

The L3Farmers Project

**Report and recommendations
to the Commonwealth of Learning
on Open and Distance Lifelong Learning for
Smallholder Farmers and Agricultural
Communities**

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EXECUTIVE SUMMARY

The following report is based upon Commonwealth of Learning (COL) initiated online discussions, meetings at the second Pan-Commonwealth Forum on Open Learning in Durban, South Africa, and research by the authors into open and distance learning (ODL) and information and communication technology (ICT) for agricultural development in low-income countries.

It recommends a collaborative L3Farmers Project by the National Agricultural Research and Extension Systems (NARES), Consultative Group on International Agricultural Research (CGIAR) and COL.

The report evidences a massive need to improve smallholders' knowledge and skills in the food production market chain in low-income countries. Such is the nature, scale and extent of this need that it cannot be met by conventional extension alone, but it can be met by employing ICT, ODL and innovatory extension methods.

COL is mandated to help develop institutional capacity, foster alliances and build exemplary models of ODL. It is already committed to collaborating with CGIAR, the Food and Agriculture Organization (FAO) and other international and national agencies to develop ODL programmes in food security, environmental sustainability and poverty reduction. The report therefore recommends that COL and CGIAR collaborate in:

1. Establishing strategic and working links with FAO, the premier UN agency concerned with food security
2. Drawing world attention to the need for ODL and ICT for extension and championing and gaining long-term funding and support from international and other donors
3. Providing the necessary expertise in instructional design, ICT and ODL and developing, adopting or adapting resources for new, improved and extended extension in low-income countries
4. Developing an open learning network for collaborative participatory extension in conjunction with the National Agricultural Research and Extension Systems (NARES), universities, colleges, non-governmental organisations (NGOs) and other public and private organisations interested in assisting farming communities in sub-Saharan Africa, South Asia and small island states
5. Building on the concept of the CGIAR Learning Resource Centre (CGLRC) pilot to create a knowledge management system, a network of Web-based portals through which international and national public and private providers can share global and local experience in research and development in ODL for agricultural development
6. Providing ODL and ICT-based training and support for:
 - managers and staff in research and development agencies whose policy-making, programme and service provision, etc., are critical to ODL extension in the targeted regions
 - extension workers, rural entrepreneurs who run telecentres, agri-clinics and community organisations, farmers and other facilitators in need of capacity-building in initiating, managing and evaluating extension using a mix of face-to-face and technology-based methods
7. Adopting, adapting and developing ODL learning resources for direct use by smallholders
8. Supporting regional extension initiatives in ODL and ICT
9. Evaluating these initiatives in terms of their cost, take-up, impact and long-term benefits.

The proposed L3Farmers Project is ambitious in scale and scope and requires major funding. It is therefore recommended that COL and CGIAR approach international and bilateral funding agencies and the private sector for financial support. The project must ultimately be self-sustainable, so a business plan is also essential.

It is also recommended that the overall strategic priorities of the L3Farmers Project be the responsibility of an L3Farmers Project Advisory Board (comprising, for example,

representatives of COL, CGIAR and NARES) and that there are also be sustaining partners (e.g., FAO and World Bank), strategic partners (e.g., governmental, NGO and commercial providers of learning resources and services who can contribute to the capital and recurrent costs), and local partners (e.g., government, local government, community agencies and local entrepreneurs willing to fund the project on the basis of the public good). Initially, one lead agency will be needed to develop the prototype and protocols for the knowledge management system and to collaborate with the strategic partners in the three targeted regions responsible for developing the open learning network and co-ordinating and training the local facilitators.

The report recommends that all of this work be carried out in 2004–2006. Four one-year action research projects are also recommended for 2004–2005: one to assess the take-up, impact, benefits and costs of two or three existing ODL/ICT applications in agricultural development; one to identify or develop and test and cost a prototype for the L3Farmers Project knowledge management system; one to develop a prototype online toolkit that can be used in conjunction with COL's existing ODL training resources, toolkits and guides to train local facilitators; and one to customise, apply, evaluate and cost existing agricultural research or training material into forms that will enable farmers to learn through ODL and self-study.

THE L3FARMERS PROJECT

PART 1: AGRICULTURAL DEVELOPMENT

"Between the idea/And the reality/Between the motion and the act/Falls the Shadow"
(T.S. Eliot, "The Hollow Men")

Introduction

Globalisation, competitive market forces and the need for value-added farming and more sustainable use of natural resources demand a radical transformation of agricultural methods, especially in smallholdings in low-income countries. There is also urgent need to eliminate inequity and injustice, provide lifelong learning and improve the livelihoods and quality of life of poor agricultural communities.

In 2002, the Commonwealth of Learning (COL) initiated electronic discussions on open and distance learning (ODL) and information and communication technology (ICT) for agricultural development. Subsequent meetings at the second Pan-Commonwealth Forum in Durban, South Africa, led to further online discussion on possible collaboration between the National Agricultural Research and Extension Systems (NARES), Consultative Group on International Agricultural Research (CGIAR) and COL. A concept note was drafted, *Enabling Lifelong Learning Opportunities for Smallholder Farmers in Africa, Asia and Small Island States through Global Partnerships* with the following vision statement:

To provide small farmers with lifelong learning opportunities through global and local partnerships that enable them to attain food security and participate effectively, efficiently and equitably in local and global markets so that their quality of life and livelihoods are improved.

COL then set up a virtual conference, Lifelong Learning for Farmers (L3Farmers), which was facilitated by Dr Ajit Maru, Research Officer, International Service for National Agricultural Research (ISNAR). This enabled over 90 agricultural planners, managers, researchers, educators and extension officers across the world to discuss what form the L3Farmers Project might take and what activities it might engage in. The following report derives from these discussions and further research by the authors.

The investigations and discussions have shown that smallholders in low-income countries are facing a long-term crisis. The two main causes of this are the inadequacy and decline of extension and the smallholders' inability to participate equitably in world markets. New systems are needed to help these farmers become more knowledgeable and capable of self-development.

Unfortunately, there has been little donor interest in supporting ODL and ICT in agricultural development. A number of agencies have begun to provide information networks and programmes for agricultural communities, but most of these initiatives are low-cost, small-scale and short-term. Moreover, few of them are truly open learning networks or designed for the farming communities themselves. Also, there is little tradition of or expertise in designing, developing, applying and evaluating ODL within the agricultural research community.

The following report concludes that there is urgent need to move beyond the rhetoric and traditional research-extension-farmer model of agricultural development and to enable researchers, extension workers and farming communities to collaborate in learning about, and profiting from, new and improved methods in the food-to-market chain. Discussions with stakeholders show strong support for the use of ODL and ICT in agricultural development and for COL, CGIAR to collaborate and work with NARES and other partners to develop an open learning network for the betterment of all agricultural communities.

The action plan and recommendations for 2004–2006 accords with COL's mandate to create

and develop institutional capacity, foster alliances and build practical demonstrations or models of exemplary practice. They also accord with COL's three-year plan for initiatives in food security, environmental sustainability and poverty reduction, and the expectations that L3Farmers Project will produce:

- An inventory of initiatives using ODL and ICT for agricultural/rural development
- A distributed knowledge management base accessible through a Web portal on prioritised issues related to the needs of smallholder farmers
- One or more frameworks that can be used to develop learning environments for smallholder farmers in local contexts, including the use of learning objects (digital text, audio and video) that can be stored in a database and modified, tagged and meta-tagged to meet the specific needs of different learners and groups
- Pilot implementations to show proof of concept

COL has already determined that the ultimate target should be smallholders in Africa, South Asia and small island states. However, in its first phase, the L3Farmers Project will first need to identify lead institutions and organisations, content providers, extension workers and local facilitators, and train them in ODL and ICT for non-formal adult learning (through ODL) and undertake or commission action research projects in conjunction with these agencies.

The L3Farmers Project will be distinguishable from other agricultural development initiatives in that it will:

- Involve NARES and developing country partners in conceptualisation, implementation and evaluation
- Provide an open learning system of programmes, professional development and instructional design in support of transforming extension in collaboration with global, regional and national partners.
- Involve non-traditional players in extension such as open universities, NGOs and community-based organisations (CBOs)

The crisis in agriculture in developing countries

Extent of the crisis

There are five billion people in low-income countries, most of whom still depend on the land for their livelihood. Seventy-five per cent of the world's poor live in rural South Asia and sub-Saharan Africa, and half of these are in regions where land is degraded and essential infrastructure is lacking.

