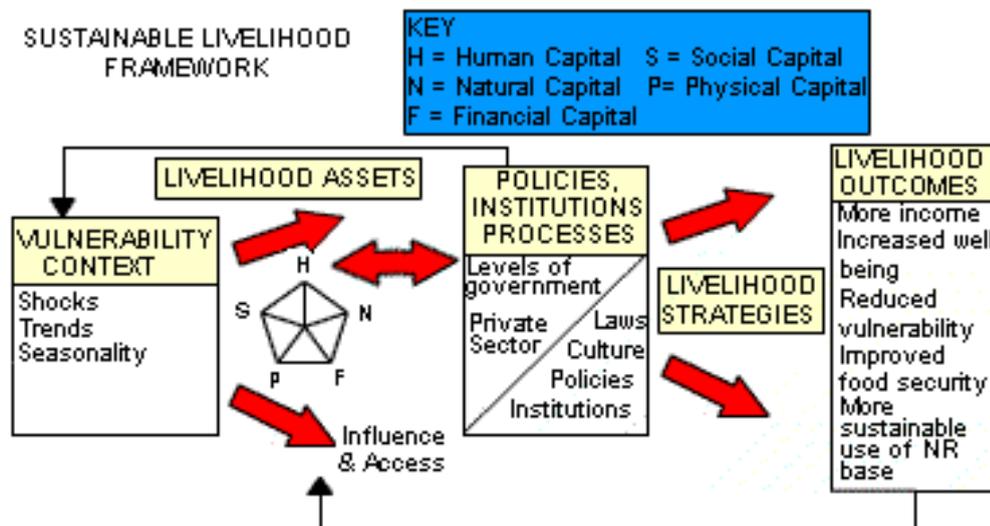


Figure 6: Sustainable livelihoods framework (source: DFID, www.livelihoods.org/info/info_guidanceSheets.html)

The Andhra Pradesh Rural Livelihoods Project in India (www.aplivelihoods.org) is an example of how the sustainable rural livelihoods approach enables practical, efficient and effective poverty alleviation initiatives. Drawing from DFID's Sustainable Livelihoods Guidance Sheets (www.livelihoods.org/info/info_guidanceSheets.html), project personnel have translated the concepts of capability and ability into the concept of capital assets that make sense in the rural communities. (The following is adapted from www.aplivelihoods.org)

Financial capital

The most versatile asset, but also the asset least available to the rural poor, a fact that makes other types of capital asset important to the rural poor:

- Available stocks including savings, liquid assets such as jewellery and livestock, resources available through credit-providing institutions
- Regular inflows of money including earned income, remittance payments and inflows from the state
- Can be converted into other types of capital – depending on policy and regulatory environment
- Can be used for direct achievement of livelihood outcomes such as the purchase of food to reduce food insecurity.
- Can be transformed into political influence and voice to help improve the policy and regulatory context and govern access to resources.

Human capital

The skills, knowledge, ability to labour and good health that enable people to pursue livelihoods:

- Varies according to household size, skill levels, leadership capabilities, health status, etc.
- Educational attainment and good health are important human capital assets, and improving these may be a primary livelihood objective of many families
- Human capital is required to make use of the other four types of capital asset.

Physical capital

The basic infrastructure and producer goods needed to support livelihoods:

- Access to transportation
- Access to secure shelter and buildings
- Access to adequate water supply and sanitation
- Access to clean and affordable energy
- Access to information and communication tools and technologies
- Access to tools necessary for agricultural production and other family enterprises

- These assets are important for maintaining health
- Poor infrastructure results in opportunity costs – income generation and access to education or health services can suffer
- Expensive access to infrastructure can decrease the margins of agricultural and rural enterprises and put businesses at a comparative disadvantage in the market.

Natural capital

Natural resource stocks used directly for production, or necessary to sustain life (air quality, nutrient cycling, erosion prevention, biodiversity, etc.):

- Destruction, degradation and disappearance of natural capital are the source of many of the shocks that dramatically hurt the livelihoods of the rural poor
- Seasonal cycles can change the value or productivity of natural capital over the course of a year
- Health and wellbeing depend on continued functioning of complex ecosystems
- Resource-based activities such as agriculture cannot function when the natural capital of items such as fertile land are not present
- The presence, absence, severe fluctuation and degradation of natural capital is often the most significant risk faced by farm families, e.g. rain, drought, floods, soil erosion, etc.

Social capital

Social resources that help people achieve their livelihoods objectives:

- Networks and connections – vertical (e.g. patron/client, rural farmer/government official) or horizontal (between people/peers who share similar interests and objectives)
- Membership of formalised groups
- Relationships of trust, reciprocity and exchanges that facilitate cooperation, reduce transaction costs, and provide informal social safety nets.
- Relationships, networks, connections and memberships can lower the costs of working together
- With improved efficiency of economic relationships, incomes and rates of saving can increase

- Social networks can facilitate innovation through the development and sharing of knowledge.

No single capital asset will yield sustainable livelihoods. People require a range of assets to maintain and enhance their livelihoods. However, the single physical asset of land, and secure legal title to that land, can generate many benefits including direct agricultural production activities and income, and financial capital through use of the land as collateral for loans. Because asset endowments change constantly, diversification of capital assets is one way that the rural poor deal with stresses and shocks.

Capital assets have potential value: that is, the value of an asset emerges through the types of structures and processes that enable the farm family to transform an asset into a livelihood outcome. Structures and processes can create bottlenecks to the transformation of a capital asset to a livelihood outcome, or they can work to enable those transformations. While prevailing cultural practices have an impact on those transformations, the more important structures and processes are often related to local, provincial or national government policies, regulations and practices.

The rural poor experience a fundamental challenge in planning for future livelihoods: their place in societal communication systems is marginal. They typically lack democratic representation or a voice in decision-making, and they typically stand outside the flow of information – information that might enable them to predict future trends and manage risks better. As this analysis reveals, herein lies a potentially effective set of opportunities for ICT applications to help make the agricultural sector more effective and efficient, while also contributing to poverty alleviation through the promotion of sustainable rural livelihoods.

Agriculture and sustainable rural livelihoods

Agriculture is central to sustainable rural livelihoods, and the rural poor find themselves within agricultural systems that are characterised by significant risks, diversity, complexity and continuous change. Even developed countries grapple with challenges surrounding sustainable agricultural livelihoods, trade barriers, legislation on genetically modified organisms, BSE and other disease crises, etc. For the rural poor in emerging economies, lack of a voice, poor access to information, and unstable or non-existent finance and insurance systems increase vulnerability to stresses and shocks, decrease the ability to find and make use of livelihood opportunities, and decrease the ability to maintain and improve livelihoods while maintaining assets.

