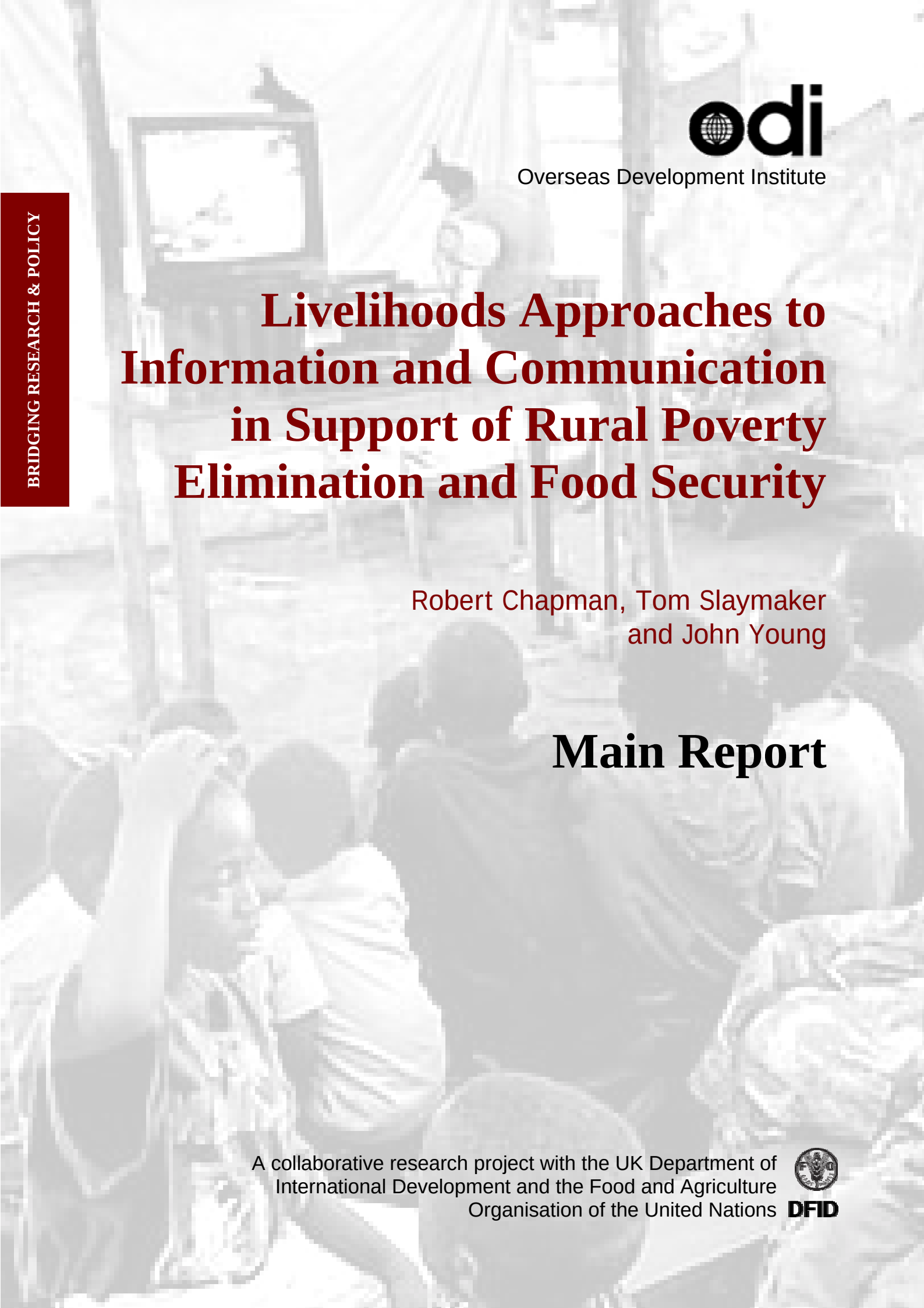

BRIDGING RESEARCH & POLICY

Overseas Development Institute

Livelihoods Approaches to Information and Communication in Support of Rural Poverty Elimination and Food Security

Robert Chapman, Tom Slaymaker
and John Young

Main Report

A collaborative research project with the UK Department of International Development and the Food and Agriculture Organisation of the United Nations