Causes of the crisis

In the developed world, computers, advanced telecommunications, satellites and other technologies inform and guide farming, environmental management and the supply of agricultural commodities to global markets. In low-income countries, however, smallholders must still depend on basic methods and ancient tillage tools. They lack access to research and advisory and information services, and they are unable to afford modern technology or improved crop and livestock varieties. They have to cope with failed land reforms and corrupt development schemes, climatic and environmental damage, and new pests and diseases that are encroaching into previously uncultivated areas. And they are unable to take advantage of markets beyond their local communities. All of these circumstances lead to a food crisis, a decline in real income and increased human morbidity. The life is being sapped out of the land and its people, and there is significant migration to the cities by those in search of work. Those who remain see decline in their incomes and local communities. Their world is very different from 50 or so years ago when their working lives, calendar years and cultural activities revolved around subsistence farming and their social status was linked to the productivity of their farms.

Agriculture may still constitute a large percentage of the GDP, export earnings and employment of low-income countries, but crop yields and farmers' incomes are exceedingly low. World Bank President James Wolfensohn observes that while military spending worldwide is about USD1000 billion and spending on subsidies or tariffs to protect developed world farmers is about USD300 billion, the rich countries offer no more than USD50–60 billion in aid to developing countries and block most of their agricultural exports – one of the few ways in which low-income countries could pull themselves out of poverty.

Globalisation and trade reform may bring benefits to these smallholders in the longer term, but they are currently having a negative effect. Some smallholders are shifting from subsistence to market-oriented farming, but limited access to world markets, unfair marketing structures, protectionism, farm subsidies and other factors distort the prices for their produce. And the privatisation of resources and services, commercialisation and modernisation of agriculture and economic re-orientation of other government programmes are reducing access to extension and other support services to deal with this crisis.

Environmental degradation

Vast regions of the earth are being environmentally damaged by large-scale commercial mono-cropping and the worldwide demand for food, fibre, timber, etc. The decisions to do this are made elsewhere in the world, denying local communities control over what they can do on their own land. Changed ecosystems become susceptible to pests and other natural disasters and the genetic diversity of crops nurtured over the centuries is destroyed. The consequences are disastrous for the local indigenous cultures and for future generations.

Drought and desertification

Drought and desertification threaten the lives of over a billion people in 110 semi-arid countries and have long-term consequences for agrarian economies, particularly in sub-Saharan Africa and South Asia. The FAO sees preparedness as the most effective strategy to mitigate the effects of drought — and information and knowledge as the key to preparedness.

HIV/AIDS

HIV/AIDS was once largely an urban problem. Today, as the 2000 UN/WHO *Report on the Global HIV/AIDS Epidemic* shows, farming communities in low-income countries are being devastated by this pandemic, particularly in sub-Saharan Africa. In Zimbabwe, 44 per cent of women on farms are HIV positive, and in Swaziland, 25 per cent of farming women have the virus. HIV/AIDS represents not only a health problem but a food security and economic problem. Food production has dropped by 40 per cent in AIDS-affected farming communities, and in the worst-hit African countries 26 per cent of the agricultural labour force will be lost over the next 20 years. The FAO is currently planning programmes in labour-saving techniques, low-input agriculture and ways of passing on farming knowledge to future generations in AIDS-decimated communities in Africa and Asia.

Feminisation of farming

The 1990 FAO *Plan of Action for Women in Development* and other studies show that agriculture in developing countries is being “feminised.” Climatic, environmental, social and economic change is leading to male labour force migration and farm management falling into the hands of women. Lacking capital, labour, time and the educational levels of the men, these women are forced to make changes in the farming methods that lead to decreased production, less nutritious crops and pauperisation.

Food and nutritional insecurity

While the developed world improves its food intake to the point that obesity is a problem, FAO/WHO state that 730 million people in low-income countries receive insufficient calories to sustain an active working life and 340 million to avoid stunted growth and serious health risks.

These problems are particularly acute in sub-Saharan Africa and South Asia.

Rural-urban migration

Populations are not only continuing to grow but the number migrating into the cities is increasing. FAO estimates that by 2005, over 50 per cent of the world's population will be living in cities. This means that far fewer people will be directly engaged in agriculture and there will be an enormous strain on the food production and distribution chain in the poorer nations. Rural farms will lack the infrastructure to transport, process and store food. Urbanisation will eat up productive land and make the food chain ever more extended and tenuous. Urban farms may have access to infrastructure but will carry the risks of contaminated food supply. The FAO sees it as critically important to improve the food supply and distribution chain in rural, peri-urban and urban areas and to train farmers and local authorities in quality and safety assurance in the production, processing, packaging, transportation, storage and marketing of agricultural produce.

Changing economic policies

Smallholder farmers in low-income countries are being severely disadvantaged by changes in economic policies and the widespread and premature withdrawal of public funding for extension and research. Under National Food Security approaches such as the green revolution, publicly funded agencies used to provide free information and training. Today, there is an expectation that "the market" will provide these services. However, it is too costly for the market to assist small, isolated pockets of farmers; it needs to deal with large or aggregated groups. Wealthy farmers may be able to access and afford commercially provided information services and thus profit from the new market economy, but not the smallholders. To improve or even safeguard their livelihoods, smallholders must either form themselves into groups or be excluded from agricultural development.

New technologies

New technologies hold great promise for agriculture in low-income countries. ICT can provide access to information and advice to improve farming practices, market participation and natural resources management. Biotechnology can improve not only major commercial food crops but the traditional crops of smallholder Africa and Asia. And material science can help in soil and water management and reducing environmental degradation. However, the availability of, and smallholders' access to, these new technologies, which were formerly seen as for the public good, are increasingly affected by the withdrawal of public sector support, growth of privatisation, rise of new trade regimes, and limitations such as the imposition of intellectual property rights.

Interest in ICT for development is over 20 years old. Despite much talk of new models of social investment, provision has been through short-term donor or NGO funding with an overlay of venture capital rhetoric. Applications have mainly been defined by the providers, government or NGO "gatekeepers," rather than by the end-users, the smallholder communities. They have also been handicapped by the fact that ICT specialists are not attuned to the context and that the providers lack the knowledge and skills needed to find solutions using ICT.

Agricultural development in developing countries

Needs

The above observations show that universal and equitable agricultural extension and development are essential to save hundreds of millions from poverty, malnutrition and starvation; stem deterioration in natural resources; save countries from bankruptcy; and deal with the crisis caused by the exponential growth in world population, rural exodus and changes in food preferences, climate, technology and economics.

The FAO states that there is need for agricultural development ranging from the application of agro-biotechnologies through sustainable agriculture and natural resources management to making the most of local indigenous knowledge. It suggests that more dialogue and training is needed to overcome the profound mistrust in technology development and transfer that exists between developed and developing nations, rich and poor farmers, corporate and public sectors and research priorities and farmers' needs. It also argues for the need to develop and share the accumulated knowledge and biodiversity represented in the indigenous sustainable land use and management systems that have developed over millennia and that can make an enormous contribution to food security, agricultural biodiversity and natural and cultural heritage.

Unfortunately, knowledge and information provision for the rural poor currently receives low priority and has little impact. There are strong arguments not only for extending but transforming extension.

Transforming extension

Conventional agricultural extension has essentially been concerned with the transfer of findings from the laboratory or experimental farm to the smallholder with the aim of improving performance and output. It has largely failed because of its deficit approach to learning and slow, piecemeal and spasmodic response to changing needs and opportunities, the farmers not understanding or seeing the relevance of findings, and extension providers lacking the networks, time, resources and capacity to support the follow-up.

Newer approaches such as Farmers First, Farm Field Schools and Farmer Participatory Research avoid treating smallholders as empty vessels to be filled with information from outside sources:

- In Farmers First, extension workers build local networks of farmers, help them identify the needs through external rapid rural appraisals (RRAs) and local participatory rural appraisals (PRAs). They then work with the farmers to develop and apply the new ideas and practices according to their own priorities.
- In Farm Field Schools, extension personnel involve farmers in experiential learning that follows the natural cycle or seasonal process of the topics under review and deals with the "whys" as well as the "hows." Where the extension workers are unable to spend sufficient time with the communities, local radio or e-mail is used to strengthen communications and/or local facilitators are identified within the farming communities.
- In Farmer Participatory Research, researchers and extension workers involve the smallholders in the research design, data gathering, analysis and decision-making and encourage them to experiment on their farms and spread the new practices to other farmers.

These newer approaches to extension involve 'learning by doing.' Research and extension is not treated as a discrete action, distinct from the views and interests of the farmers, but as an integrated, empirical, social and political development process.