Small-scale economic opportunities – agricultural and otherwise – are the economic basis on which the rural poor survive. They are business people and entrepreneurs and, like all such people, they need:

- Access to capital

- Fair and transparent regulatory and business policy environment
- Access to information about market prices, input prices, market trends, market risks, potential shocks and stresses
- Access to information about livelihood opportunities that will enable diversification and ways to leverage links among existing rural and agricultural enterprises
- Qualified and informed financial and input suppliers
- Stable physical infrastructure for logistics, market access, input acquisitions
- Availability of an educated and skilled workforce
- Preservation of, and rights to, resources, especially land
- Accessible and affordable health services
- Social safety nets to enable risk-taking.

For any ICT solution to be adopted enthusiastically, and to be considered a success after implementation, the solution must have a positive impact on the day-to-day key performance indicators of its users. Everyone in the agriculture sector has a role to play, and measures their success by a simple set of goals and objectives. By having a positive impact on users' ability to do their job, the ICT solution will have served its purpose well, demonstrating measurable results, and being proactively adopted by participants who see the real and immediate value of the applications.

There is probably no such thing as a poor rural family whose livelihood is entirely dependent on agriculture. Other sources of market income and labour income are common and vary from family to family, and from region to region. Generally in Asia, many rural households receive remittance payments from family members who work in urban areas or overseas. Gross international remittance payments received by a country generally exceed donor assistance – especially donor assistance that reaches, or might benefit, the rural poor. Remittance payments are also an extremely important source of capital for agricultural investments. Thus any ICT intervention that lubricates the flow of remittance payments, or reduces associated transaction costs, will have a major impact on rural livelihoods and the agricultural sector (including ICTs as simple as the telephone, as evidenced by studies of Grameen Telecom's Village Phone programme, www.telecommons.com/villagephone).

The rural farm family is the glue that holds family members together, regardless of the location of individual members. When the livelihood of the farm family is devastated, urban members lose a critical safety net and rural members may have to leave the rural area. Children may be fostered to relatives or find themselves on the streets; the elderly may be abandoned; and productive individuals may migrate to the cities. Helping the farm family unit to survive and thrive is an important sustainable livelihood objective – one that has implications far beyond the rural community.

Rural/urban migration is an important factor in the family social safety net and economic system. Migration patterns, and changes to those patterns, have consequences for livelihoods strategies and capital assets. During the Asian economic crisis in the late 1990s rural areas experienced reverse migration, as family members who had once migrated to urban areas returned to the relative livelihood safety of the rural family. Migration patterns and remittance patterns vary according to region and gender. Male migration in Bangladesh, for example, often places senior female family members as heads of households, and in charge of farming practices and decisions. The HIV/AIDS crisis results in rural out-migrants who have fallen sick with HIV/AIDS returning to their original farm family to be cared for and to die there. In such cases the farm family is responsible for providing extra food, time for care, money for medicines, and the cost of a funeral.

The challenge is to identify ways to harness ICTs to strengthen the rural family and improve its ability to develop livelihood strategies, especially its agricultural livelihood strategies. Strengthened rural families will also support the effectiveness and efficiency of the agricultural sector and contribute to poverty alleviation.

Bottlenecks to sustainable rural livelihoods and agricultural sector enhancement, and potential roles for ICTs

The sustainable rural livelihoods approach helps clarify the bottlenecks to poverty alleviation and agricultural sector enhancement. Each of the five capital assets identified above can be associated with bottlenecks that can be the subject of interventions for improvement. For each bottleneck, it is possible to identify a role for ICTs and potential sustainable livelihoods outcomes.

Tables 1–5 provide a matrix analysis of capital assets, bottlenecks, potential roles for ICTs and potential sustainable livelihoods outcomes.

Recommendations for targeting rural livelihoods and the agricultural sector

ICTs should be harnessed to achieve specific and measurable development outcomes that have a direct impact on the efficiency and effectiveness of the rural agricultural sector in the context of poverty alleviation, and thus on sustainable rural livelihoods. The following development outcomes have been identified through the sustainable rural livelihoods approach (Tables 1–5):

- Increased farm family income – 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

Table 1: Financial capital – the most versatile asset, but also the asset least available to the rural poor, which makes other types of capital asset important to the rural poor				
Examples and/or features of capital asset	Use or transformation potential of capital asset	Bottlenecks to access, use or transformation of capital asset	Role for ICTs	Sustainable livelihoods outcomes
Available stocks including savings, liquid assets such as jewellery and livestock, land and resources available through credit-providing institutions Regular inflows of money including earned income, remittance payments and inflows from the state	Can be converted into other types of capital – depending on policy and regulatory environment Can be used for direct achievement of livelihood outcomes such as purchase of food to reduce food insecurity Can be transformed into political influence and voice to help improve the policy and regulatory context and govern access to resources	Challenges to the effectiveness and efficiencies of financial service organisations that serve the rural poor and agricultural producers. This includes organisations that transmit remittance payments to the rural farm family, and those that provide access to credit for productive enterprises and agricultural producers. Challenges can be in the form of management capability and skills, service organisation infrastructure, personnel training needs, etc.	Application of ICTs to extend, administer and manage credit support Basic access to telecommunications services to enhance organisational effectiveness of financial services organisations (this was the original reason for the Grameen Bank's decision to establish Grameen Telecom's Village Phone initiative) Basic access to telephone services to enable family members to reduce risks associated with remittance payments, and improve family members' abilities to make collaborative decisions on transforming remittance financial capital to achieve livelihoods objectives Where organisational efficiency is a significant bottleneck, computerise financial systems of financial service organisations that serve the rural poor Where remittance payments are a key source of the regular flow of money, electronic banking systems that facilitate and improve the flow of remittance payments, reduce risks associated with payments, and reduce transaction costs associated with transfers	Increased farm family income and savings Increased income results in greater farm family participation in rural/agricultural organisations and improvements in external relations (Table 5, social capital)
		Challenges to farm family access to financial services which are often associated with lack of collateral, but may also relate to institutional reach into rural areas, or a basic lack of institutions oriented to providing financial services to rural communities and agricultural producers	'Parabanks' that piggyback on rural institutions may make effective use of computers and telecommunications systems to build on existing efficiencies and extend rural reach Assisting existing financial services organisations to extend services using ICTs, where appropriate and practical	
		Legislative, policy and regulatory challenges can impede the reach of financial services or their effectiveness with the rural poor	See Table 5, social capital – louder voices and improving human networks and connections	

