

Livelihoods Approaches to Information and Communication in support of Rural Poverty and Food Security.

Executive Summary

This paper provides the results of a joint FAO DFID and ODI study in late 2001 to analyse the role of information in livelihoods and make recommendations on how agencies can capitalise on and integrate the best elements of traditional communication methods and the ICT revolution technologies. Livelihoods approaches are being widely adopted by governments and development agencies to reduce poverty and increase food security in developing countries. Communication and information play a vital role in these approaches, and the principles of the livelihood approach provide useful guidance to the development of communication and information systems.

It is clear from the study that there is considerable scope to develop improved communication and information systems which incorporate the advantages of face-to-face transfer of local knowledge, and of more flexible information storage, management and delivery of information through the internet and mass media, and can bridge the two. However although there are many examples of apparently successful approaches in many developing countries, and much qualitative evidence of the benefits to rural communities, there is little empirical data of the impact on livelihoods.

Existing communication and information systems, based on inter-personal interaction, supplemented with printed material and mass-media are very effective, and most people value and need local knowledge, based on local experience, more than external ideas. Yet there is a tendency, in this internet-driven information age, to assume that providing internet connectivity is the best way to improve communication and information systems. This study has shown that this is often not the case. The most appropriate approaches are those which strengthen local systems and indigenous knowledge, introduce new technology carefully, ensure that poor people have access to it, and can use it to their own advantage, and seek to incorporate indigenous knowledge systems within it. There is no doubt however, that computer and internet technologies provide enormous potential for building information systems that can handle widely varying, rich, data, and make it easily accessible to anyone with a computer and internet connection, and the skills to use them.

The key recommendations to enhance the contribution of communication and information within livelihoods approaches are:

- **Determine who should pay:** A new consensus is needed on who should pay for communication and information services for poor rural communities.
- **Ensure equitable access:** New systems must deliver the right kind of information in the right format, for poor people to ensure that existing inequalities are not exacerbated.
- **Promote local content:** It may be more useful to promote more information sharing between local institutions than bring in new information from outside
- **Strengthen existing policies and systems:** Further work is needed to strengthen communication policies, and new systems should seek to build on existing systems.
- **Build Capacity:** Capacity building is needed at all levels, to equip people with the new skills necessary to develop and manage new systems.
- **Use realistic technologies:** The most effective systems use realistic technologies that enhance and add value to existing systems.
- **Build knowledge partnerships:** New technologies provide enormous opportunities to build knowledge partnerships that cross national, ethnic and social boundaries.

1. Introduction

Livelihoods Approaches are being widely adopted by governments and development agencies to reduce poverty and increase food security in developing countries. Information is a vital component, essential for linking and informing decision-making processes at every level, yet information and information systems are rarely properly integrated into livelihoods-orientated projects and policies. Meanwhile new information and communication technologies are expanding rapidly into many developing countries, creating a digital divide between those who can afford state of the art telecommunications and internet access and those who can't, and threatening to submerge well established and effective traditional information systems.

The Food and Agriculture Organisation (FAO), Department for International Development (DFID) and the Overseas Development Institute (ODI) undertook a research project in late 2001 which included a literature review and field trips to three countries, Ghana, Uganda and India, to analyse the role of information in livelihoods, and make recommendations on how agencies can capitalise on and integrate the best elements of traditional communication methods and the ICT revolution technologies within the livelihoods approach.

This document presents the key findings. It is synthesised from, and in a web-based version, linked to a series of more detailed issue papers, and country reports for Ghana, Uganda and India, which are themselves linked to an annotated bibliography, a summary of web resources, and the background documents and web sites themselves.

Section 2 provides an introduction to the Sustainable Livelihoods Approach, describes the role of information within it, how better information can contribute to better decisions, and information needs for rural communities, their institutions, governments and donors. Section 3 describes existing information systems for rural communities in developing countries. Section 4 describes seven key recommendations for improving information systems including determining who should pay; ensuring equitable access; promoting local content; building on existing systems; building capacity; using realistic technologies; and building knowledge partnerships, and provides some practical examples from the literature and the country visits. Section 5 presents some conclusions and recommendations.

2. The Sustainable Livelihoods approach and the role of information

2.1 The Sustainable Livelihoods Approach

Sustainable Livelihoods (SL) approaches have emerged through debate within a wide range of development agencies over the last decade, and have helped development organisations develop partnerships and common agendas. Donor interpretations of an SL approach typically incorporate a set of principles, an analytical framework providing a broad and systematic understanding of the various factors that constrain or enhance livelihood opportunities and how they relate to each other, and a developmental objective i.e. to enhance the overall level and sustainability of livelihoods and reduce poverty. There are variations in emphasis and interpretation of the approach between different agencies but the basic underlying principles are fundamental and common to all agencies. An FAO-sponsored Inter-Agency Forum on Operationalising SL Approaches produced strong agreement on the guiding principles that underpin SL approaches. It was also noted that many of the field-level tools and methods, such as participation, are already well established in the work of many agencies. The need to better understand, and allocate resources to facilitate linkages between micro-level livelihood systems and their policy environment was

well recognised, but identification of the most effective entry points for SL remains a key issue for further clarification. The Inter-Agency Forum produced a number of key lessons for the application of SL approaches including shifting the focus from resources to people and from livelihood constraints to people's strengths, stressing outcomes rather than outputs, prioritising diagnosis, demand-driven implementation and the establishment of feedback mechanisms, ensuring economic, institutional, social and environmental sustainability through adoption of exit strategies in the early stages of programme implementation, fostering interdisciplinary teamwork, and encouraging innovative partnerships.

2.2 The role of information and communication in the SL framework

Communication and information are critical components of the SL framework, essential for linking and informing decision-making processes at every level. A Strategic Programme in Support of SL should aim to improve linkages between processes of policy design and implementation, and the sustainability, productivity and profitability of livelihood outcomes. Communication and information in support of SL, therefore, has three functions: 1) to facilitate the exchange of information by the poor necessary for sustainable livelihoods; 2) to improve communication within and between the institutions responsible for making decisions that affect livelihood options; and 3) to empower poor communities to participate in the decision-making processes.