Reconciling the local knowledge and indigenous practices of smallholders with up-to-date scientifically informed understandings of sustainable production requires a total transformation of extension. The FAO report, *Improving Agricultural Extension*, stresses the need to develop self-help capacities within farming communities so that when external support is withdrawn, local players who understand the local communities and their needs can become the leaders and facilitators. The Neuchâtel Group report, *A Common Framework for Agricultural Extension*, notes the need to widen the range of providers to include public and private research and development agencies, media and information organisations, community groups, NGOs, etc.

It must be recognised that the community is the prime target and discussion the main means of learning. The learning resources and instruction methods need to be selected on this basis. The communities need to be enabled to work out for themselves the actions needed, by

whom and on what basis. At each stage, they will go forward only if the preceding phase has gone well. This is how Kofi Annan successfully carries out his stewardship of the UN: not by using the US governance culture of imposing strategies on others but by the decision-making process of the African village, holding lengthy discussions and allowing plenty of time for reflection before seeking consensus and closure.

Smallholding practices are not simply shaped by the farmer but by the household and wider community. Studies show that family- and community-based learning has greater impact and is needed to ensure that crucial gender, generation and social issues are addressed. For example, women's roles are often traditionally differentiated. Their social networks are primarily with other women and their access to information may be constrained by men and their status and lack of education. Their information and learning needs may therefore be totally different.

Carrying out interviews for the book, *The Japan We Never Knew*, environmentalist David Suzuki met a farmer, Kawaguchi, who is an advocate for radical agricultural reform. Kawaguchi observes that changing the farming practices of his family and neighbours is not easy, that they say "We are shy to try something different." But he then observes, "We only need about three out of ten people to overcome this inertia. After that, when five out of ten are doing it, the rest will be shy about being left out."

Extension may also need to take account of traditional calendars and weather forecasting methods, and recognise that plants and animals often have cultural as well as culinary attributes. It may also have to deal with areas where there is indirect or evasive communication, things are left unsaid and issues remain buried.

Landless agricultural labourers constitute a major part of the agricultural sector in South Asia and sub-Saharan Africa. They too can have an enormous effect on productivity, quality control, post-harvesting management and marketing. Capacity-building programmes also need to reach this large group.

In all of these interventions, extension needs to deal with the four stages of transition: denial, resistance, exploration and commitment.

- At the *denial* stage, farmers may reject any idea of a need for change. Their orientation is to traditional values and practices. This calls for a raising of awareness of the need for change and demonstration of the benefits to be gained.
- At the *resistance* stage, the farmers' over-riding concern will be self-protection. Here the training has to be concerned with empowerment as well as knowledge and skills building.
- At the *exploration* stage, the farmers need to be helped to realise that things do not always work out right the first time.
- At the *commitment* stage, the orientation needs to be to the future so that not only will the farmers be capable of change but be able to envision the need for further change.

Using ODL and ICT

Extension can be further transformed and extended by using ODL and ICT. Given the necessary infrastructure, skills and funding, multimedia materials and advice and feedback can be provided from multiple sources to bridge the informational, motivational and training gaps in rural and remote communities.

All of the points discussed in the section above need to be borne in mind when using ODL and ICT in extension. The central issue is not the courseware, content or technology, but creating the networks and social dynamics needed to bridge local and external ideas and practices and acquiring and applying new learning.

To have any impact, the content and presentation must be in forms that are appropriate to the communities and their needs and circumstances. Sophisticated learning materials using jargon and specialised or technical language will mean little to those lacking in literacy or basic educational opportunity, or who traditionally acquire their values and knowledge orally

or by example through their elders. Language is another constraint. Many smallholders do not speak English and even extension workers may have problems functioning in an English-language environment.

ODL, e-learning and the rise of virtual providers and consortia are seen as offering an exciting new paradigm for extension. However, to date relatively little support has been given to this work. International and national agencies have begun to make materials available on the Web or on CD-Rom to help NARES build capacity, but this work has rarely been given high priority and few of the providers have had the funds, infrastructure, knowledge or capacity to address the massive task of worldwide agricultural development. As the case studies show, a number of these initiatives have only been short-term or have failed to become institutionalised. In most cases, they have taken the form of information or communication systems rather than open learning programmes. There is great need for an open learning network, a repository of materials and online services that enable smallholders who encounter difficulties or see need for change to access the necessary information and training as demand dictates. This is a major and long-term task, calling for multiple inputs and major funding.

Computers and Internet and satellite technology are probably the long-term solution for virtual extension. But connectivity in many of the regions targeted is still a problem. Access is improving, particularly in telephony, but many communities still lack the connectivity, electricity, funding and skills to exploit electronic technology. In many areas, the most accessible media are radio, newspapers and television, which mainly provide entertainment and information irrelevant to community needs, a situation only worsened by globalisation and privatisation.

Internet penetration is low in Africa, small island nations and Asia (discounting the region's most developed and urbanised countries, Hong Kong, South Korea, Singapore, Taiwan, Japan, Malaysia and Macao) and concentrated in urban centres. Telecommunications is an almost entirely price-driven business offering low returns except from corporate customers, and so users in low-income countries and rural and remote areas must pay highly for access and usage. And much of the Internet-based information currently available is unsuited to the needs, reading skills and comprehension levels of the smallholders.

There is, therefore, need to think not simply in terms of online learning, but also of the use of audio and videotapes, interactive radio, VCDs, CDs, DVDs, cellular telephony, SMS, etc. Where teledensity is low and devices and delivery are high relative to local incomes, the digital divide can also be bridged by using telecentres (multi-purpose community-based ICT centres), cyber-café's, points of presence (POPs), and vehicles equipped with peripatetic ICT facilities. Community access systems such as Warana Wired Village, Cyber Grameen and Rural Access to Services through the Internet (RAS) in rural India, and the IDRC/Acacia telecentres in Africa have shown that there are viable markets for tele-learning, tele-medicine and tele-health, e-government and e-commerce in poor rural areas. The success of such initiatives depends on their content and information provision, not simply the technology and connectivity. Some telecentres have failed due to inadequate needs analysis or failure to provide information and communications that accorded with local needs and forms of interaction. Some have been short-term subsidised interventions without any provision for long-term sustainability and have struggled or closed when donor support has ended.

ODL and ICT ventures in extension require sound business as well as educational planning.

The following table lists some applications of ODL and ICT in agricultural development.

Examples of non-formal ODL and ICT applications in agricultural community development

Title	Description
GENERAL	
Farm forums	Farm forums began in Canada in the 1940s and have been used in, for example, India, Ghana, Tanzania, Botswana, Zambia, Benin, Niger and Senegal. Radio programmes on farming issues are produced in collaboration with extension services and broadcast using a "listen-discuss-act" approach to audience participation.
Radio club	This francophone version of farm forums focuses more on empowerment. It involves the listeners in selecting the topics for investigation, collecting the information, producing the programmes and finding solutions to locally determined problems.
Radio campaigns	Like farm forums and radio clubs, radio campaigns can involve study groups and print materials for follow-up, clarification, contextualisation, decision-making and action. However, they run for shorter periods and are often more tightly focused, sometimes only dealing with single issues. They may involve several agencies and use study group leaders for local discussion of issues covered in the broadcasts. Radio campaigns have been successfully employed in India, Tanzania, Botswana and Zambia.
CGIAR Learning Resource Centre (CGLRC)	CGLRC (www.knowledgebank.irri.org/cglrc) was designed to provide CGIAR learning resources in standardised electronic format to the agricultural and natural resources management community. This pilot repository of learning objects was hosted by IRRI in the Philippines and the intention was that national institutions could use these learning resources and adapt them to the language, contexts and needs of their users. Extension workers and farmers literate in English could also use some of these materials. The learning resources included decision support tools, techniques in dryland agriculture, fishing and aquaculture, forestry, law and policy on the management of plant genetic resources, livestock breeding and diseases, plant breeding and genetics, rice production, soils, water and irrigation, and training materials for trainers. In many ways CGLRC foreshadowed what is recommended for the L3Farmers Project but the site was only a pilot and is now only accessible on special request to the International Rice Research Institute (IRRI).
ISNAR Learning for Institutional Innovation	ISNAR (www.isnar.cgiar.org) was supported by CGIAR in the Hague. Its aim was to contribute to the generation and use of knowledge to foster sustainable and equitable agricultural development and help bring about innovation in agricultural research institutions in low-income countries through the use of training modules and materials, distance learning programmes, publications, and radio and TV programmes, action-oriented learning and group work grounded in work contexts. It ceased operation in 2004.
Rice Knowledge Bank	Developed by the IRRI, the Rice Knowledge Bank (www.knowledgebank.irri.org) is a comprehensive digital library designed for those who work with farmers, governments and NGOs and comprises learning materials, reference guides, decision support tools and biological databases, discussion areas, news, updates and publications.
IRRI Rice Web	IRRI Rice Web was a pilot site providing a compendium of the history of rice, its production, processing and trade, recipes, research issues, terminology and literature. It was developed by the IRRI in the Philippines, in collaboration with the West Africa Rice Development Association (WARDA), Cote d'Ivoire and Centro International Agricultural Tropical (CIAT, Colombia). It has received international recognition as an outstanding educational Web site. This now resides with the Rice Knowledge Bank (www.knowledgebank.irri.org), a more heavily trafficked site.