Table 2: Human capital – the skills, knowledge, ability to labour and good health that enable people to pursue livelihoods				
Examples and/or features of capital asset	Use or transformation potential of capital asset	Bottlenecks to access, use or transformation of capital asset	Role for ICTs	Sustainable livelihoods outcomes
Varies according to household size, skill levels, leadership capabilities, health status, etc. Educational attainment and good health are important human capital assets – improving these may be a primary livelihood objective of many families. Quality of trusted advisors to farm business (bank, legal, government, education)	Human capital is required to make use of the other four types of capital asset	Lack of, or poor quality, health, education and agricultural extension training resources such as infrastructure, personnel and knowledge resources	ICTs applied to programmes and projects that provide direct support to human capital accumulation at rural community and farm family levels. This can include ICT-enabled assistance with the logistics of service provision, or the efficiency of service provision. It can also include direct farm family access to ICTs and ICT services (e.g. rural telecentres or rural PCOs) where such services can assist directly with access to knowledge resources for the accumulation of human capital. Examples of approaches and applications are many, and might include agricultural extension information about diversification strategies; tele-education/distance education programmes; telephone directories pointing rural people to information services they might access to improve livelihood decision-making, etc.	Improved health indicators (related to improvements in income and food security attained with relevant knowledge) Family investments in education and training Reduced vulnerability evidenced by indicators such as reduced birth rates and reduced rural out-migration
	Trusted advisors provide input in the form of knowledgeable recommendations and provide access to data not available to the farmer	Access to advisor limited by distance or time availability Advisor has quality information but limited access to, or influence over, the farmer Advisor has access and influence, however is only marginally more skilled or knowledgeable than the farmer	ICTs directed at the intermediary layer of advisors and influencers can have a tangible impact on the quality, quantity and timeliness of information delivered to the rural farm family. ICTs can equip advisors and influencers with market data, best practice information, real-time economic data, extension information, etc. See page 70 for sample ICT applications.	Reduced vulnerability evidenced by indicators such as increased crop yield, herd health, family income
		Policies, institutions or processes that impede the delivery or availability of health, education and training resources. These can include delivery/availability bottlenecks at local, provincial and national levels of government, also bottlenecks at local institutions, and cultural norms that may limit access (including gender and social status issues)	See Table 5, social capital – louder voices and improving human networks and connections	

Table 3: Physical capital – the basic infrastructure and producer goods needed to support livelihoods

Examples and/or features of capital asset	Use or transformation potential of capital asset	Bottlenecks to access, use or transformation of capital asset	Role for ICTs	Sustainable livelihoods outcomes
<p>Access to transport buildings</p> <p>Access to adequate water supply and sanitation</p> <p>Access to clean and affordable energy</p> <p>Access to ICT tools and technologies</p> <p>Access to tools necessary for agricultural production and other family enterprises</p>	<p>These assets are important for maintaining health</p> <p>Poor infrastructure results in opportunity costs – income generation and access to education or health services can suffer</p> <p>Expensive access to infrastructure can decrease the margins of agricultural and rural enterprises and put businesses at a comparative disadvantage in the market</p>	<p>Government policies, institutions and programmes which may not reflect the interests or needs of the rural poor.</p> <p>Appropriate and effective rural physical infrastructure responds to user demands. Where infrastructure is provided, but does not respond to real demand, investments are wasted, maintenance is not carried out, and service becomes unsustainable</p>	<p>See Table 5, social capital – louder voices and improving human networks and connections</p> <p>'Dashboard' data systems and feedback tools that enable service providers (private or public sector) to monitor key rural service delivery indicators (usage, revenue, leakage, customer feedback, etc.) for established infrastructure</p> <p>'Universal access' telecommunications policies and programmes are important tools in providing telecommunications infrastructure services. When farm families have basic access to telephones, a variety of simple but important everyday tactics for improving livelihoods are made easier and less costly (in terms of opportunity costs and consumer surplus)</p>	<p>Increased income spent on shelter, water and power supplies, and improvements in access to basic rural infrastructure such as potable water, electricity, telecommunications, and waste management (water and solid)</p>
		<p>Sector strategies (transport, energy, telecommunications, etc.) which do not include frameworks that address the real conditions of rural areas and ecosystem health, and provide mechanisms for participation of the rural poor in the articulation, implementation, management and evaluation of strategies</p>	<p>See Table 5, social capital – louder voices and improving human networks and connections</p> <p>Improved use of computers and electronic data-gathering and transmission tools (including tools that increase decision-makers' access to voices of the rural poor) to enhance decision-making that might provide appropriate, efficient and cost-effective infrastructure</p>	
		<p>Rural community capacity to design, implement and manage community-based infrastructure. This is also tied to bottlenecks in government policies, institutions and programmes which may not allow, or may hinder, such infrastructure provision</p>	<p>See Table 5, social capital – louder voices and improving human networks and connections</p> <p>See Table 2, human capital – access to training and education services</p>	
		<p>Lack of private sector alternatives to public sector infrastructure provision. This is often related to impediments to the reform of managing ministries in relation to liberalisation, privatisation and regulatory oversight of private sector provision of infrastructure</p>	<p>See Table 5, social capital – louder voices and improving human networks and connections</p> <p>Improved use of websites/tele-education tools on privatisation best practices and computerised modelling programmes among ministry officials, so that they can learn about and visualise the impacts of privatisation and liberalisation policy choices. [The Commonwealth Telecommunication Organization has developed tools to enable telecommunications regulators and policy-makers to see the impact of decisions on telecommunications access, revenues and service levels; the World Bank has a variety of online best practice resources in this area.]</p>	

Table 4: Natural capital – natural resource stocks used directly for production, or necessary to sustain life (air quality, nutrient cycling, erosion prevention, biodiversity, etc.)				
Examples and/or features of capital asset	Use or transformation potential of capital asset	Bottlenecks to access, use or transformation of capital asset	Role for ICTs	Sustainable livelihoods outcomes
Destruction, degradation and disappearance of natural capital is the source of many of the shocks that dramatically damage the livelihoods of the rural poor. Seasonal cycles can change the value or productivity of natural capital over the course of a year.	Health and wellbeing depend on continued functioning of complex ecosystems. Resource-based activities such as agriculture cannot function when the natural capital of items such as fertile land is not present. The presence, absence, severe fluctuation and degradation of natural capital is often the most significant risk faced by farm families – e.g. rain, drought, floods, soil erosion, etc.	Poor access to services and inputs for agricultural production, fishing and agro-forestry.	See Table 3, physical capital – sector strategies.	Improvements in indicators of sustainable use of natural resources: natural capital investment by farm families; appropriate investments in natural capital by various levels of government.
		Impediments to local efforts to conserve resources and enhance biodiversity through direct actions.	See Table 5, social capital – louder voices and improving human networks and connections.	
		Government policies, institutions and programmes that might reform the supply of services, and improve management, access to and governance of natural resources.	See Table 3, physical capital – sector strategies.	
		Lack of, or weak, environmental legislation and enforcement.	See Table 5, social capital – louder voices and improving human networks and connections.	
		Government policies, institutions and programmes that might improve market development efforts and also increase the value of agricultural, fishery and agro-forestry products.	See Table 3, physical capital – sector strategies.	