Improved information alone however is not sufficient for improved decision making. Decision-making is a political process and stakeholder participation in decision-making processes is crucially important. The SL approach is fundamentally people-centred and demands a detailed participatory assessment of the strengths and information needs of target beneficiaries and stakeholders as an early activity in programme design. This needs to engage with stakeholders at all levels, promote two-way flows of information between them, and pay attention to the role of information in relation to different livelihood assets.

The SL approach emphasises multi-sectoral collaboration and partnerships between government departments, public and private sector, civil society and international development agencies and seeks to build on existing strengths and opportunities and to supplement and enhance existing systems. Mechanisms to improve collaboration between stakeholders through, for example regular meetings, workshops and seminars, and new reporting procedures are likely therefore be more important than introducing new information technologies, which should, themselves seek to enhance and strengthen existing technologies rather than replace them.

2.3 Better decisions and livelihoods with better information

Improved information should lead to better decision-making at all levels. The table below provides examples of the types of decisions taken at different levels, which can be enhanced through improved systems for communication in rural communities.

Decision-making level	Decision type	Information required
Rural poor household	Livelihood strategies (prioritisation of livelihood activities and investment decisions)	Availability of inputs & services, market prices, information on health, education and governance, and their institutions and policies.
Producer organisations	Collective strategies (production, processing & marketing)	Information on opportunities and constraints for production and trade.
Local NGO	Design of projects to support the rural poor	Information about existing livelihood opportunities and constraints, and potential support from projects and interventions.
Local government	Local & District policy making (prioritising resource allocation), revenue generation, governance mechanisms etc.	Information about local and regional production, nutrition, health and education status, poverty, national policies and processes, and opportunities for economic growth.
Public service providers	Formulating national, district & local technical assistance programmes in production, health, education etc	Context specific information on sectoral and cross-sectoral issues, production systems and constraints, and community needs and capacity.
Private sector organisations	Assessing market demand for agricultural goods and services, mechanisms to meet them, and increasing income.	Market information, production systems and constraints, and new approaches and technologies.
National NGOs	Networking with communities, advocacy work & informed engagement in policy making processes	Local, regional and national policies institutions and decision-making processes, traditional systems, and community needs.
National government	Formulating targeted national policies and strategies for economic growth and poverty reduction.	Monitoring national production, health, education and poverty status and trends, opportunities through international trade, livelihood strategies, resources and distribution.
International Donor agencies	Setting priorities for donor assistance programmes	Monitoring national and global production, health, education and poverty status and trends, national governance and capacity to deliver policies and services.

Attention to the means of communication, format and content, and degree of transparency is also important if rural communities are to be empowered to make better decisions. Issues of information quality and quantity need to be balanced with the capacity of decision makers to use the information provided. Improved systems for the management and communication of rural information, built upon the principles of SL, can help poor communities organise as groups, exchange experiences, obtain technical information, and also to hold responsible institutions accountable and put pressure on relevant authorities to deal with their problems.

2.4 Information needs for rural communities, their institutions, donors and governments.

A recent assessment of stakeholder participation in FAO Field Programmes (Warren, 2001), identified more than 25 different stakeholder types. Primary stakeholders include farmers and other community actors in projects and programmes. Secondary stakeholders include local governance institutions and 'interface' institutions such as technical services, NGOs, and private sector organisations. Tertiary stakeholders include national-level development agencies, national NGOs, policy makers and international support agencies. Each of these stakeholder groups have specific information needs.

Rural communities need up-to-date information on sources, availability and cost of inputs for production, also on the potential of different techniques and technologies used for production, processing and marketing. However, the information that is often most relevant to improving livelihoods is non-technical, including the role and responsibilities of different institutions in the provision of key services including health and education, and where to go and who to ask for more specific information. Law for example is a crucial topic for rural people, key questions concern inheritance, women's rights to land and relationships between crop-raisers and herders. Agricultural credit is another. Legal and financial disputes are common because rural people do not have access to basic legal and financial information. Rural communities increasingly need information about off-farm activities, about rural development projects and policies and how to participate in and influence government processes. It is important that this information is available in an appropriate format and language, and that rural communities have the capacity to analyse and act on it.

Specific situations create specific information needs and user participation in planning and implementation is vital. The highly successful Gyandoot project in India designed to increase government transparency was developed with local communities, in comparison with the nearby private agricultural extension and information service Samaikya Agritech (Pvt Ltd) project which is failing due to poor uptake by farmers. The FAO has been at the forefront of developing participatory approaches (FAO, 1998). Warren (2001) noted fourteen different methods/means used to facilitate stakeholder participation in FAO field programmes. Rather than a single standardised method, a particular *site-specific blend* of different methods is usually developed (sometimes in a very creative manner) to fit the particular social and institutional setting and the political context within which the participatory process takes place. A combination of quantitative, qualitative and participatory action-research concepts and methods is used to monitor and evaluate stakeholder participation.

3. Existing information systems

Rural communities, their institutions, government and other agencies all have well developed communication networks for local information dissemination, and many people still trust word-of-mouth information, and what they can see with their own eyes above other information. A study of farmers in Uganda and Ghana found that farmers trusted endogenous sources, such as word-of-mouth, experience and observation more than

exogenous sources such as extension agents and radio (Carter, 1999) although 46% of farmers in Ghana and 31% of farmers in Uganda used exogenous information. Local institutions such as churches and community groups are also important.

Traditional media such as television and radio can reach a wide audience. Radio is more widespread than television in Africa, and the number of households with a radio has grown rapidly over the last 40 years to over 120 million in 1995. But public service broadcasting is collapsing in many countries (eg Radio Uganda), and is being replaced by commercial FM channels which tend to broadcast music and entertainment rather than educational programmes. A few commercial channels, however retain an educational component (eg Voice of Teso in Uganda), and there are many successful community-radio stations funded by bilateral and non-government donors (eg Simli (Friendship) Radio in Ghana. Television use in Africa has not grown at the same rate as other developing countries such as India where deregulated satellite television has enabled cheap access to a wide range of cable television services. Although access to the internet is growing throughout the developing world, North America and Europe still account for 89% of all Internet hosts whereas Africa has only 0.25%, and the "Digital Divide" is widening. While the number of internet hosts per thousand inhabitants in North America grew from 46 to 167 between 1997 and 2001, the number in Africa only grew from 0.17 to 0.31. Much of rural Africa still doesn't have a telephone service, so despite an increasing quantity of agricultural information available on the internet there is very little access to it in most rural communities.