World Agroforestry Centre (ICRAF)	ICRAF (www.worldagroforestrycentre.org) has been designed to raise awareness and provide training in agroforestry and integrated natural resource management. It works in collaboration with a consortium of educational and training institutions and its target groups are the rural poor in tropical developing countries. It is beginning to use ODL and ICT to deliver its programmes and link with other global providers and learning systems.
Virtual Academy of the Semi-Arid Tropics (VASAT)	VASAT (www.vusat.org) is an information, communications and non-formal distance learning consortium for rural communities and intermediaries led by the International Crops Research Institute for Semi-Arid Tropics (ICRISAT) (www.icrisat.org). It comprises an e-library, a compilation of training material and other resources. VASAT's partners are research institutions and councils, higher education institutions, corporate bodies, state government bodies and project groups, the COL, the International Water Management Institute, South Asia Regional Office, ISNAR and the International Livestock Research Institute in South Asia. This coalition shares information, knowledge and skills related to climate literacy, drought preparedness, best practice in dryland agriculture and other issues through ICT and distance learning. VASAT is currently planning to design, develop and test ICT-based information exchange models and a learning objects repository and link rural communities and their organisations with international and national centres of excellence and expertise in drought and desertification management. It will do this in collaboration with the CGIAR partners such as FAO, COL and NARES, intermediary organisations and the rural communities and it will adopt a common approach with the proposed CGIAR KM-ICT and learning projects.
Agricultural Knowledge and Information Systems (AKIS)	AKIS has been developed by the World Bank and FAO to link farmers, agricultural educators, researchers and extension workers and to generate, share and utilise agriculture-related technology, knowledge and information. This Web site covers topics such as livestock and animal resources, fisheries and aquaculture, crops, markets and agribusiness, producer organisations and irrigation and drainage.
COL and FAO-CGIAR Knowledge Finder on Food Security, Environmental Sustainability, and Rural Development	COL gathers information on ODL material dealing with agriculture, environmental sustainability and rural development and makes this more widely available through a Web site (http://colfinder.org/food). The information sources are all full-text, on the Internet and in the public domain. The information is indexed by the server and checked frequently for any changes, updates or additional documents. Dead links are automatically removed. The system enables users to search all sites simultaneously at no cost. Additional research tools are available at a low subscription rate.
Access to Global Online Research in Agriculture (AGORA)	The AGORA Web site (www.aginetwork.org/en/) provides free or low-cost access to over 400 journals in the fields of food, agriculture, environmental science and related social sciences. It is available to students and researchers in qualifying not-for-profit institutions in eligible developing countries. AGORA is an initiative by FAO and a range of public and private sector partners: Blackwell; CABI; Elsevier; Kluwer; Lippincott, Williams & Wilkins; Nature Publishing Group; OUP; Springer Verlag; and John Wiley and Sons. The Cornell University Mann Library, Rockefeller Foundation, DFID and USAID provide funding and support. The Web site has been developed collaboratively by FAO and Cornell University and is based on tools and systems developed by WHO for a similar service in health.
Virtual Extension-Research Communication Network (VERCON)	The Committee for Development Group, Extension, Education and Community Service (SDRE) and Research and Technology Development Service (SDRR), in collaboration with the World National Agriculture Information Committee (WAICENT) Outreach Programme, have developed concept models for using ICT for agricultural and rural development. One of these is the Virtual Extension-Research Communication Network (VERCON) which uses ICT to improve linkages between research and extension systems. A VERCON project is currently being implemented in Egypt (www.fao.org/sd/2001/KN1007_en.htm).

SUB-SAHARAN AFRICA

INADES-formation

INADES-formation (African Institute for Economic and Social Development) (www.sdnf.undp.org) operates primarily in francophone West Africa. It is designed for smallholder farmers and uses print, radio, audio and local facilitators to support group and individual study. It aims to give farmers the socio-economic power to become responsible for their own development and manage their own community resources. INADES programmes have been translated into more than 50 local languages. The programme has been effective in teaching young male farmers and extension workers, but participation rates have recently declined and the programme's focus is now moving to issues such as financial management and marketing.

University of Namibia Centre for External Studies: Action Research Pilot Project on the Use of Affordable Media in Northern Namibia

This programme has been established by the University of Namibia's Centre for External Studies, Faculty of Agriculture and Natural Resources and Department of Information and Communication Sciences in collaboration with local extension services and traditional authorities in the four regions served. It aims to provide education on animal husbandry for smallholders in the north-central regions of Namibia using radio, simple post-literacy printed handouts, audiocassettes, study groups and visits by extension workers.

ACACIA Initiative

The Canadian government, through IDRC, is supporting the Acacia Initiative Programme in Africa, which is designed to empower sub-Saharan rural communities in applying ICT for their own social and economic development and test ICT as a tool for transformation in developing countries. IDRC funds telecentres and ICT-based projects in collaboration with the International Telecommunications Union (ITU), UNESCO and national governments. The initiative operates as an integrated research and development programme in applications, technology, infrastructure and governance. Acacia also supports Canada's contribution to the African Information Society Initiative (AISI) (www.bellnet.org/partners/aisi) which has been endorsed by African governments as an action framework to build Africa's information and communication infrastructure. Acacia I operated in Senegal, Uganda, Mozambique and South Africa. Acacia II will continue in Uganda, Mozambique and Senegal, but will also operate in South Africa in partnership with the Development Bank of South Africa, Angola, Namibia, Tanzania, Kenya, Rwanda, Benin, Ghana, Egypt, Tunisia and Morocco.

Information and Communication Support for Agricultural Growth in Nigeria (ICS-Nigeria)

ICS-Nigeria (www.ics-nigeria.org) is a USAID pilot project aimed at strengthening the capacity of farmer assistance organisations in six states of Nigeria by identifying, developing, packaging and disseminating agricultural information in print, radio, video, CD-Rom and the Internet through farmer resource centres. One training programme is an illustrated guide in pdf for semi-literate farmers on how to grow cassava commercially.

Electronic Delivery of Agricultural Information to Rural Communities in Uganda

This project (www.agricinfo.or.ug) operated in Central Uganda in 2000–2002 in response to the need for information on new skills and farming techniques among rural communities. The project was funded by IDRC and was a collaborative effort between the National Agricultural Research Organisation (NARO) and CAB International (CABI). It involved assessing the information needs and ICT preferences of rural farmers, women's groups, extension workers, youth groups, NGOs and community-based organisations; identifying, acquiring and repackaging agricultural information, research findings and indigenous knowledge from Ugandan and international sources into appropriate formats and languages; empowerment and capacity-building within the local communities; facilitating extension workers through training of trainers workshops; and developing a sustainable business model for these products and services. IDRC-supported telecentres served as resource centres, providing access to the Agricultural Research Information Service (ARIS), training resources, reference materials, market information, e-commerce opportunities, and various advisory services.

Commonwealth of Learning Media Empowerment (COLME) in Ghana

COLME (www.col.org) has set up a pilot project using digital video technology to produce instructional programmes for farmers. It works in collaboration with in-country agencies, identifies rural community needs and provides training for extension workers in shooting and editing videos addressing regional concerns. The tapes are used by extension officers and/or broadcast nationally. In Ghana, COLME is aimed at addressing the high rates of illiteracy among smallholders and lack of training for women smallholders, despite their traditional predominance in food production, and the project is managed by the Women in Food and Agricultural Development Unit of the Ministry of Food and Agriculture's extension service.

AGRINET

AGRINET is the communication network of the Agricultural Services Sub-sector Investment Programme (AgSSIP) in Ghana. It is designed to improve the flow of information between Ministry of Food and Agriculture offices, agricultural researchers, extension officers, students and universities. A Web-based agricultural information system is being developed for smallholders, traders, researchers, and the general public.