Table 5: Social capital – social resources that help people achieve their livelihoods objectives				
Examples and/or features of capital asset	Use or transformation potential of capital asset	Bottlenecks to access, use or transformation of capital asset	Role for ICTs	Sustainable livelihoods outcomes
<p>Networks and connections – vertical (e.g. patron/client, rural farmer/government official) or horizontal (between people/peers who share similar interests and objectives)</p> <p>Membership in formalised groups; relationships of trust, reciprocity, and exchanges that facilitate cooperation, reduce transaction costs and provide informal social safety nets</p>	<p>Relationships, networks, connections and memberships can lower the costs of working together</p> <p>With improved efficiency of economic relationships, incomes and rates of saving can increase</p> <p>Social networks can facilitate innovation through the development and sharing of knowledge</p>	<p>Lack of policy and programme support for improving the internal functioning of rural and agricultural NGOs, CBOs and cooperatives, and policies that may legally prevent or hinder the formation of rural and agricultural civil society organisations</p>	<p>Training in the use of appropriate and affordable ICTs to advance the interests and objectives of the organisations that represent the interests of farm families</p> <p>Training in the use of appropriate and affordable ICTs to improve horizontal links among organisations that represent the interests of farm families</p> <p>ICT support for existing or planned multi-stakeholder initiatives to improve policies and programmes</p>	<p>Strengthened rural and agricultural organisations contribute to measurable increases in other capital stock</p>
		<p>Lack of policy and programme support for extending the external (horizontal and vertical) links among organisations focused on enhancing sustainable rural livelihoods</p>	<p>As above</p>	
		<p>Lack of government policy and programme attention to consultation with rural and agricultural civil society organisations</p>	<p>Training and support for the use of ICTs for media advocacy related to rural/agricultural stakeholder positions on policies and programmes</p>	
		<p>Lack of access to ICTs that supplement and/or enhance face-to-face relationships (horizontal and vertical). For farm families and the intermediary organisations that may represent their interests, a key bottleneck is often access to reliable and affordable telephone and Internet connections</p>	<p>Universal access telecommunications policies and programmes that result in affordable access to telecommunications services among farm families and the organisations that may represent their interests</p>	

- Improved health indicators – related to improvements in income and food security attained with relevant knowledge
- Family investments in education and training
- Reduced vulnerability – evidenced by indicators such as reduced birth rates
- Reduced rural out-migration
- Sustainable use of natural resources – evidenced by indicators such as reduced soil erosion
- Better risk management decision-making at the farm level – evidenced by indicators associated with the above outcomes.

The analysis also reveals five key outputs for ICT interventions that will contribute to the above outcomes. Each output is associated with a primary level of intervention: (a) the family farm household; (b) intermediary organisations that might provide direct services to the family farm household; and (c) policy-makers and programme delivery agencies with responsibility for coordinating services that might reach the family farm household. Intermediary organisations are agencies and organisations with offices and personnel at the rural community level, and whose service or programme delivery work directly touches farm family household members. These intermediary organisations can include agricultural extension offices, CBOs, NGOs, agricultural cooperatives, farmers' organisations, school boards, health delivery services, and natural resource management organisations. Intermediary organisations are important because many ICT interventions will have the most impact if they begin at this level.

The rural livelihoods approach yields seven most appropriate ICT project themes for improving rural livelihoods (see page 19).

Gender strategies and ICTs

The sustainable rural livelihoods approach also encourages analysis of gender roles in the maintenance and enhancement of family livelihoods. Recognising that women are twice as likely as men to be involved in agricultural activities, and that women have principal roles in smallholding subsistence farming, agri-business and food processing, it is critical to assess any ICT intervention in terms of gender.

A review of existing research on ICT adoption among communities in rural areas categorises their main obstacles under five headings:

- Lack of information and education on ICT applications
- Uncertainty surrounding the costs and benefits of using ICTs
- Unavailability of ICT support resources and customised applications
- Lack of information and confidence around security issues

- Unsupportive government regulation policies.

There are some clear gender differentials within those five categories.

There are distinct differences between men and women in their access to resources, information and support that have a direct impact on their access to, and use of, ICTs. Women usually face higher barriers than men to the kinds of training that can equip them with computer literacy or engagement in ICT-related employment. They also have less access to collateral, and subsequently less access to finance and capital that enables them to invest in ICT. Compared with men, women have less time in which to balance the tension between earning an income and caring for their household members.

At the same time, much of women's work remains unpaid, making the use of financial capital for ICT access particularly challenging. In developing countries, women spent only one-third of their time in paid standard national accounts activities, compared with three-quarters for men.

Compared with their male counterparts, funding assistance for the full range of livelihood strategies for women is behind the times – funding is typically dominated by projects in certain sectors such as literacy, health and fertility programmes for women. Only a few agencies or foundations are beginning to enter the arena of rural enterprise training for women, and even fewer are investing in ICT use by women. One of the advantages of the livelihoods approach is that it helps to draw attention to such funding and programming deficiencies.

The male bias is reflected in the gender balance within trade team representations, particularly agricultural trade team representations, at national levels. One stark example of the bias against women can be seen in formal bilateral trade mission activities, which remain for the most part male-dominated. Some of this is cultural bias, and some is institutional.

Compared with men, women are more often the shock-absorbers of livelihood stress and uncertainty. Their economic value has been recognised as producers and providers, and more recently as consumers. More and more, however, as creators of wealth and capital, women must also be valued as distributors and transformers of capital in support of livelihood enhancement. Women are both producers and distributors of wealth, and this has critical implications if we really want to address sustainable rural development in a systematic way.

Women are less likely than men to be members of business or rural network associations, or other rural intermediary organisations. This finding provides a great opportunity for representative associations, such as employers' organisations, agricultural producers' organisations or chambers of commerce, to increase women's membership (ILO, 1996–2005).

On the positive side are the following factors.

Women **are** interested in using ICTs in all its forms, they are innovative, and will work together if the technologies enable them to. They are constantly reinventing themselves and are imaginative about working within narrow confines.

Women are *de facto* social entrepreneurs; their livelihood objectives are often less about making profit for profit's sake, and more about servicing their immediate communities and families.

Over the past two decades, women's economic activity rates have been increasing in the entrepreneurship sector, with women in advanced economies owning more than 25% of all businesses. The number of female-owned businesses in Africa, Asia, Eastern Europe and Latin America is growing rapidly, and with that growth their direct impact on job creation and poverty reduction is also growing (UN, 2001). The Internet has a real impact on the growth rate of female-owned enterprises: in China women initiate about 25% of new business start-ups; in Japan four out of five small business owners are women (UNCTAD, 2002, chapter 3).