Most developing countries are rushing to join the internet age. India, in particular invested heavily in telecommunications infrastructure over the last decade, and now has internet connectivity down to District level throughout the country. African countries, slower off the mark, with fewer resources, and greater dependency on donors, are relying on private-sector investment. Policies to improve information and information communication technologies policies are fragmented in many countries (eg Uganda) and the capacity to implement them is weak.

It is wrong though to assume that that without access to the internet, communities do not have existing information systems of any substance. This can lead an overly optimistic technologically deterministic approach (Heeks, 1999) to the conclusion that the problem will only be solved if the existing information networks are replaced with 'modern' systems. Furthermore, this runs the risk of losing farmers' rich, vital, experiential knowledge of agriculture, much of which circulates in local informal networks, and of undermining trust and social systems.

Many organisations are incorporating this information within the new information systems. The Centre for Agriculture and Biotechnology International (CAB International) manages a wide range of information resources of existing agricultural information, through publications, CD ROMs and research studies. A recent CD ROM and Internet-based database contains farmer-based information on 200 crops and 150 countries including images and descriptions of over 1800 pests, diseases and weeds. This is also happening in developing countries. The National Innovations Foundation (NIF) in India has been established to "build linkages between excellence in formal scientific systems and informal knowledge systems".

FAO's World Agriculture Information Centre (WAICENT) has developed a number of *Specialised Information Systems* for the supply of information needs on all aspects of agricultural development and food security. These global information systems (e.g. Global Information and Early Warning System (GIEWS), Food Insecurity and Vulnerability Mapping System (FIVIMS) and FAO Statistical System (FAOSTAT) are extremely valuable for providing a global picture, and for the purposes of inter-country and inter-continental comparisons but are of limited value for sub-national policy making and planning, and many developing countries lack the capacity to manage and use this information effectively.

FAO's current strategy is to establish the capacity to collect, analyse, use and disseminate information within member countries. WAICENT is also developing a number of tools to enhance the capacity of member countries to manage and analyse information, for example the Key Indicators Mapping System (KIMS). The WAICENT Outreach programme is designed specifically to help with this, as is the establishment of national FIVIMS.

There is great scope for integrating existing communication systems and networks in developing countries into new information systems. The Indian Council for Agricultural Research (ICAR), Indian Agricultural Statistics Research Institute (IASRI) and Department for Information and Publications in Agriculture in India are collaborating to build a nation-wide information network for agricultural research and extension.

Linking these research-based knowledge systems with practical farmer-based systems will be necessary if this is to benefit rural communities. Various widely recommended changes to agricultural extension could facilitate this (Christoplos et al, 2001 Roling,1995 Rivera,2000, Berdegue and Escobar, 2001). One approach, the Agricultural Knowledge and Information System (AKIS) is designed to facilitate both vertical and horizontal information transfer. FAO and the World Bank have expanded the approach as a dynamic framework for information integration and exchange to support rural development (AKIS/RD). In this system, agricultural researchers, extension providers and educators form a knowledge triangle to interact with, share information with and support farmers. (FAO/WB, 2000). For this to work, extension workers must: abandon their traditional *linear* or top-down mode of technology transfer; adopt a *facilitation* role to help farmers, researchers and themselves to learn together, and help farmers to make their own decisions; and then an *advisory* role in which information is provided as requested by the farmers. These principles are well described in India's new agricultural extension policy framework.

Agricultural research and extension has undoubtedly contributed profoundly to development as demonstrated by the Green Revolution, but the combination of a reduction in public research budgets, a globalising market and the information explosion has created a more complex knowledge landscape. Information on demand and markets is becoming increasingly important to minimise price fluctuations due to over or under-production, and help farmers get the best price for their products (see for example Foodnet in Uganda). The role of international development institutions is increasingly to transfer knowledge to intermediaries, and to manage knowledge as an international or global public good (World Bank, 1999). This role is particularly important to ensure that good information is available to poor rural farmers and developing countries with limited public sector information management capabilities (Berdegue and Escobar, 2001). New organisations are emerging in many countries to provide a wider range of practical and information services to rural communities, for example The National Institute of Agricultural Extension Management (MANAGE) in India, and the National Agricultural Advisory Services (NAADS) in Uganda. Information systems will need to combine the benefits of new information and new information technologies with the advantages of traditional knowledge and traditional communication networks to do this.

4. Key lessons - improving information systems

The literature review identified seven key recommendations for improving information systems for sustainable livelihoods in developing countries. More work needs to be done to determine who should pay for information to ensure that the poor don't lose out in the rush for privatisation, and that systems are sustainable. Ensuring equitable access is critical if it

is to benefit and empower poor communities and promote democracy, and the emphasis should be on providing appropriate local content. New information initiatives are most successful if they strengthen existing policies and systems and if sufficient effort is made to build the capacity for people to use them. Finally, experience has shown that using realistic technologies, and knowledge partnerships are key to improving information systems.

4.1 Who should pay?

Until recently information for agricultural and rural development has been regarded as a global public good which should be made freely available to all, but as the absolute value of aid to rural development continues to decline, and donors and governments shift towards the private sector provision of previously public-sector services, the question of who should pay for information services, especially for poorer communities, becomes increasingly critical.

The basic human, physical and organisational resources for information and communication services can be very expensive, but are relatively easy to estimate. Adopting participatory approaches adds additional costs, many of which are difficult to calculate. Some of these 'costs' are a necessary part of processes of democratisation; others may be unintended such as the exposure of village affairs to external groups leading to a loss of local autonomy and market share (Warren, 2001). A clearer estimate of the total cost of participatory information systems is needed.

Nor is enough understood about either the positive, or negative impact of information systems and services. A recent review of community-based ICT initiatives, stressed the need for improved monitoring and evaluation and impact assessment (Michiels & Van Crowder, 2001). The review also noted that participatory needs assessments are rarely performed prior to ICT applications. The emphasis tends to be more often on providing "access" to information rather than assessing the actual specific information needs of communities and local groups. Despite a growing literature on how to assess the impact of information and communication initiatives (for example IDRC's ACACIA program), it remains difficult and "until relevant methodologies and adequate tools are developed to effectively assess the social impact of the application of ICTs for sustainable development from the user's perspective, efforts to demonstrate how people are empowered by knowledge will lack credibility" (Gomez et al 1999:1). Impact Assessment for Information System Development was the subject of one of three workshops at the FAO's first Consultation on Agricultural Information Management (COAIM, 2000) where it was recommended that FAO, CTA, and other organisations develop and promote impact assessment for agricultural information programmes and projects with the aim of ensuring that impact assessment becomes an integral part of the planning and implementation cycle.