Simli (Friendship) Radio

Simli (Friendship) Radio broadcasts throughout northern Ghana, with assistance from the Danish aid agency, Danida. It provides educational and extension services, using local agricultural information to support "school for life" programmes for eight- to 12-year-olds and adult learning programmes. Local schoolteachers are trained to integrate these programmes into their classes to enable local communities and smallholders to improve their skills and literacy. The agricultural extension programmes are prepared by community radio extension officers who visit the smallholders to discuss their problems and priorities and then record discussions with local experts, interviews with smallholders, etc. The programmes are broadcast in local languages, and are far more accessible to local smallholders because they can hear themselves and their neighbours discussing issues.

World Bank Agricultural Extension Centres

The World Bank has set up ICT-supported agricultural extension information and communication centres throughout Tanzania, where 30 per cent of places are reserved for women.

Radio Apac

Radio Apac is an initiative of COLME. It is a community radio service that broadcasts in Luo language in northern Uganda from a radio station that fits into a suitcase. The system comprises earphones, a microphone, a mixer, two tape recorders/players, two CD players, a transmitter, and a hook-up to commercial FM networks and satellite feeds for off-air programming. It can broadcast up to a 50 kilometre, run on a car battery and be modified for solar power. The system costs USD3500, a fraction of the cost normally associated with radio broadcasting. Similar systems are in use in Canada Jamaica, and several countries in Africa and South America.

International Women's Tribune Centre (IWTC)

IWTC in Uganda, in partnership with IDRC, has developed a rural extension system offering direct access to information for poor women with minimal education. The first programme is a CD-Rom, "Rural Women in Africa: Ideas for Earning Money."

Arid Lands Information Network-East (ALIN-EA)

ALIN-EA is a network of community development workers and extension staff involved in dryland development. In partnership with the WorldSpace Foundation, digital satellite broadcasting technology is used to disseminate information to remote areas via the AfriStar satellites and simple radios. ALIN provides ICT training to community development workers so that they can educate local people about new water-saving technologies that increase crop yields. In collaboration with the Intermediate Technology Development Group (UK) and DFID, ALIN is assessing the potential benefits of satellite radio for isolated rural communities in Kenya, Uganda, Tanzania and Ethiopia. Extension staff and community development workers report that the system allows them to access and share a wide range of information, but that the information was often too technical, the equipment was prohibitively expensive, and the one-way transmission prevented

the all-essential feedback.

Panos Institute West Africa

Panos Institute West Africa has set up a production studio in Mali that serves a network of 23 journalists in francophone Africa who produce documentaries and educational programming for rural communities. More than 100 documentaries have been produced and distributed to 100 independent community stations in West and Central Africa. Panos has compiled a database of the radio programme materials, which are available on cassette or via the Internet for community radio stations to use directly or translate and assimilate into local programmes.

Le Réseau d'Information et de formation sur le sustainable développement (RIFOD)

RIFOD has initiated a Web and CD-Rom-based information platform on sustainable agricultural development for Burkina Faso called DEVENET. This draws upon the results of research and input from the local communities and examines methods, practices, experiences and thoughts in agriculture, tillage, water, environment, gender and development.

Centre interafricain d'études en radio rurale (CIERRO)

The pan-African Centre for Studies into Rural Radio (CIERRO) in Ouagadougou uses the Internet, CD-Rom, and community, local and rural broadcasting within member countries to improve communications between national co-ordinators and their partners.

ASIA-PACIFIC

All India Radio Farm School Programme

This programme began in the 1960s, had considerable success and reached many thousands of smallholders. The programmes were broadcast in 144 districts and special farm units were established in 46 radio stations to provide a farm broadcasting service daily.

Kothmale Community Radio

The Kothmale Community Radio Internet project (www.kothmale.net) was designed to test an ICT access model for 200,000 people in marginalised communities in the central hill region of Sri Lanka. Supported by UNESCO, the project used community radio as an interface between the community and the Internet. The community radio station broadcast daily "radio browsing the Internet" programmes in which the presenters, supported by studio guests, browsed the Internet live with listeners who had requested them to surf the Web on their behalf. The information accessed was explained and contextualised with the help of the studio guests. The communities were also encouraged to develop their own Web sites and produce content that could then be hosted on the station's server. Users included local farmers and producers.

Tamil Nadu Agricultural University (TNAU)

The TNAU Directorate of Extension Education was one of the pioneers in distance education to help farmers, farming women and rural youth in India learn new production technologies and adopt new technologies. The Directorate provides Farm Schools on All India Radio, which broadcasts 13 lessons over three-month periods at the rate of one lesson per week and organises one-day contact programmes for participants to discuss issues with the scientists and programme's presenters. It also offers correspondence courses, also conducted over three-month periods by mailing out six audiocassette and print lessons per fortnight and organising three-day contact programmes at the end of the courses. Video lessons in agriculture and allied fields are also broadcast or distributed on cassettes to farmers, extension workers, government and non-government organisations, etc. The Directorate plans to strengthen its ICT system.

Yashwantrao Chavan Maharashtra Open University (YCMOU) Extension, Community Education and Non-qualification Programmes

YCMOU (www.ycmou.ac.in), which was established as a state open university in 1989, works with local government agencies and NGOs to provide non-formal education on agriculture and crop production and other programmes, using distance education and self-study print and audiovisual materials, study groups and practical demonstrations.

National Institute of Agricultural Extension

MANAGE (www.manage.gov.in) is responsible for the Innovations

Management (MANAGE)	in Technology Dissemination (ITD) component of the National Technology Project (NAPT) being implemented with World Bank assistance by the India Ministry of Agriculture. ITD will provide computers and Internet connection for all participating agencies, researchers, extension managers and farmer clients in 28 districts in seven states, videoconferencing between the participating organisations, training and information for farmers on, for example, crop technology and market intelligence, and funding for the communication costs. It has also set up a network of information kiosks to provide training in and access to ICT for disadvantaged rural communities. These kiosks offer information on farmers' rights, loans and grants, etc. The basic aim is to re-orientate extension to be more demand-driven, integrated with research and directed towards self-sustainability and farmer-centred decision-making.
NAARM Virtual Learning Centre (VLC)	VLC is a pilot site of the National Academy of Agricultural Research Management in Hyderabad, Andhra Pradesh, designed to build the capacity of India's National Agricultural Research System (NARS) in Research Management by providing online, non-formal, free learning in agricultural research management, information management and human resources management that can be emulated by the various institutions of NARS. The courses are designed by the faculty of NAARM to be interactive.
M. S. Swaminathan Research Foundation (MSSRF)	MSSRF (www.mssrf.org) seeks to impart a pro-nature, pro-poor and pro-women orientation to job-led economic growth in rural areas by harnessing science and technology for environmentally sustainable and socially equitable development. Its Honda Informatics Centre collects, collates and disseminates actionable information through various database services. The Farmers' Rights Information Service is a multimedia database on agrobiodiversity in India and tribal communities' contributions to conservation and biodiversity. The Every Child a Scientist Centre provides underprivileged children with opportunities to nurture their inherent talents through the use of ICT. The Information Village Research project, Pondicherry, uses ICT and local languages to provide market information, education, employment news, and information on health, crops, weather and fishing conditions to 12 underprivileged villages. The Hindu Media Resource Centre takes scientific issues to the wider community. The MSSRF-TATA Virtual Academy for Food Security and Rural Prosperity is also under development.
Gyandoot	Gyandoot (www.gyandoot.net) is an award-winning intranet in Dhar district in Madhya Pradesh that connects rural cyber cafés to the Internet and serves the everyday needs of the local people. The cyber cafés are located on the roadsides of the central villages where people normally travel. Together, they serve over half a million rural people, who can access prices and volumes of local and national agricultural produce markets on a daily basis, print out land records for crop loans from banks, apply for caste, income and domicile certificates and other government services, gain public grievance redressal, and access rural Hindi e-mail, employment news, a rural newspaper, and various e-learning and e-advisory services.
Indian Society of Agribusiness Professionals (ISAP) e-groups	ISAP (www.isapindia.org) is a network of professionals in India and the SAARC countries that serves farmers and small rural entrepreneurs and the many agricultural graduates who fail to find gainful employment or work in isolation. It uses a mix of face-to-face meetings, seminars and workshops, e-mail, discussion lists, SMS, telephony, a Web site and agri-clinics to share information nationwide. It is run by professionals in irrigation, food processing, international trade, research, agricultural extension, etc. It is probably the largest agriculture and rural development professional network in the world. It has over 9000 members, 75 chapters, 400 NGO partners and 110,000 farmer sign-ups, and it has answered well over 3000 queries/problems raised by the farming communities. ISAP was selected by Digital Partners, USA, as one of the Most Promising Social Enterprises for their 2002 Award.
ITC's E-Choupal	The India Tobacco Company (ITC) began E-Choupal as a cost-effective means of dealing directly with farmers to buy agricultural

products for export. The system is now becoming a meta-market for rural India. Farmers can strike orders with ITC directly through Internet kiosks, the ITC and the farmers achieve savings by bypassing the middlemen, and the local entrepreneurs gain commissions on the transactions made through their kiosks. The kiosks can also be used for companies to sell products and services directly to the farmers and to train the farmers in how to use these. The system is developing into a one-stop shop for selling and buying of a range of products and services including government services in the rural market.