At the same time, it is important to distinguish between the push and pull factors that draw women increasingly into the arena of micro- and small enterprise development. The push factors, often the combined results of the negative effects of globalisation, include:

- Withdrawal of, or decline in, state expenditure and aid for social programmes as a result of the negative consequences of structural adjustment programmes, which continue to place a disproportionate burden on women to service the social needs of their communities
- Women are required *de facto* to underwrite the costs of the social services they provide, including earning an income to finance care of children, the aged, the ill, the mentally unstable, and other marginalised sections of the community; this suggests that they need to have access to the cash economy
- The effects of casualisation and flexibility of formal employment, and the resulting insecurity of income and scarcity of income alternatives that women can engage in, mean that women need to be innovative and imaginative about earning from their rural enterprises (see www.wiego.org for further information on women in informal sectors).

The pull factors are expectation-led. Women are turning to innovative private and cooperative means of livelihood through selling products, services and know-how. Increasingly, women want to take advantage of ICT and new knowledge sources that may create business opportunities in expanding markets, in order to take advantage of the positive affects of globalisation, including:

- Trade liberalisation and potential for expanded market access
- New business alliances and new entry points in the value chain of production (cutting out the middleman or 'disintermediation' – when web-based companies bypass traditional retail channels and sell directly to the customer, traditional intermediaries such as retail stores and mail-order houses may find themselves out of a job).

A comprehensive understanding of the historical, cultural and political economic context is a prerequisite to considering the potential for introducing any kind of ICT platform into communities in rural contexts. Project managers need to differentiate between men's and women's activities and needs by type, input, skill and motivation, in order to vary the kind of support and services offered. It is not helpful to treat women as a homogeneous category that can be serviced with credit or ICT for group-based micro-activities. Keeping up-to-date with changes in the economic, social and political climates of different countries is important because they influence entrepreneurial/rural livelihood ambitions in specific directions at different times (see ILO, 1996–2005).

Improving universal access telecommunications policies and programmes

Effective policy and programme strategies for universal access to telecommunications services (especially voice telephony) are well known and well documented. According to the World Bank, and verified by many other rural telecommunications experts, the following combination of fundamentals is necessary:

- Support for the liberalisation of the telecommunications market within a country
- Creation and support for a pro-competitive legal and regulatory environment
- Privatisation of the incumbent operator
- Dovetailing the above with the establishment of universal access programmes and policies.

Despite the available evidence, the combination of these fundamentals is not present in many Asia-Pacific Economic Cooperation (APEC) countries (Sri Lanka is a notable exception). One key reason is that the demand for universal access is not being well articulated or heard. The organisations that best represent rural stakeholders – rural and agricultural organisations – are often absent from national policy dialogues that help create and or shape positive universal access policy change and programmes. If they are not part of national policy dialogue, universal access policies, programmes and regulatory reform initiatives risk neglecting the needs of the very people the initiatives are meant to serve. There are several reasons for this absence (see page 16).

According to the World Bank, 'poverty reduction requires a clear understanding of the needs, priorities, demands, and pressures of the poor. Household and community surveys, and demand studies ... are an important means of gaining this knowledge. This is a first step in developing participatory universal access programmes, which involve local communities in the design of such development projects through demand assessments and by allowing them to participate in the decisions about the location of particular information access outlets.'

However, there is a great deal more that needs to be done to ensure that universal access programmes are developed using participatory processes. Empowered rural and

agricultural stakeholder organisations are fundamental to ensuring that policies and programmes meet the needs of the rural poor.

Interventions to empower rural and agricultural intermediary organisations and their members to advocate for improved policies for universal access to telecommunications might include a number of activities:

- Identification and documentation of advocacy and policy dialogue experiences, strategies and successes among rural and agricultural stakeholders worldwide
- International dialogue and peer learning among rural and agricultural stakeholder organisations that wish to move forward with positive policy change for universal access in their home countries
- Capacity-building efforts to enable principals of rural and agricultural stakeholder organisations to learn about effective universal access policies and regulatory mechanisms
- Mobilisation of rural and agricultural stakeholders to engage in dialogue with their members, and to craft policy recommendations and implement national universal access advocacy strategies.

Rural credit and rural financial services

One of the most potentially exciting areas for the application of ICTs for the direct benefit of farm families in rural settings is in the arena of extending, administering and managing credit support. As yet, this area is in its infancy. The shortage of affordable capital is one of the most, if not the most, critical factors constraining the sustainability of micro-enterprises and family farms. Micro-finance is serious business. About 1200 institutions worldwide provide micro-credit loans to 13.8m people for a sum of US\$7bn. Nearly all the loans are repaid with interest. Loan sizes vary, but a mere US\$150 is the typical amount borrowed. More than 75% of loans are made to women, who are more likely to repay.

Many international finance institutions acknowledge the importance of intermediary service models in reaching poor and marginalised sections of the community, and have concluded that new financial products and initiatives need to be designed with these communities in mind (WBG, 2002, p.26). The financial intermediary sector that services small business is undergoing some radical thinking around extending its reach to poorer sections of the economic community, and taking its services to clients who might not otherwise have access. The potential use of ICTs and software systems to service the credit and savings expectations of the small entrepreneur are immense.

Examples of initiatives in this area include:

- Grameen Telecom and the Village Phone Programme in Bangladesh (the subject of a CIDA-supported case study, www.telecommons.com/villagephone)

- DFID’s Financial Deepening Challenge Fund (www.enterplan.co.uk/fdcf) – a cost-sharing grants scheme that encourages private sector financial institutions to increase access to commercially sustainable financial services for the poor and for businesses that employ the poor, and includes several ICT and financial services interventions, including:
 - a £1.8m mobile micro-finance data communications platform championed by Vodafone that will allow financial institutions in Kenya and Tanzania to operate more effectively in rural areas
 - a £500,000 mobile banking service championed by the UK Equity Building Society to employ VSAT technology to enable online banking services
 - a £1.4m rural bank branch outreach project that employs laptop computers and Internet connections to expand bank branch networks in Uganda
 - a £2m project of the CRDB Bank to develop smart card infrastructure and related financial services products for the poor in Tanzania
 - a £1.6m agricultural credit card scheme to improve credit access for agricultural inputs for small farmers in Pakistan
 - a £1.4m micro-insurance programme in India using the ICT-enabled e-Choupal network and rural community insurance groups
 - Vodafone’s I Computerising financial reporting and performance measures making them cost-effective, transparent and accessible to borrowers and lenders (see Uganda Women’s Finance Trust, page 23)
- E-Choupal, a private sector venture of India’s ITC Ltd, which combines market price and crop information with financial and credit services
- Use of smart cards for secure transactions and improved financial management (see case study: Milk Cooperative Smart Cards: Rajasthan, India)
- Extending credit outreach in creative ways, such as mobile banking (see case study: Mobile Banking for Blue Collar Workers – India).