Recent information infrastructure development success stories include the private-sector establishment of mobile phone networks in Uganda and Bangladesh and fixed-line telecentres in Senegal. Although requiring a sizeable initial investment, once up and running, these have proved quite profitable, and the Ugandan government is building a requirement to provide services to remote, commercially unattractive areas into licensing agreements with private sector telecommunications service providers. Newspapers are cheap to produce and are enormously popular. The New Vision in Uganda carries a regular agricultural column, and has been encouraging journalists and other papers to provide more useful information for farmers. Radio can cover costs through advertising, sponsorship, and payments for basic services such as public announcements. Buganda Central Broadcasting Station in Uganda has managed to attract private sponsorship for a series of programmes to support small and medium enterprises. This is not yet common in government publications and information services. Extension bulletins, for example are normally distributed free but it has been argued that they should be sold in order to generate revenue and also as a means of deriving feedback as to the actual value of the product.

Given the right support, communities and local groups can provide their own services, and there are many successful examples of sustainable local information services including the Pondicherry e-villages and Gyandoot networks in India. New and innovative partnerships between government agencies and the private sector are now emerging, albeit slowly. Some purely private sector initiatives have been successful, for example EID Parry's Agriline Portal which serving sugar cane farmers in Tamil Nadu, while others, like Samaikya Agritech in Andhra Pradesh are struggling.

Profitability or cost-recovery is not however the only measure of sustainability. Experience with telecentres (Gomez et al 1999 & McConnell et al 2001) has identified a wide range of factors, many of which also apply to other information and communication activities. They include:

- *technical issues* – basic infrastructural requirements and systems development (telephones, electricity, telecom service providers), also availability and responsiveness of technical support and expertise;
- *institutional issues* – locating a telecenter within the existing institutional framework and building on existing knowledge networks (formal and informal) i.e. in partnership with local government schools, libraries, universities, health centres and civil society organisations;
- *economic issues* – income generation, cost recovery, ability to pay, participatory market demand assessments to identify optimal location of information services;
- *social and cultural issues* – information content and format appropriate to the context of users, capacity of managers/operators of information services to identify and supply the information needs of users and human capacity (literacy, numeracy) of beneficiaries to make use of information; and
- *political issues* – participation in planning and implementation, political networks, local power relations and access, discrimination and exclusion.

In order to be sustainable, information services must find new ways of communicating important information using innovative formats and combining different information types. Kenya's Tembea na Majira radk or 'Soap opera for development' radio programme, for example, covers a wide range of topics and issues ranging from family relations to agriculture and national policies and programmes (Mundy and Sultan,2001) (the importance of local content and context is discussed further below in Section 4.3).

4.2 Equitable Access

The technological capacity to transfer information and communicate across large distances has increased rapidly in recent years. But this information must be available to all if the benefits are to empower individuals to improve their livelihoods, rather than perpetuate existing social, economic and political disparities between the 'information haves and have nots'. The challenge is to harness this new capacity in order to enable rural communities, and their governments, in developing countries, to manage information more effectively and develop communication strategies that promote the transfer of information that is more relevant to people's livelihoods.

Although some agricultural information in developed countries is only accessible to farmers who are prepared to pay for it, there is far more 'public information' that is freely available that developing country farmers are excluded from simply due to lack of access. There are numerous organisations from the FAO to local NGOs that are trying to improve the dissemination of information relevant to rural livelihoods in developing countries.

Many new initiatives seek to facilitate access by rural communities to internet-based information networks, computer databases and multimedia tools:

- The IDRC Pan Asia Networking programme (www.panasia.org) aims to connect institutions such as Universities and education and research centres in regional networks.
- A pilot project in the Philippines in Barangays in Mindanao is bringing together internet access, computers and practical training resources in Multipurpose Community Telecentres (MCTs). The MCTs, a partnership between government, private sector, community and academic organisations, provide Philippine-related information on a wide range of subjects from health and education to rural enterprise development and agriculture.
- The Farmknow website established by the China Agricultural University has been established to allow farmers around Beijing to diagnose problems with their vegetable crop from a database of over 70 locally occurring agricultural diseases and 30 insect pests. Farming specialists are available to provide assistance and respond to e-mail questions.

Traditional media such as television and radio continue to have a considerable head start when it comes to 'universal access' to information, especially in Africa. Rural and community radio initiatives enable the target audience to be more clearly defined and crucially allow for community participation in the development of more locally appropriate programmes to be 'broadcast' or 'narrowcast' (eg the Buganda Central Broadcasting Station). The potential for interactive community radio to answer specific questions and respond to identified needs can be greatly enhanced by linking local radio stations to the Internet, as shown to great effect by the Global Knowledge Partnership project at Kothmale radio station in Sri Lanka.

Early experience identifies the capacity of projects to use available knowledge effectively to reach the poor as a key consideration in the design of information programmes. This requires a shift in emphasis from simple "knowledge management", to "knowledge for empowerment" which recognises that local power structures can influence local knowledge dissemination, and specifically targets the most marginalised (eg Gyandoot). The empowerment of any group centres on its capacity to generate and use knowledge and to share it on an equal basis with other groups (Siochru, 2001).

Some local initiatives in India are seeking to empower the disadvantaged by increasing opportunities for rural communities to access information relevant of their livelihoods. Semi-literate women manage community-level information centres in M.S.Swaminathan's e-villages to provide for the specific information needs of particular user groups, such as wave height and weather forecast information for the fishermen in the village of Veerampattinam. In Bangladesh, Grameen phone has established a rural mobile telephone network in Bangladesh run by women who rent them out to other villagers to earn extra income for their families. Choosing women to manage these initiatives, aims to address the unequal power relations that exist between men and women in these communities, helps to erode the existing hierarchies, and promotes development goals that are based on more broad based and bottom-up knowledge strategies.