Indiagriline by EID Parry

The AgriPortal of EID Parry (www.indiagriline.com) is designed to address the specific needs of the rural farming community and catalyse e-commerce in agricultural and non-farm products by offering a network of partnerships. The content is developed in Tamil by EID Parry in collaboration with the Tamil Nadu Agriculture University and its Research Stations, Tamil Nadu University for Veterinary and Animal Sciences, National Horticulture Board, AMM Foundation, Murugappa Chettiar Research Centre, and other players in agricultural media and publishing.

Multichannel Learning Centres

The Education Development Centre (EDC) in Papua New Guinea provides technical assistance in community-based learning for sustainable development. With funding from the Norwegian Rainforest Foundation, the EDC has teamed up with partners to organise the 10 tribal groups of the Managalas Plateau into a micro-enterprise to jointly harvest, market and export local crops. EDC provides multichannel learning centres (MCLs), which use a variety of media to educate the people about the issues involved, and interactive radio instruction that combines broadcasts, drama, and audience participation. Local clans gather around the radio, listen to the programmes in pidgin and then hold meetings on managing and conserving the rainforest under threat from loggers and land developers. This approach has been found to be an improvement on earlier efforts that were over-reliant on extension workers with a limited understanding of the issues and used print materials that the people found difficult to follow. The programmes are also distributed to students in schools, women's groups, and literacy and reading clubs.

PinoyFarmer Business Development

PinoyFarmer Business Development was initiated by the Philippines Department of Agriculture in partnership with Winrock International to develop an ICT-supported extension service. The project aims to help local farming and fishing communities to make sound business decisions, create new business opportunities, and achieve profitable and sustainable innovations. The farmers can access information on new technologies and markets through radio and TV programmes and receive support for improved crop production, quality control methods, processing, packaging and marketing.

Asia Pacific Regional Technology (APRTC)

APRTC is an independent, non-profit organisation dedicated to improving the welfare and knowledge of low-income country farmers and the promotion of sustainable agricultural practices. It provides continuing education through an e-learning system called agLe@rn (www.aprtc.org/agLe@rn). The agLe@rn courses contain interactive components and cover topics such as ICT for agricultural professionals, integrated pest management in rice, cotton and vegetable cultivation, responsible pesticide use and integrated soil fertility management. They involve Tamil Nadu Agricultural University, University of Agricultural Sciences – Bangalore, G.B. Pant University of Agriculture and Technology, WorldView International Foundation and private sector representatives CropLife Asia and CropLife International. APRTC also links with ITC's e-Choupal Initiative to reach smallholder farmers. APRTC's Web site and courses are hosted on a server managed by the Japanese Ministry of Agriculture, Forestry and Fisheries. APRTC may be seen as engaging in many of the activities proposed in the L3Farmers Project report but suffer from a lack of donor support.

FAO Regional Office for Asia and the Pacific (RAP)

RAP, at the request of the Government of Thailand, is training extension workers in the use of handheld computers containing a decision-support programme for maize farmers. The programme

guides them on how much fertiliser to use, the optimum planting dates, and the expected yield. The project aims to save foreign exchange by reducing wasteful use of imported fertilisers, and the experience gained from this project will be used to develop similar computerised farm decision support programmes for other crops.

Knowledge Networking for Rural Development in Asia/Pacific Region (ENRAP)

Knowledge Networking for Rural Asia/Pacific Projects (ENRAP) (www.enrap.org) is an IFAD and IDRC funded initiative to support knowledge networking in rural development projects in the Asia-Pacific region through strategic uses of ICT by project staff and, ultimately, agricultural communities.

Pan Asia Networking

Pan Asia Networking is an IDRC initiative designed to help researchers and communities in Asian countries find solutions to their social, economic, and environmental problems, understand the positive and negative impacts that ICT can have on people, cultures, economies and societies, and develop ICT applications that can promote sustainable development.

CARIBBEAN

Caribbean Agricultural Information Service (CAIS)

CAIS aims to improve access to information that will have a direct impact on agricultural development through national networks, reform extension systems for the rural poor and provide new ICT-based forms of extension and information services for rural development.

Community Knowledge Sharing (CKS)

This MIT eDevelopment Group initiative in the Dominican Republic is an Internet-enabled asynchronous messaging system designed to extend the benefits of network connectivity into rural areas and break down language, literacy and usability barriers within and between communities. Recognising that large segments of the rural population have low levels of literacy, CKS uses an icon-based design and the system can be customised according to the abilities and preferences of the users.

Rural Universe Network (RUNetwork)

The RUNetwork in Jamaica is a project of the Caribbean Agricultural Information Service (CAIS) that uses Internet tools to improve the exchange of knowledge and experience between rural communities, researchers and extension services. It also extends access to information through "information cafés" which are equipped with Internet connection. CD-Rom information and printers, scanners, digital cameras and audio recorders facilitate the collection of local information.

Inter-American Institute for Cooperation on Agriculture (IICA)

IICA's Caribbean Agro-Entrepreneurs Distance Learning Centre offers Internet and CD-Rom courses through the IICA AgriDistance Learning and Training Centre in Jamaica which also has chapters in Barbados, Dominica, St. Lucia and Trinidad and Tobago. The Centre provides training in various aspects of agriculture through a variety of media to develop cadres of professionals, managers and technicians who can lead the economic diversification and technological modernisation process needed to enhance the productivity and competitiveness of the Jamaican agricultural sector. Institutions and agencies collaborating with IICA in developing these courses include McGill University and University of Nova Scotia in Canada and Caribbean Export and The Seven.com in Barbados. Current courses cover information and extension in agriculture (CD-Rom), an introduction to e-commerce (Web-based), organic farming for entrepreneurs (CD-Rom), farm management (Web-based) and health and occupational safety for entrepreneurs (CD-Rom).

Fintrac Agribusiness Support in Honduras

After the devastation caused by Hurricane Mitch in Honduras, US-agribusiness development consultancy Fintrac used ICT — global positioning system (GPS) devices, portable weather stations, digital cameras, laptops, portable printers and cell phones — to enable extension officers to immediately access vital agricultural information and make recommendations to farmers on the spot. This approach allows extension workers to spend 95 per cent of their time in the field rather than the office and has been shown to be effective in providing information to field technicians, lead

partners and smallholders and contributing to development along the farm-to-market chain. New proprietary software, the Client Impact and Results Information System (CIRIS), has been designed. It not only allows the field technicians to access individual client data and follow up on local technical assistance requirements but to view recommendations on a crop-specific basis by other field staff across the world. In the future, all Fintrac laptops will have fully replicated versions of the master database so that field staff do not need to be online, something which is critical when they are based in remote areas with only sporadic Internet access.

**Commonwealth of Learning Media
Empowerment (COLME) in the Caribbean**

COLME uses digital video technology to produce instructional programmes for farmers in the Caribbean. It works in collaboration with local agencies in response to community needs, and provides training for agricultural extension officers so that they shoot and edit videos that address regional concerns. The tapes are used by the extension officers and/or broadcast nationally. This approach has been used in St. Kitts and Nevis, Dominica, Grenada, Trinidad and Tobago and Jamaica, supported by the Rural Agricultural Development Authority (RADA). COLME programmes in the Caribbean focus on fostering agribusiness opportunities and environmental sustainability. The advantages of video are that it allows for gathering of local content, it avoids the problem of hilly terrain blocking transmissions, the visual information tends to be of greater value to farmers (many of whom have VCRs and TVs), and the extension workers can still serve large numbers of farmers at a time when extension services are being greatly reduced.