On the last point, mobile banking brings a number of players together, providing interaction through connectivity and integrating with existing financial service support. The leading credit and loan agencies are keen to retain and maintain customer loyalty and to improve information flow from their clients, so as to keep a finger on the pulse of their local credit rating and markets (interview with Hany Assaad, Head of Micro and Small Business Finance and Financial Technologies, International Finance Corporation, June 2002).

Some sample ICT applications applied to a generic supply chain with positive impacts on ICT outputs are described on the next page.

Micro-credit manager

In an effort to make micro-credit more accessible, the ICT solution could provide banks with a specialised micro-credit management system. By putting micro-credit application forms, guidelines and a database of micro-credit peer groups into the system, the administrative costs are decreased and accessibility to credit increased. The system would allow interested peer groups to find out information about micro-credit at kiosks or community centres, or through a cooperative or bank location. They can fill out requested information directly, or with assistance at the location, and be notified of loan approval through their bank branch by SMS phone message or other, more traditional means. The loan management system may or may not tie into core banking systems directly to report on loan status, etc.

Grant/loan funding application manager

Similarly to the micro-credit manager, this application focuses on making farmers and farm groups aware of grant or loan opportunities, and the criteria for these, available via intermediary, NGO and government organisations. It then provides a simplified method of application for the loan, and provides information necessary to secure the loan. After the grant or loan is secured, the system will monitor repayment or project success, based on responses to automatic queries sent by phone, through the ICT solution via the loan officer, or directly to the farmer/farm group.

Contract manager

A relatively easy application to implement, and possibly with the highest impact on stabilising farm income. By building an electronic contracting system available to the loan officer at the time of loan provision, the farmer may lock in a future price for a crop, reducing the risk of fluctuating market prices. The system would require the cooperation of post-harvest processors and/or brokers and farmers' groups. By establishing a mechanism to contract large quantities of a certain variety and quality of crop or livestock, the processors and brokers can secure demand for processing, export or future sales. Historical attempts at farm income stabilisation have typically been made by ministries of agriculture by entering and exiting the open market on a large scale, to buy up overproduced commodities and to sell underproduced commodities – a crude stabilising process. However, forward contracting controls prices and production proactively, before production, reducing over- and underproduction and working hand-in-hand with a possible crop-balancing application.

Crop balancing

A simple data aggregation tool which analyses the purpose and timing of loans against historical crop and herd averages to predict over- and underproduction scenarios. With near real-time information on planned production, bank officers have a better prediction capability for future market prices, loan demands, food security threats (underproduction), or an opportunity to give incentives for alternative crop production.

This tool could also use data from any farm or herd management applications available for greater accuracy.

Online training and education

Primarily aimed at bank loan officers and staff (trusted advisors), the ICT solution portal may contain short PowerPoint, video and essay training materials focused on the agriculture industry. Staff may be required to finish a certain number of training modules of their choice on a quarterly or yearly basis, increasing their knowledge of agricultural topics such as fertiliser application, seed varieties, genetics, post-harvest processing, export markets, etc. The training module application can also be used to test and record staff performance, keeping track of the modules they have completed and offering incentives for good results or achieving a certain level of knowledge. The application could also be used for traditional bank-related training and new staff orientation. The staff of cooperatives and farmers could also access the training directly, gaining new information about crop diversification, best practices, etc.

More informed and relevant decision-making – more informed rural people and farmers

A recent review of UN and World Bank poverty reduction strategy papers concluded that:

‘There is a general deficiency in analysis of the extent and the underlying causality of food insecurity and vulnerability, and of poverty of specific population groups. Hence little analytical basis is provided for targeted policy and programme development ... there is a lack of consistency between, on the one hand, priority setting and analysis, and, on the other hand, policies, strategies and interventions aimed at alleviating food insecurity vulnerability, and poverty.’

Recommendations from this report focus on the necessity for involving non-government stakeholders, particularly rural and agricultural NGOs, in collaborating to improve data collection and to disaggregate data according to the spatial distribution of the poor, temporal realities and social dimensions such as gender, age and ethnicity. This requires functional cooperation among ‘a diverse group of national and international institutions operating at both national and local levels’, and a focus on multi-stakeholder analysis of poverty reduction needs and strategies. Further, it requires governance processes and communication tools that meet the functional needs of the stakeholders involved. It also requires efforts at building the capacity of government officials to build multi-stakeholder analytical initiatives, and building the capacity of intermediary organisations to enhance their data-gathering and analysis activities.

There is a clear role for ICT applications and tools for **practical** knowledge management. Caution is required here, as there is a tendency to view such tools as ‘magic bullet’ solutions to multi-stakeholder initiatives. In reality, such tools and applications can work only when more social and political governance and procedural mechanisms are addressed. Where there is evidence of a predisposition to resolve governance and

procedural obstacles among leading stakeholders, there is a good opportunity for ICT applications and tools to enhance those efforts and yield better analytical results.

Policy areas that can be addressed through improvements in poverty-reduction data gathering and analysis, and that engage rural and agricultural intermediary organisations, include:

- Agricultural policies dealing with primary food production within a country
- Domestic trade policies dealing with transport, storage, processing and retailing of food products
- Health, nutrition and social welfare policies dealing with public health, water and sanitation, and nutrition
- Social and economic policies dealing with employment, income and taxation
- Education and training policies
- Rural public services and infrastructure policies in general.

The ICTs involved can range from teleconferencing tools to sophisticated analysis based on GIS. It is more important to focus on the processes that enable multiple stakeholders to choose and develop the most appropriate and cost-effective ICTs for improving analysis and decision-making, than to focus on any particular application that might seem to be a 'magic bullet'. Hence a programming strategy involving ICTs might work best if it leads with governance and follows with the most appropriate ICT applications and tools. The VERCON project in Egypt (page 31) and FAO's FarmNet initiative (page 40) are both examples of efforts that begin with multi-stakeholder planning processes that seek to enhance governance issues as a primary project outcome, with the introduction and use of ICTs deemed by the stakeholders to be appropriate project outputs.

Some sample ICT applications applied to a generic supply chain with positive impacts on ICT outputs are described below.

Knowledge base

A knowledge base is a portal-type application that can centralise many major sources of information into one searchable reference library. The sources of information could include government websites, universities, document archives, the Internet, economic reports, historical data, ministry GIS layers, and others. The information may have different security levels depending on who is looking at the information, but in general would be open to browsing or searching by topics and keywords. Internet information would be filtered and categorised for more accurate and valuable results. Examples of information in the knowledge base include:

- Best practices
- Technology

- Seeds
- Livestock
- Veterinarian resources
- Natural language sources.