Information that flows between groups that can be accessed and used by any group for its own purposes is likely to be democratising. National Agricultural Research Systems (NARS) however tend to focus on technologies and solutions for the commercial farming sector, ignoring the needs of smaller-scale farmers for information on which to base their livelihood

decision-making (eg INSTI in Ghana, and Serere in Uganda). This simultaneously helps wealthy farmers to enhance their competitiveness in the market, and makes it more difficult for small farmers to make effective livelihood decisions. The West African Rice Development Agency (WARDA) however used a participatory varietal selection process where farmers interacted directly with rice breeders to share information to decide which new rice varieties should be developed. Processes like this, where farmer-level information is used directly by decision-makers, can help make decisions more effective, and make the development process more democratic.

Information systems can contribute to democratisation if they provide:

- equal access to information for all;
- information for decision-making that is relevant to all groups;
- opportunities to communities, and empower them to participate in wider decision-making such as through greater transparency of government processes and information relating to rights and entitlements;
- accountability of those institutions responsible for information management and transfer to all their constituents or stakeholders.

A good example is the Gyandoot project in Madhya Pradesh in India, where the District Government has established an electronic network with kiosk at village-level where communities can access information about government programmes and can send e-mails to government officials. The capacity of government agencies to provide this degree of participation however is very limited. A recent study of extension systems as part of the Neuchatel initiative concluded that many of the problems associated with service delivery in the extension systems in developing countries result from the over ambitious nature of their design. Alternative methods of information transfer and service delivery at the local level, be it through NGOs as suggested by Bebbington et al (1993) in Latin America, or other means could relieve the state of unrealistic resource allocations resulting in wasted expenditure. NAADS in Uganda is working with District Agricultural Offices (eg in Soroti) to explore new forms of agricultural extension and information provision including through Farmer Field Schools. Another suggestion is to consolidate efforts at the rural-urban interface such as the district town level, and ensure that within that spatial context at least, broad-based access to information and services are available, and rely on word of mouth and other traditional systems to reach remote areas.

4.3 Local Content

As discussed in Background Paper 3 - Existing information systems local communities trust endogenous and local information more than exogenous information. So although issues and problems can be raised through examples from elsewhere, communities are unlikely to believe solutions, and be motivated to adopt them without substantial discussion of locally-specific examples. For example, a programme on rural law, broadcast through a network of 48 local rural radio stations in West Africa, which brought together lawyers from six West African countries to discuss topics identified by local communities ranging from identity cards, marriage and birth certificates to women's rights in marriage and to land, sparked such interest in each country that they formed the starting point for a series of broadcasts on related issues in each station (www.radios-rurales.net).

Information can provide a *catalyst* for people identifying and setting their own goals and priorities. Information systems can become self-sustaining, dynamic and evolutionary if they are adapted to local needs, and provide people with reliable locally relevant information, and can contribute to local decision-making (Michiels and Van Crowder, 2001). For example,

information on food and agriculture should be relevant for local agro-ecological conditions, weather and topography, as well as local cultural and economic aspects of production, marketing and processing. Similarly information on governance, health, and education should focus on local issues. The information needs to be transparent and up to date with information on new approaches, developed elsewhere, supported by cases of successful implementation and adoption locally. The Sneha Mahila Women's Group in Andrapradesh in India has recently acquired a computer and internet connection, and, frustrated by the lack of useful information in the local language is setting up their own website.

In fact, supporting communication between relevant local institutions may be more important than providing content from the Internet at local level. The linked local learning (LLL) process promoted by CTA in East Africa for example has been developed to assist the institutions at every level, from communities to government departments and NGOs to donors, deal with the social changes at the district and village level that are occurring due to decentralisation policies. A pilot study to investigate the use of ICTs to enhance this process in Tanzania, Uganda and Kenya recommended a combination of an IT network linking national and district levels with high frequency radio connections at village level. The communication planning workshops held in each country also highlighted the importance of using all communication channels available and not relying solely on new technologies right down to the village level (TDG/ISG, 2000)

Integrating local knowledge and context into national and international information systems requires both a detailed understanding of the local context and a sophisticated capacity to tailor information appropriately for both local and national or international audiences. Micro-level information managers and linked learning facilitators should therefore be integrated into the inter-institutional information flow processes and the agricultural policy cycle to improve knowledge and information sharing. The Ghana Agricultural Information System (GAINS) and Crops Research Institute (CRI) are working closely with farmers through a question and answer service, on-farm trials and farmer field schools to bridge the gap between central and local knowledge.

4.4 Strengthen existing policies and systems

The country visits identified a complex array of separate and often contradictory policies in different institutions seeking to improve information and communication. There is an urgent need in some countries (e.g. Uganda) to harmonise policies at national and sub-national level. Although access to the internet in rural areas is extremely limited in most developing countries, and more or less absent in rural Africa (see Section 3 Existing information systems.) there is a danger of making this the focus of information system policies. Many people in rural areas are poorly educated and illiterate, and despite this already have rich and effective information networks. Innovative mechanisms to bridge the gap between the internet and rural areas through rural radio, high frequency radio links or village internet booths have been described in Section 4.2 – Ensuring Equitable Access.

At least as important as improving access to, and the content of, agricultural information systems is integration at the national level through a multi-disciplinary and cross-sectoral approach. This will both create opportunities for maximising resource efficiencies and knowledge sharing, and allow the development of improved inter-sectoral information for policy makers and better coordination of international and national agencies. Although a major challenge, this is an essential pre-requisite for PRSP processes. While some countries, notably Ghana and Mali, are developing stand alone IT and communications policies and strategies, others, for example Uganda are building them into the PRSP process itself.

Integration of sectoral information initiatives at the district and local levels such as those using ICTs mentioned above should also “*provide a supplement, not substitute, to existing information systems* (Heeks, 1999)”, and it is important to avoid the tendency for government institutions to seek to control information. The Internet was designed as a decentralised network (Berners-Lee, 1999), and allows users to access information from a wide range of sources, to use it for their own purposes and manage it for others to use in a more specific context. The internet offers the capacity for individuals to communicate with individuals (through e-mail or on-line dialogue), for individuals to communicate to many (through web-sites) and for many people to communicate together (through e-conferences). Other systems provide less flexibility.