Summary of findings

The following conclusions may be drawn from the above findings and used as guiding principles for the action plan and recommendations that follow:

1. There is enormous need for capacity-building in smallholder communities in low-income nations that are starved of research, advisory and information services.
2. There is correlation between education and improved productivity in the food-market chain.
3. Smallholders face a long-term crisis because of their inability to participate with equity in agricultural markets.
4. The lack of knowledge about the sustainable use of natural resources and appropriate agricultural technologies is leading to environmental destruction.
5. Extension and research needs to focus on the agricultural practices of the future, not the present.
6. Public funding for extension is reducing.
7. NARES cannot initiate reforms fast enough to cope with the rapid advances in globalisation, liberalisation, deregulation, market orientation and new technology.
8. ODL and ICT can provide more extensive, equitable, relevant, participative and cost effective education and empowerment for smallholder self-development.
9. Considerable effort and funding has gone into supporting ODL and ICT in formal education, but these have received insufficient priority in non-formal adult and community education.
10. International agencies, governments and the private sector need to make far greater and long-term investment in ICT and ODL for extension.
11. Rhetoric about ODL and ICT in extension has only recently been reflected in the reality.
12. Few of the research or extension agencies have the resources or capacity to undertake interventions on the scale needed or knowledge of how to plan, cost, design, deliver and evaluate ODL.
13. There have been few independent evaluations of the quality and impact of ODL or ICT in agricultural development.
14. Most of the networks established by research and extension agencies are top-down and provider-driven information or communications networks rather than open learning systems offering dialogue and collaborative learning.

15. Some ICT pilot programmes have been successful and replicable, but many others have not been sustainable or institutionalised.
16. A few ODL courses of high quality have been developed, providing proof of concept.
17. Some projects are designed to overcome language barriers and present technical information in forms suited to the smallholders, but some of the online material is better suited to the needs and comprehension levels of the scientists and technicians than the end-users.
18. Agricultural development agencies tend to establish their networks and programmes in isolation or small local partnerships. There is need to build on these initiatives and create a larger coalition, network and knowledge management system to apply ODL systemically to extension.
19. To achieve the necessary multiplier effect, the initial focus needs to be on training and providing ODL resources for the managers of extension services and the extension workers and local facilitators rather than the farmers themselves.
20. ODL needs to be multimodal, multimedia, with smallholders meeting in groups and collaborating in applying the new learning.
21. There is need to build bridges between indigenous culture and knowledge and scientific ways of knowing and doing things.
22. Flexible approaches are needed to take account of local infrastructure, human capacity and social dynamics needed to achieve the necessary learning and change.

PART 2: ACTION PLAN AND RECOMMENDATIONS

“The gift of material goods makes people dependent. The gift of knowledge makes them free.”
(E.F. Schumacher)

Action plan for 2004–2006

Collaboration between COL and CGIAR

COL is mandated to create and develop institutional capacity, foster alliances and build practical demonstrations or models of exemplary practice. It is also committed to developing collaborative programmes in food security, environmental sustainability and poverty reduction with CGIAR, FAO and other international and national agencies with mandates for agricultural and rural development. And CGIAR has piloted the online Learning Resources Centre (CGLRC), a repository of learning objects for use by extension officers and others working in the field. There is therefore need and opportunity for COL and CGIAR to collaborate in:

1. Establishing strategic and working links with major donors such as FAO
2. Championing ODL and ICT for extension and seeking long-term funding and support from international and other donors
3. Providing the necessary expertise in instructional design and ICT and developing, adopting or adapting resources for new, improved and extended extension in low-income countries
4. Developing an open learning network for collaborative participatory extension in conjunction with NARES, universities, colleges, NGOs and other public and private organisations interested assisting farming communities in sub-Saharan Africa, South Asia and small island states
5. Building on the concepts of the CGLRC and APRTC pilots to create a knowledge management system, a network of Web-based portals through which international and national public and private providers can share global and local experience in research and development in ODL for agricultural development
6. Providing ODL and ICT based training and support for:
 - managers and staff in research and development agencies whose policy-making, programme and service provision, etc., are critical to ODL extension in the targeted regions
 - extension workers, rural entrepreneurs who run telecentres, agri-clinics and community organisations, farmers and other facilitators who need to be capable of initiating, managing and evaluating extension that uses a mix of face-to-face and technology-based methods
7. Adopting, adapting and developing ODL learning resources for direct use by smallholders
8. Supporting and evaluating regional extension initiatives in ODL and ICT in terms of cost, take-up, impact and long-term effectiveness

The prime characteristics of the L3Farmers Project, which can be distinguished from the other agricultural development initiatives described in this report, are that it can apply and evaluate the principles and practices of ODL in providing professional development and instructional design programmes and services for transforming extension, and it can involve NARES and other partners in low-income countries from conceptualisation to implementation.

Target groups

The study has established that there would be three target groups for the L3Farmers Project:

- Smallholders in sub-Saharan Africa, South Asia and the small island states (the ultimate

- beneficiaries)
- Extension workers and others who can act as learning facilitators within smallholder communities
- Managers and staff in agricultural research and development agencies whose policies, priorities, resource provision and other actions can support ODL and ICT in extension in these three regions

The farmers themselves may not be directly reachable, so the L3Farmers Project would first need to concentrate on providing training and support for the managers, extension workers and other facilitators. However, the L3Farmers project would need to do more than simply replicate or limit itself to the existing extension systems. It would need to involve new partners, local activists and facilitators — for example, the entrepreneurs who run telecentres, agri-clinics, and community organisations, and farmers who reveal capacity for community development work.

The support of these local partners would be critical. They can:

- Identify and assess the farming patterns and learning needs of the smallholders
- Help farmers to form themselves into self-help and learning groups
- Establish the networks and link the smallholder groups to relevant learning resources and support learning within and across communities
- Evaluate the application and outcomes of this learning

The modes of learning would need to:

- Combine face-to-face and mediated delivery and interaction
- Be appropriate to the farmers' literacy and comprehension levels, cultures and circumstances
- Link learning and work
- Focus on quality, productivity, efficiency and efficacy

The extension workers, local facilitators and farmer group leaders would need extensive training and mentoring to help them take on their new roles. The L3Farmers Project would therefore need to start by developing, collecting or adapting and delivering online training material that can enable these facilitators to use ODL and ICT effectively in collaboration with the communities they serve.

Mobilising and supporting indigenous initiative

Change will not automatically come about through the importation of knowledge, ideas and techniques by means of ODL and ICT. The willingness of the farming communities to learn and put new ideas into practice will depend on how they feel about themselves and the issues, personally and collectively. The L3Farmers Project therefore needs to be less about “development,” and more about fostering conditions that lead to self-improvement. It needs to combine interactive methods, local intervention and external support, respect local strengths and traditions and foster and support indigenous initiative and development.

The L3Farmers Project open learning network

This study has shown that most of the technology-based initiatives to date have taken the form of *information networks* or *communication networks* with the content largely determined by the providers. The L3Farmers Project needs to be conceived as an *open learning network*, offering programmes concerned with:

- Smallholder defined needs
- Active, problem-based and collaborative learning
- Learning how to learn
- Motivating, building confidence and competence, and supporting the immediate application of learning in local situations

- Adaptability to different contexts and cultures

This network needs to be thought of as *technological* (e.g., using the Internet), *organisational* (e.g., linking international, national and local providers), and *social* (e.g., aggregating smallholders in “community information spaces” — telecentres, POPs, farmers’ co-operatives, vehicles equipped with ICT and other public, private or community facilities — that can be facilitated by extension workers and others).

The learning resources will need to be:

- Used in group or community settings
- Far more than face-to-face workshops or handouts converted into electronic documents
- Appropriate to the culture, language, literacy, comprehension levels, skills, resources, contexts and learning needs of the smallholders
- Delivered appropriately in terms of tools, processes and learning methodologies
- Faster, cheaper and better than the alternatives
- Capable of speeding up change and bringing immediate benefit to the learners
- Evaluated in these terms

All of the NARES and other extension agencies involved in the L3Farmers Project will need to become creators, managers and facilitators of networks rather than transferors of technical knowledge. Most agricultural research and development agencies lack knowledge and experience in developing and delivering ODL and ICT programmes for non-formal adult and community education. The L3Farmers Project would therefore need to develop these methods and competencies.