Risk management

Risk management applications may be used for several tasks, including crop insurance, loan risk assessment, crop diversification decisions, etc. Primarily GIS mapping and reporting applications, they combine spatial data from a variety of sources to provide information on:

- Floods
- Drought
- Sourcing and mapping spatial data
- Prediction
- Disaster event management
- Procedures
- Farmers' impact predictions
- Crop insurance predictions and impacts.

Weather reporting

Weather information is not needed for its own sake, but is tied to the performance of crops and thus the performance of loans, crop insurance and livelihoods. Both long- and short-range weather forecasts are needed, for different reasons. Long-range forecasts (by region) help predict crop types, varieties and insurance risk. Short-range forecasts will be used to determine planting dates, fertiliser and herbicide applications and harvest dates.

Crop storage

Crop storage is a simplified logistics application. Typically there are a wide variety of crop storage options and infrastructure available to farmers across a given region. An accurate inventory of these storage facilities, their capacity and near real-time inventory and load information would be valuable to farmers deciding what to do with their harvest. In addition, reports of status at regional and national levels provide an invaluable resource to the government and market analysts for determining food security issues and market prices.

Water resource monitoring

Water is a critical element in agricultural production. The availability and distribution of water resources in the form of natural rainfall, irrigation ponds, rivers, and their management are critical to food safety and productive agriculture. This application, a combination of GIS and web applications, would focus on centralising all available data on water resources, providing spatial mapping, real-time monitoring from available telemetry stations, and management procedures.

Directory of people, resources and assets (spatial)

There are a vast number of regional and national resources and assets available to the agriculture industry, forming a critical logistical chain in the production of crops and livestock. Each should be used in the most efficient and productive way. By providing a central, spatial resource database, all participants in the agriculture industry will have easier access to the resources, people and logistics they need to produce more efficiently. The database would contain information such as locations of private cooperatives and services, mills, meat processing facilities, storage facilities, food processors, transportation depots, ministry offices, bank branch offices, etc.

Louder rural and agricultural stakeholder voices

Louder rural and agricultural stakeholder voices is an output from ICT interventions that is closely tied to more informed decision-making. Farm families, and the organisations that may represent their interests, tend to lack access to affordable telecommunications services. Access to even basic telephone service may be lacking. Also, the skill and knowledge to employ ICTs appropriately and efficiently to advance the voices of rural and agricultural stakeholders in lobby and advocacy work is generally lacking. The primary ICT approach here is to enable intermediary organisations that are predisposed to improving rural and agricultural policy and programme decision-making, and which have strong links to farm families (particularly women), to develop appropriate ICT integration and use strategies, together with modest funding to support the implementation of those strategies. Combined with efforts to improve universal access, opportunities for louder rural and agricultural stakeholder voices to be heard and attended to will have a significant impact on sustainable rural livelihoods.

Health, education and agricultural extension training and knowledge resources

Improvements in access, reach and service for health, education and agricultural training resources are important in the mix of ICT services that can enhance sustainable rural livelihoods. Benefits are most likely to be obtained through initiatives that dovetail with existing organisations that have credibility and functional services for farm families, but can leverage new advantages, cost savings and service improvements with the use of ICTs.

This is a particularly important area for the agricultural extension sector, and the approaches to that sector have relevance to training and knowledge resources in the health and education sectors.

Over the past 20 years the dominant donor-supported extension approach in Asia has been public sector provision of the T&V system (see page 10). Numerous critiques of T&V and other technology-transfer approaches have led to a chorus of calls for 'demand-driven extension'. Concurrently, there is growing recognition that farmers and rural community members have demands for information and appropriate learning methods that are not being met. Demand-driven extension involves a shift from public sector extension delivery to a negotiated system through which farmers and rural community members determine their needs and have some control over the financing of extension services which are delivered by public, private, NGO or farmer organisation providers. This approach may ensure that the delivery agencies are ultimately accountable to the client.

The call for demand-driven extension opens the door for examination of how ICTs can be cost-effective, practical tools for facilitating and channeling farmers' demands, and addressing those demands. But when so many rural areas of developing countries are without access to the basic telecommunications services that support so many key ICTs such as the telephone and the Internet, this examination is severely challenged. Any resulting programmes and projects remain totally dependent on the strength of national universal access. Telecommunications policy rises to the surface as a primary enabler or obstacle.

Parallel with changes in extension delivery in the 1990s, in many developing countries government funding for the core research and extension institutions that provided services to small farmers and rural communities virtually collapsed. This was particularly true during the financial crisis in Asia. During the 1980s and 1990s, structural adjustment programmes have created pressure for governments to reduce public expenditure on agricultural and rural development research and extension services. Coinciding with these expenditure reductions, many donors and academics have called for a new extension paradigm that focuses on decentralisation, and includes increased farmer participation and the use of extension contracting or outsourcing.

Decentralisation, however, is not a magic bullet for dealing with reduced expenditure. Decentralised government research and extension services still require financing, particularly financing to build the capacity of regional stakeholders to develop and support functional and sustainable extension services. Decentralisation also requires financing and tools (e.g. ICT tools) for coordination. In the absence of coordination, countries can experience a patchwork of donor-funded projects and indigenously developed projects.

In order for coordination of decentralisation to happen, communication needs to be emphasised and supported. Communication is key to coordinating increased farmer participation and coordinating the use of extension contracting. For decentralisation to work, stakeholders involved in agricultural and rural development need to communicate, negotiate and arrive at decisions that can be also be communicated in order to achieve results. For decentralisation to work, there must be financing for stakeholder

communication, and for the adoption and integration of ICTs that that cost-effectively facilitate communication.

Some sample ICT applications applied to a generic supply chain with positive impacts on ICT outputs are described below.

Market price

A market price application of the ICT solution would centralise market information from a number of complementary sources, including access to expert analysis of the market. In the long term, these external market price sources could be compared with internal market price predictions and reports based on historical and predictive data collected directly by the bank. The value of market price data is its ability to assist in loan loss provisioning or cost–benefit analysis. For this, regular market price reporting will not provide enough information. The market price application of the ICT solution must also compare similar periods across multiple years; allow price reporting in any range of time, historical to present; compare short-term market price trends with the cost of storage options, etc.

Crop modelling scenarios

This is a very valuable application for farmers and trusted intermediary advisors. By collecting input price, yield information and market price data, farmers can try out several different scenarios for their land before planting a crop. By combining input prices (seed, fertiliser, etc.) with yield and commodity price information, the farmer can choose the best balance of fertiliser and inputs compared with yields and market prices to maximise profits. When also tied to test plots and historical yield results (best practices) this can be a powerful tool in predicting and stabilising farm income.