The World Bank and FAO’s new more decentralised and participatory approaches for extension systems seek to capitalise on similar pluralistic approaches, where farmers are encouraged to use a range of public, private and non-governmental extension services to meet their information needs, for example, the National Agricultural Advisory Service in Uganda. The principles are to improve farmer’s choice, transform current public services into more demand-led services and promote new *pluralistic partnerships*. The extent to which partnerships that are essentially promoted by public sector funding can actually be pluralistic is not certain but at least the promotion of greater institutional pluralism is likely to make extension services more participatory and effective (Rivera, 2001). In this context the public sector will be increasingly expected to monitor the quality of information that is being made available to farmers rather than attempting to manage and control all the information itself.

A study of knowledge management systems within development initiatives identified a number of key lessons and principles for building effective knowledge management systems (Richardson 2001), many of which apply more generally to communication and information systems. The study found that many donor-driven systems are overly ambitious, overly complex, and over-designed. They tend to overlook the fundamental organisational processes and institutional incentives that drive information use and ignore potential ‘losers’ who may subsequently resist implementation. On the other hand, effective systems:

- have specific users who demand specific information to inform decisions for which they are held accountable;
- have sustained commitment of ‘champions’ among the ministry leadership;
- build in clear rewards to individuals for contributing information;
- are simple and modest in scope;
- focus on information that directly informs priority decisions;
- build on existing databases, taking advantage of existing data collection routines.

New initiatives should aim to build on the strengths of existing systems of information exchange. The potential benefits from enhancing these systems requires the identification of the most appropriate institutions to work with, enhancing their capacity and infrastructure and promoting networking across sectoral, hierarchical and geographical boundaries. Enhanced rural systems will only be effective if they link with improved national and international systems.

4.5 Building capacity

A government’s capacity to use, manage and disseminate information for improved livelihoods is determined by the political system, the financial resources available, the strength of the state, the motivation and capacity of the decision-makers, and the capacity of

civil society to participate. Many governments, such as in Brazil, are themselves working to improve information management and dissemination but there is a need for international organisations to assist in the process of capacity building due to the limited resources available for government capacity building programmes in many countries. The Digital Opportunities Taskforce (Dotforce), was established by the G8 at Okinawa in 2000 to engage the public sector, private sector and civil society in a wide-ranging consultation to identify mechanisms for bridging the digital divide. The World Bank Institute (WBI) also provides a forum for policy-makers in developing countries to create appropriate communication strategies and compare their experiences.

Local capacity in information collection, storage and dissemination will also need to be enhanced in order to bridge the gap between information providers and users. Education leading to basic literacy and numeracy, especially for marginalised groups, is a priority for improving local capacity to use and generate information, and local government and non-government institutions need to be encouraged and strengthened to provide more information locally, for local dissemination, and to contribute to national systems.

The FAO has been involved in a number of projects, that support training of local level animators and information specialists who are able to both capture and disseminate information that is focussed on the local context for example the Audio-Visual Production Services Centre (CESPA) project in Mali. The training not only provided new skills in specific communication technologies (which are discussed in later sections) but also helped build the confidence of local individuals and groups to recognise the value of their knowledge, and the importance of the simplest methods of communication such as face-to-face meetings and discussion. The farmer field school approach, developed by the FAO, is a good example that could be promoted in a wider context alongside more formal training for literacy or specific information techniques. The integration of targeted training with processes that encourage local ownership and self-learning and the sharing of information and skills amongst local groups would help to promote grassroots capacity building that responds more directly to local needs. Information that is then generated and disseminated locally is more likely to be sustainable.

Capacity-building is also needed at other levels. The Uganda branch of the Council for Economic Empowerment for Women in Africa (CEEWA) and the Development Network of Indigenous Voluntary Associations (DENIVA) in Uganda both works with NGOs to strengthen their capacity to exchange information, while the Client-Orientated Agriculture Research and Dissemination Project (COARD) works with Agricultural researchers to help them communicate the results of their work more effectively.

New information technologies to improve the way that information is managed and disseminated require new standards and skills. One hundred and sixty one representatives from all 91 Member countries attended FAO's first Consultation on Agricultural Information Management (COAIM) in June 2000. Capacity building was identified as a key issue, and it was recommended that the FAO, through WAICENT, continues to focus on this by providing training in member countries and developing international standards. The COAIM conference recognised the importance of developing standards and ensuring appropriate use of ICTs. The need for standards will increase as more information is generated, and new technologies and information networks emerge. Many standards such as the AGROVOC vocabulary already have wide support, but more capacity is needed at national and regional levels if it is to be applied. The FAO is currently developing the Standard Generalised and Extensible Mark-up Languages (SGML and XML) for document management and technical capacity will be required to implement these, particularly at the national level. Close collaboration with other international and intergovernmental capacity building initiatives could ensure both the efficient use of resources and the development of training packages.

In the face of all the new technology however, the importance of face-to-face and other 'low-tech' methods of communication should not be underestimated and the links between technical capacity building initiatives and the more traditional information users still need to be developed (Munyua, 2000).

4.6 Realistic technologies to support information and communication

Information and communication initiatives for development are expanding exponentially, and attempts to monitor new initiatives and their impact are increasingly heroic. A report by Bridges (2001) identifies over a hundred, mostly large-scale international programmes ranging in scope from the private sector to NGOs, Volunteer programs, healthcare and the digital divide. Coordination is impossible, and instead of trying to control development, the emphasis is now on developing a realistic set of compatible approaches that avoid technocratic determinism because "it is not about the technology, it is about the people who use it" (Bridges 2001). Heeks (1998) identifies a number of reasons why technology is not used properly in public sector reform in India. This is mainly due to inadequate understanding of both the technology and its potential, so that some public sector officials simply ignore it, or isolate it within the computer department, or idolise it and promote unsustainable schemes. Very few successfully integrate information technology within realistic information strategies (Gyandoot, in India being a notable exception). These reactions are not confined to developing countries, but can be observed in managers and organisations throughout the world.

It is therefore important for organisations to monitor and learn from the experience of others. The Commonwealth of Learning (COL) aims to do this by building collaboration between and working with a wide range of organisations. The COL works with a number of CGIAR centres and with the National Academy of Agricultural Research Management (NAARM) in Hyderabad to develop technology-enhanced distance learning courses on agricultural research management. The COL produces a wide range of training materials and a recent report on telecentres documents experiences from practitioners around the world. The Rockefeller Foundation has also recently published a comprehensive review of over 50 case studies, which found that the evaluation process within projects is often less participatory and people-centred than the projects themselves, mainly due to the lack of new participatory approaches to evaluation appropriate for the new technologies, making it more difficult to even identify the key lessons (Dagron 2001). The World Bank, amongst other organisations, has attempted to identify the wide range of information technologies available and their potential application to information for agricultural development, with particular emphasis on their own projects.