The L3Farmers Project knowledge management system

The L3Farmers Project would also need to develop a knowledge management system; a network of Web-based portals accessible from anywhere in the network. This would need to be co-ordinated by COL and CGIAR. Within this knowledge management system, singly and collaboratively, international and national public and private sector organisations would then be able to share global and local experience in ODL and ICT for extension, build capacities and provide organisational and professional support. Such a system could offer the following items specially developed by L3Farmers Project partners or provided by other agencies linked into the network:

- Learning resources and learning objects on topics and in forms appropriate for direct access and use by the smallholders, together with suggested strategies for using these resources
- Training resources and learning objects that can be used or adapted by local facilitators for extension activities, together with suggested strategies for their use
- Training resources to help farmer organisation leaders hold local meetings and make presentations designed for some form of action by the farming communities
- Training resources in developing, delivering and evaluating ODL and ICT for content providers and local facilitators
- Links to other Web-based agricultural development resources that may be of use to extension workers with descriptions of their aims, target audiences, language (level), knowledge/skills pre-requisites, technical requirements, etc. (to avoid copyright problems, these meta-data will not be attached to these resources or the resources stored on the L3Farmers Web site)
- Extension workers’ and other facilitators’ reviews and farmers’ testimonials of educational and training resources, articles and other material found to be useful in extension
- Local insights, experiences and exemplary practices of ODL for extension submitted by field workers
- A listserv for discussion and planning groups
- An open area for e-mailed advice and feedback
- A members’ area for confidential email exchanges
- FAQs

This knowledge management system would need to be conceived as a virtual trainer for agricultural development. It would need to be practical and outcomes-oriented, and be an enabler, not a competitor or duplicator of what other agencies are doing. It would need to complement, supplement, strengthen and provide wider access for work being undertaken by others. It would be a resource developed in collaboration with the agricultural development community.

No single agency would be required to bear the full cost of providing the resources. The wider the partnership, the wider the range of resources provided through this system. The resources would be digitally stored and available via the Web or CD-Rom by the participating nodes and used or adapted for all forms of learning and interaction between the providers and smallholders (e.g., interactive radio, community meetings and community newspapers). They would need to include audio and visual as well as text-based material to provide motivation and circumvent language difficulties. They would also need to be designed in accord with the ISO Code for Language Standards.

The system would be designed to provide cultural and comprehension bridges between providers and smallholders and encourage and support bottom up and lateral as well as hub-periphery communication. It would also need to be continually evaluated for the quality of its programmes, materials and services, number of hits, user satisfaction levels and impact on work practices.

Project governance

Funding

The L3Farmers Project would need a business plan. It is conceived as for the public good and could succeed only if supported by international and bilateral funding agencies and the private sector over a relatively long period of time. However, the project must be ultimately self-supporting and financial sustainability must be planned for.

Information, especially on the Internet, is generally regarded as free. But it must always be paid for by someone. In considering who pays for information and learning provided through the L3Farmers project, it would be important to distinguish between that which is for the public good and that which is for the private good. Material for the public good would need to be paid for by international, bilateral, governmental, commercial organisations or agencies with interests in extension and made freely available in the public domain. Material for the private good would need to be developed on a user-pay basis and appropriately priced for the targeted groups

Management

The overall strategic priorities of The L3Farmers Project would need to be the responsibility of an advisory board comprising, for example., representatives of COL, CGIAR and NARES. There could also be sustaining partners (e.g., FAO and World Bank), strategic partners (e.g., governmental, NGO and commercial providers of learning resources and services who can contribute to the capital and recurrent costs) and local partners (e.g., government, local government, community agencies and local entrepreneurs willing fund the project on the basis of the public good).

COL and the strategic partners would create, make available and recommend links to the learning resources. In the initial phase of L3Farmers, however, there would need to be one lead agency responsible for developing the prototype and protocols for the knowledge management system and working with the strategic partners in sub-Saharan Africa, South Asia and small island states responsible for the local networks and co-ordinating and training the local extension workers who implement and evaluate the approaches used in the field.

Recommendations

It is recommended that:

1. COL considers these findings and recommendations, consults with the key stakeholders, undertakes further research and development (see Recommendation 2) and applies for additional funding from major donors in order to take the L3Farmers Project forward in 2004–2006.
2. COL commissions four 12-month action research projects from providers with a strong track record in agricultural development who are able and willing to provide matching funding (cash or in kind) for these projects:
 - **Action Research Project 1** will assess the take-up, educational and practical impact and benefits, costs and cost benefits of two or three existing ODL/ICT applications in agricultural development (this work may be undertaken by one agency or collaboratively by a number of providers).
 - **Action Research Project 2** will identify or develop a prototype for a knowledge management system appropriate to the needs of the L3Farmers Project as defined above, and field test, evaluate, cost and determine the management, technical and human resource requirements of this system.
 - **Action Research Project 3** will develop a prototype online toolkit that can be used in conjunction with COL's existing ODL training resources, toolkits and guides to train extension workers and other local facilitators in face-to-face and distance learning extension work.
 - **Action Research Project 4** will customise existing agricultural research findings or training material into a form that would enable farmers to learn online, and evaluate and cost the development and delivery of this material.

These four 12-month programmes should be under way in 2004 and completed in 2005. Given the short time line and budget restrictions, these programmes will inevitably be limited in scope. Nevertheless, they will yield invaluable information on the strategic alliances, modus operandi, logistics, costs, human and technical resource capacity, intellectual property and copyright considerations, etc., needed to inform future planning, budgeting and action by the L3Farmers Project.

3. Members of COL's Sub-programme 3.5 on Poverty Reduction, in partnership with partners in the three regions to be served by the L3Farmers Project, should investigate and report on existing and planned-for extension training and technology or infrastructure that could be used by the L3Farmers Project.
4. COL should form a formal alliance with CGIAR and other organisations to initiate further research and development and seek additional donor funding for the L3Farmers Project.
5. COL and CGIAR should organise a roundtable with regional representatives with expertise in ODL, ICT and agricultural development in low-income countries to finalise the plans, guidelines and protocols for implementing the L3Farmers Project (e.g., at PCF3 in 2004).
6. COL and CGIAR should collaborate in developing and evaluating the L3Farmers Project partnerships, learning network and knowledge management system and learning outcomes (2004–2006).

Appendix

Agricultural development content providers and funding agencies

International content providers

Commonwealth of Learning (COL)
Consultative Group on International Agricultural Research (CGIAR)
Food and Agriculture Organization of the United Nations (FAO-Asia Pacific, Africa, Caribbean)
International Crops Research Institute for Semi-Arid Tropics (ICRISAT)
International Centre for Research in Agroforestry (ICRAF) – World Agroforestry Centre
International Food Policy Research Institute (IFPRI)
International Institute of Tropical Agriculture (IITA)
International Livestock Research Institute (ILRI)
International Plant Genetic Resources Institute (IPGRI)
International Rice Research Institute (IRRI)
International Water management Institute (IWMI)
International Service for National Agricultural Research (ISNAR)
West Africa Rice Development Association (WARDA)
WorldFish Center
United Nations Educational, Scientific and Cultural Organization (UNESCO)
United Nations Development Programme (UNDP)

International co-ordination

Global Forum on Agricultural Research (GFAR)

International funding — public sector

African Development Bank
Asian Development Bank
Caribbean Development Bank
European Union
International Fund for Agricultural Development (IFAD)
World Bank

International funding — bilateral

AusAID (Australia)
Canadian International Development Agency (CIDA/IDRC)
Danish International Development Agency (DANIDA)
Department for International Development (UK) (DFID)
Directoraat-Generaal voor Internationale Samenwerking (Netherlands) (DGIS)
Japanese International Cooperation Agency (JICA)
Swedish International Development Agency (Sida)
Norwegian Agency for Development Cooperation (NORAD)
NZ Overseas Development Agency (NZODA)
US Agency for International Development (USAID)

International funding — private sector

Gates Foundation
Soros Foundation
HP
Winrock
Rockefeller

South Asia content providers

Indian Council of Agricultural Research Institutes (ICAR)
Indian State Agricultural Universities such as G.B. Pant University of Agriculture and Technology (GBPUAT), Maharashtra Animal and Fisheries Sciences University (MAFSU), Tamil Nadu Agricultural University (TNAU) and Tamil Nadu Veterinary and Animal Sciences University (TANUVAS)
Indira Gandhi National Open University (IGNOU), India
Yashwantrao Chavan Maharashtra Open University (YCMOU), India
Bangladesh Agricultural University (BAU)
Bangladesh Open University (BOU)
Peradeniya University, Sri Lanka

South Asia funding

National Bank for Agricultural and Rural Development (NABARD), India
University Grants Commission (UGC), India
Wipro, India
Infosys, India

Caribbean content providers

Caribbean Agricultural Research and Development Institute (CARDI)

Caribbean funding

Caribbean Development Bank