Crop diversification

Crop diversification is a key tool for mitigating risk, and diversification-specific information is required to assist the farmer in making a decision. The crop diversification system would centralise all relevant information regarding the production of a specific crop or livestock: soil type, rainfall, inputs, feed, fertiliser, length of season, market prices, etc. With this information, the farmer will be able to make a more informed decision about the final profitability of a change in crops. The system would also provide instructions on best practices for the crop, to educate the farmer in the new initiative and provide links to possible post-harvest processors or export markets for the crop.

Ask the expert

This application could be a simple database of national and regional experts on various topics in the agriculture industry. There could be several or even dozens of possible experts for each topic, and they would be expected to answer a certain number of specific questions in their field of expertise on a weekly or monthly basis. These

questions and answers could also be monitored by an ICT solution editor, and added to an expert questions database for future farmers or officers to consult before asking the expert directly. In this way the foundation of an expert system is begun. With enough queries and answers, and the addition of a natural language searching capability, the system may eventually be able to answer virtually any common question on any of the stored topics with the same accuracy as a real expert.

Appendix II Navigating Rural Telecommunications Policy Jargon

Teledensity

The term ‘teledensity’ is used internationally by organisations such as the International Telecommunication Union (ITU) as an indicator of telephone accessibility. Teledensity is a measure of the number of telephone lines per 100 inhabitants. In Canada, for example, the teledensity is 102 telephone lines per 100 inhabitants; in comparison, in Malawi it is 0.5 lines per 100 inhabitants. Globally, teledensity is rising as a result of increasing mobile telephone services.

Teledensity figures do not provide a very good picture of rural access to telephone services. The Panos Institute estimates that the teledensity in rural Malawi is one telephone per 1250 people, or 0.08 telephone lines per 100 inhabitants (Shanmugavelan and Wariock, 2004). Across Africa, Panos estimates that only one rural African in 1000 has a telephone.

Globally there is a serious lack of data on *rural* telecommunication access. In planning ICT initiatives, it is important to dig beneath the available statistics to gain a true understanding of telecommunications access realities in rural areas. Those realities can seriously affect how we plan initiatives.

Key terms

Agricultural extension practitioners need to become familiar with some key terms as they investigate how rural telecommunications access will affect the planning of ICT initiatives.

Digital divide

The term ‘digital divide’ characterises the fact that the world consists of people who do and people who do not have access to – and the capacity to use – ICTs, including the telephone, television and the Internet. The digital divide manifests itself in different ways – between those in cities and those in rural areas; between the educated and the uneducated; between economic classes; and between the more and less developed nations.

Rural digital divide

According to FAO (2003), the opportunities offered by ICTs are unevenly distributed, particularly when comparing cities and rural areas: ‘Barely 6 per cent of the world’s population is linked to the Internet, and many people on the planet have never made a telephone call. There is growing disparity between those who have access to information and those who do not. The latter are the majority, and most of them live in rural areas of

developing countries.’ To capture this reality, FAO has coined the term ‘rural digital divide’.

Universal service

The concept of universal service first emerged in the USA at the turn of the century. Universal service is a term used to refer to the policy of providing telephone service to all community members, and is based on the North American concept of a telephone in every home. It is generally recognised that universal service, in terms of a telephone in every home, will not be achievable (or desirable from the perspective of a commercial operator) in most developing countries for the foreseeable future (Richardson, 2003).

Universal access

Universal access refers to the condition where a working, affordable telephone is within reach of the whole population of a country (Benjamin and Dahms, 1999). Many telecommunications analysts prefer the term *universal access* over the term *universal service* because it more accurately reflects the commercially viable answer to rural telecommunications in developing countries: the provision of a small number of telephone lines at locations convenient to many rural and remotely located residents.

Digital access index

In November 2003 the ITU released the first global index to rank ICT access (www.itu.int/ITU-D/ict/dai). The index goes beyond traditional measures of ICT access, such as teledensity, to measure the overall ability of people in 178 countries to access and use ICTs. When planning ICT projects involving participants from many developing countries, this can be a very useful starting point.

Public access points

Pay phones, shared mobile phones, telecentres, telephone kiosks and other points of access may be the only option available for prospective users of agricultural extension ICT initiatives. These users may have to travel great distances, with significant hardships, and face many opportunity costs, simply to get to a telephone or a computer with Internet access. Once they reach an access point, they may have to pay a high price for the services they use.

Appendix III Resources

Association for Progressive Communication: ICT Policy and Internet Rights, <http://rights.apc.org/resources.shtml> [online resource].

Includes:

ICT Policy: A Beginner's Handbook (Nicol, 2003)

According to APC, this book 'lays out the issues and dispenses with the jargon to encourage more people to get involved in ICT policy processes. It is for people who feel that ICT policy is important but don't know much about it, e.g. a government official worried about a gap in her technical knowledge of how the internet works, a human-rights worker concerned that his need to send secure email is being challenged by national government policy, a citizen fed up with paying exorbitant rates for dial-up internet access and ready to organise'

ICT Policy for Civil Society Training Curriculum (APC, 2003a)

According to APC, the 'ICT Policy for Civil Society training course builds the capacity of civil society organisations to understand policy and regulation related to information and communication technologies (ICT) so that they can begin to engage and influence policy processes affecting ICT adoption and implementation at national, regional and global levels.'

Frequently Asked Questions About Conducting a National WSIS Consultation Process APC (2003b)

According to APC, this guide to organising a National Consultation on ICT policy 'provides some useful answers to a civil society organisation that has the interest and initiative to organise an ICT policy-related consultation.'

See also:

Sustainable Rural Livelihoods: Practical Concepts for the 21st Century (Chambers and Conway, 1992)

ICT and Development: Help or Hindrance (Curtain, 2004)

Revisiting the 'Magic Box': Case Studies in Local Appropriation of Information and Communication Technologies (FAO, 2003)

Rural ICT Toolkit for Africa (African Connection Program, 2003)

A Participatory Approach to Developing Local Applications (Richardson and McConnell, 2000)

(for full references see page 47).

Appendix IV Acronyms and abbreviations

ACP	African, Caribbean and Pacific
APC	Association for Progressive Communication
APEC	Asia-Pacific Economic Cooperation
CBO	community-based organisation
CRIS	Communication Rights in the Information Society
CTA	Technical Centre for Agricultural and Rural Co-operation
DFID	Department for International Development (UK)
FAO	Food and Agriculture Organization of the United Nations
GIS	geographic information system
GPS	global positioning system
ICT	information and communications technology
IFAD	International Fund for Agricultural Development
ITU	International Telecommunication Union
NGO	non-governmental organisation
PAFID	Philippine Association for Intercultural Development
PCO	public calling office
PDA	personal data assistant
RDVA	Rural Development Volunteers Association
SMS	short messaging service
T&V	training and visit system
UPS	uninterruptible power supply
VERCON	Virtual Extension and Research Communication Network
VSAT	very small-aperture terminal
WAP	wireless access protocol

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