Given the breadth of available technologies including CD-ROM, Computer networks, Desktop publishing, Geographic Information Systems, Interactive video, packet radio, mobile and satellite communications etc, it is difficult to assess, and even more difficult to predict the real advantages of each for people's livelihoods. With increasing availability, reduced costs, better, and easier to use computers information technologies are increasingly applicable to tackle rural development needs (Zijp, 1994), and are being introduced even in the most remote circumstances, e.g. ITU pilot projects from South Africa to Bhutan and Mongolia. However this belies the reality that the vast majority of the rural poor, that remain the target beneficiaries of most development programmes, only use information that communicated face-to-face and by word of mouth. The scale of technological and infrastructural requirements is the starting point for a realistic approach to using technology for development. It is therefore essential to analyse the full extent of telecommunications and IT infrastructure deficiencies in order that realistic measures can be implemented and effectively monitored against targets.

Technical capacity is one key factor, and the UNDP (Human Development Report, 2001) has developed an innovative approach to mapping the scale of technology development of countries using a Technology Achievement Index (TAI). This index assesses a country's:

- ability to create new technologies - focussing on the ability to innovate;
- use of recent innovations - based on the use of the Internet and technology exports;
- basic communications infrastructure - focussing on telephones and electricity
- level of human skills, amongst both creators and users of technology.

Nations have been ranked according to their index value into four categories namely leaders (TAI above 0.5), potential leaders (0.49-0.35), dynamic adopters (0.20-0.34) and marginalized (below 0.2). India for example is categorised as a dynamic adopter which is lower than might be expected due to the poor diffusion rate for old technologies and Ghana is ranked as marginalized for the same reason although it does not have the dynamic approaches to new technologies and exports that helps to elevate India's ranking¹. The mapping of the technology context should help design realistic approaches to technologies for information and communication that assist in the diffusion of both old and new technologies.

Another key factor is a country's ability to identify the information needs of the poor. Although much is known about living standards, employment, health and education through household and community surveys, few assess access to information services. For information service planning it is also important to know a range of factors relating to the use and availability of information at the household level. 'Steadmans', a private sector media research company in Uganda is in high demand by international, government, and non-government organisations in Uganda to assess the impact of their communications work.

In developing countries the most realistic approach is often to use a combination of, and link the old and the new technologies. Mass media such as radio and television can reach large audiences and the potential exists for digital broadcasting via cable and satellite to continue to reach wider audiences at ever-lower costs. Shared access to the internet through telecentres enables some rural people to access information which they can then share with their neighbours (eg Gyandoot). Networked rural radio stations (e.g. in Senegal), or radio stations with internet connections for example the Kothmale radio station in Sri Lanka, or Buganda Central Broadcasting Station in Uganda, provide mechanisms to transfer information from the internet to a much wider audience. There are already a number of examples of realistic approaches seeking to combine existing and new information systems.

Many communities live very close to existing infrastructure and the cost of connecting them up would be relatively small. Fibre optic cables and telecommunications infrastructure passes along roads and railways en route to the target market in many countries and existing satellites also provide huge potential for more widespread access.

4.7 Knowledge partnerships

Information systems for SL need to be able to share information horizontally between organisations at the same level, for example research institutes or farmer organisations, and vertically, between organisations at different levels, for example different tiers of government, or international and national research institutes, and local extension agencies.

¹ Uganda does not yet have a ranking due to insufficient data.

Traditional information systems have evolved to facilitate communication vertically, between individuals in one level to individuals in the level immediately 'above' or 'below' in the hierarchy, and horizontally between individuals at the same level in the same or related organisations. Vertical systems require a high degree of compatibility of information and technology throughout the system, often making the information of limited use for others with similar interests, but different perspectives and/or different systems. Horizontal systems are often more chaotic with different peer-groups sharing a wide range of information using different systems, making it difficult for others to combine or compare information from different groups. For information networks to work well in both dimensions requires a combination of sufficient system integration to allow vertical flows, and sufficient flexibility to encourage horizontal flows.

Farrington and Nelson (1994) identify two types of networks - information exchange networks (IEN), and organisations with a networking function (ONF). Information exchange networks tend to share information through a participatory two-way process, increasingly via the internet, whereas organisations with a networking function are more often involved in more centralised, unidirectional information service such as the CD ROMs and databases of organisations such as CAB International, CTA and the FAO. Easy access to the Internet favours the development of information exchange networks, and these may predominate in the future.

The UNDP (2001) describes the combination of current technology driven social transformations with the broader economic transformation driven by globalisation as a new paradigm termed 'the network age.' An important element of the network age is the opportunity to increase participation at every level. This can result in sharing information management responsibilities, more efficient use of the information and resources available, and facilitate greatly improved knowledge transfer.

In this network age, a new, partnership model for information and knowledge sharing is emerging. Individuals form flexible, participatory partnerships to generate and share knowledge often using internet technologies (e-mail, web sites and discussion groups). Partnerships often involve individuals and groups from many levels of many organisations, and change frequently, and internet technologies make it much easier to assimilate, analyse and re-broadcast disparate information. The boundaries between organisations and levels are disappearing. There is the potential, if it is possible to find mechanisms to overcome the problems of connectivity and information literacy, to foster *community knowledge partnerships* between individuals and groups at community level, that generate and circulate locally relevant information, and external partners, that can share information from elsewhere. This approach could help to reduce the current 'one-way' flow of information from scientific, information rich elites to a remote information poor villages, and encourage a rich 'two-way' flow of information between knowledge systems at every level.

How this can be done will be determined by the specific context of each country. In India, where there is good internet connectivity and considerable IT expertise, this could be done through overlapping electronic networks at community level, among research and extension organisations (VERCON) and within government planning systems (FIVIMS). A different approach is needed in Uganda, where internet connectivity is less well developed, IT expertise lower, and there is a greater reliance on traditional forms of communication. A district-level example is given involving close cooperation between an individual Agricultural research institute, the district agricultural office, farmer field schools and a local FM radio station.

5. Conclusions and Recommendations.

It is clear that there is considerable scope to develop improved communication and information systems which incorporate the advantages of face-to-face transfer of local knowledge, and of more flexible information storage, management and delivery of information through the internet and mass media, and can bridge the two. However although there are many examples of apparently successful approaches in many developing countries, and much qualitative evidence of the benefits to rural communities, there is little empirical data of the impact on livelihoods. This is due in part to the pace of change in information and communications technology, and in part to a general lack of effort and methods to evaluate the impact of communication and information projects.

Communication and information play a vital role in livelihoods approaches, and the principles of the livelihood approach provide useful guidance to the development of communication and information systems. Effective communication and information are vital for poor people to develop improved, sustainable, livelihoods, for decision makers responsible for setting the policy context, and people involved in the institutions and processes within which they live, and to strengthen communication between them all. The emphasis of the livelihoods approach on people, their assets, the policies, institutions and processes which influence their lives, promoting multi-sectoral partnerships and focusing on outcomes rather than inputs, also provides a useful framework to guide communication and information initiatives.

Existing communication and information systems, based on inter-personal interaction over thousands of years, printed material over the last few hundred years (or much less in rural parts of most developing countries), and mass-media over the last few decades are very effective, and most people value and need local knowledge, based on local experience, more than external ideas. Yet there is a tendency, in this internet-driven information age, to assume that providing internet connectivity is the best way to improve communication and information systems. This study has shown that this is often not the case. The most appropriate approaches are those which strengthen local systems and indigenous knowledge, introduce new technology carefully, ensure that poor people have access to it, and can use it to their own advantage, and seek to incorporate indigenous knowledge systems within it. There is no doubt however, that computer and internet technologies provide enormous potential for building information systems that can handle widely varying, rich, data, and make it easily accessible to anyone with a computer and internet connection, and the skills to use them. Internet technologies provide new opportunities to build new knowledge networks that can cross national, ethnic, social and organisational boundaries and contribute simultaneously to local and global learning.

The key recommendations, for people involved in improving communications and information in livelihoods approaches are:

1. Determine who should pay

It is unlikely that the private sector will be prepared to deliver communication and information systems that will be useful for the poor. It is important therefore to:

- Develop a new consensus on who should pay for information for poor communities.
- Explore new mechanisms (eg vouchers, group ownership of resources, and income-generating information services) to build more sustainable publicly funded systems.
- Explore opportunities for income generation from new information infrastructure (e.g. advertising on rural radio) to justify the investment in the longer term.
- Explore new forms of public-private partnership in information service provision.
- Develop new tools are needed to gather empirical evidence to ascertain the benefit of improved information, especially for poorer farmers, to justify public expenditure.

2. Ensure equitable access

New systems must deliver the right kind of information in the right format, for poor people. The wrong information, in the wrong format, or, if information is only available to wealthier groups, may accentuate existing inequalities. It is important therefore to:

- Identify and target the most marginalised groups and ensure equal access to existing information.
- Promote more reasonable time-scales in project design – most communication and information programmes have a very short time-frame.
- Use government's and multilateral organisation's own information systems to demonstrate how new technologies and approaches can be used to make public information more accessible.
- Improve networking between organisations involved in improving communication and information systems to learn more about how to ensure equitable access.
- Empower rural communities to demand the information they need.

3. Promote local content

Poor people need locally-relevant information, in the right language, to meet their immediate needs. It may be more useful to promote more information sharing between local institutions than bring in new information from outside. It is important therefore to:

- Promote information as a catalyst for community initiatives and adoption of technologies within decentralised and locally owned processes.
- Establish capacity-building programmes for micro-level information managers to help them to be able to generate appropriate information for the local context.
- Develop new systems to manage the integration of external and local information.
- Develop new mechanisms to link ICTs with traditional face-to-face communication.
- Link micro and macro level information needs to enable better information flows between policy makers and local users, and ensure the right information is available at each level.

4. Strengthen existing policies and systems

Communication policies in many countries (and organisations) are fragmented and unclear and further work is needed to make them effective. Many existing communication and information systems work well, and new systems should seek to build on them. It is important therefore to:

- Understand the existing policy framework.
- Work with local policy makers to harmonise and improve policies.
- Gather empirical data about new communication and information initiatives and use it to inform the policy debate.

- Support existing information systems at community level.
- Identify existing information system infrastructures that can be improved or enhanced with appropriate new technology.
- Encourage multi-disciplinary, cross-sectoral, inter-organisational communication and information systems that can inform rural development strategies.
- Explore new mechanisms to increase availability of the internet in rural areas, through partnerships with government and private sector companies.
- Promote the integration of internet, ICT and traditional information systems within the new pluralistic approaches to agricultural extension.
- Develop methods for making external information sources compatible with the requirements of existing systems rather than the other way around.

5. Build Capacity

Strengthening human capacity is at least as important as new technology. Capacity building is needed at all levels, from international and bilateral agencies down to community level – to equip people with the new skills necessary to develop and manage new systems. It is important therefore to:

- Support national government capacity building through the provision of training packages and information management resources.
- Promote standards for information management within international policy processes and share the experience of information strategy making between governments.
- Develop standards for information systems that promote livelihoods approaches.
- Strengthen local capacity in information collection, storage and dissemination including using innovative formats for the target audience based on the local cultural context.
- Develop appropriate training materials for field-level, national and regional organisations.

6. Use realistic technologies

There are many examples of over-ambitious communications and information systems that have never worked effectively in developed as well as developing countries. The most effective systems use realistic technologies that enhance and add value to existing systems. It is important therefore to:

- Develop models for realistic approaches to information technology that can be expanded as the infrastructure and resources become available.
- Provide a forum for discussing and evaluating international experiences that contributes to lesson-learning within governments and development agencies.
- Explore new approaches to link old and new media.
- Develop tools for participatory evaluation of SL-focused information approaches and projects.

7. Build knowledge partnerships

New internet technologies provide enormous opportunities to build new knowledge partnerships that cross national, ethnic, social and institutional boundaries. It is important therefore to:

- Encourage more pluralistic and decentralised networking that involves greater participation and two-way information transfer.
- Develop innovative partnerships where possible to encourage decentralised information management and knowledge transfer using new technologies where appropriate.
- Promote community knowledge partnerships by assisting communities to share information with a range of partners through targeted knowledge sharing venues and trained intermediaries.