DFID

Contents

Acronyms

AKIS/RD	Agricultural Knowledge and Information Systems for Rural Development
ALO	Agricultural Liaison Officer
AMARC	World Association of Community Broadcasters
ARTEMIS	Africa Real Time Environmental Monitoring Information System
CABI	Centre for Agriculture and Bioscience International
CESPA	Le Centre des Services de Production Audiovisuelle
CGIAR	Consultative Group on International Agricultural Research
COAIM	Consultation on Agricultural Information Management
COL	Commonwealth of Learning
CTA	Technical Centre for Agricultural and Rural Cooperation
DELIVERI	Decentralised Livestock Services in the Eastern Regions of Indonesia
DFID	Department for International Development, UK
EMPRES	Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases
ENRAP	Electronic Networking for Rural Asia/ Pacific
FAO	Food and Agricultural Organization of the United Nations
FIVIMS	Food Insecurity and Vulnerability Information Mapping System
GIEWS	Global Information and Early Warning System
IA	Impact Assessment
ICTs	Information and communication technologies
IDRC	International Development Research Council, Canada
IDGs	International Development Goals
IFAD	International Fund for Agricultural Development
IICD	International Institute for Communication and Development
IIRR	International Institute of Rural Reconstruction
ITU	International Telecommunications Union
KIDS	Keys Indicators Database System
KIMS	Key Indicators Mapping System
LLL	Linked local learning
M&E	Monitoring and evaluation
MCTs	Multi-purpose community telecentres
MSSRF	M. S. Swaminathan Research Foundation
NIF	National Innovations Foundation
NGO	Non-governmental organisations
PRSP	Poverty Reduction Strategy Paper
SDRE	Sustainable Development Research and Extension Division
SL	Sustainable Livelihoods
SPFS	Special Programme for Food Security
SRISTI	Society for Research and Initiatives for Sustainable Technologies and Institutions
SWAps	Sector Wide Approaches
TAI	Technology Achievement Index
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VAM	Vulnerability Analysis and Mapping
VERCON	Virtual Extension, Research and Communication Network

Acknowledgements

This desk study was undertaken as the first phase of a collaborative research project by the Overseas Development Institute (ODI), the UK Department for International Development (DFID) and the Food and Agricultural Organization of the United Nations (FAO). The authors would particularly like to thank Dylan Winder of DFID and Stephen Rudgard of FAO for their help finding and identifying the relative importance of the many DFID and FAO documents consulted. The authors would also like to thank all the other colleagues in ODI, DFID and FAO who helped with the study and NR International who provided many of the pictures.

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Executive Summary

Livelihoods approaches have been the subject of much debate in recent years. Growing donor and development agency experience of implementing such approaches suggests they have considerable potential for improving the focus of programmes, policies and the overall strategic coherence of interventions designed to promote poverty reduction and food security in developing countries. The Department for International Development, UK and the Food and Agricultural Organization of the United Nations jointly commissioned this review of the theoretical background literature on sustainable livelihoods and the current context of information and communication, to assist their strategic understanding of the role of information in support of sustainable livelihoods. The study focuses on the potential of livelihoods approaches to improve the impact of information and communication initiatives in developing countries. Although information and communication are widely recognised as basic and fundamentally important elements of any development activity, they remain poorly integrated within emerging livelihoods approaches. This report therefore aims to bring together livelihoods thinking with ideas from information and communication for development, in order to improve understanding of the role and importance of information and communication in support of rural livelihoods.

Photo © Chris Stowers/Panos Pictures

Woman washing clothes in slums, beneath a huge satellite dish

It is widely acknowledged that a livelihoods approach provides a useful, logically consistent framework for thinking through the complex issues influencing the lives of the poor. In particular it draws attention to ways in which policies, institutions and decision-making processes influence resource access and ownership, and determine strategic livelihood options available to poor households. Information and communication systems are crucial in this regard, both in generating information required by the rural poor to make decisions on livelihood strategies, and in generating information required by institutions responsible for making decisions about policies and processes that affect those strategies. In each case, it is only through improved information that individuals and institutions can make informed choices about the opportunities and constraints associated with agriculture-based strategies.

However, improved information alone is not sufficient for improved decision-making. Decision-making is a political process and promoting multi-stakeholder participation in decision-making processes is a key concern. Furthermore, different stakeholder groups each have specific information needs and delivery preferences. Highly differentiated information needs assessment is essential in order to effectively support decision-making at different levels. It is evident that effective promotion of poverty reduction and food security requires changes in institutions and attitudes, knowledge and information levels, processes and skills. Improved understanding of the capacity of decision-makers at different levels to make use of the information provided is key for the identification of appropriate systems and institutions for the delivery of relevant information.

Enhancing the quality and quantity of information also relies on attention to the flow of information, such as the means of communication, format and content. Information can potentially have a catalytic role but much depends on its reliability and relevance to the needs of particular user groups. There is a necessary trade-off between the level of technical detail involved in information collection and analysis, and the practical usefulness of that information. Standardisation of techniques of information collection, storage and presentation is important, both to improve efficiency in information handling within agencies and also to ensure that information can be used externally by other agencies, thereby facilitating greater cross-sectoral communication and coordination. Equally important is developing effective means of prioritising information needs at different levels. Improved information can enable people to better defend their interests and articulate their needs; it increases their bargaining power and ability to influence decision-making processes which affect them. Transparency is equally important if information is to empower people to make better decisions. Improved communication systems can enable individuals to organise as groups and use information to hold institutions and authorities accountable.

A notable feature of livelihoods thinking is that it promotes an approach to development problems that transcends individual sectors. Building cross-sectoral, multi-disciplinary partnerships is a complex challenge. Success will ultimately depend upon the establishment of effective systems of information and communication which facilitate multi-level knowledge partnerships between different stakeholders in rural development strategies. However in terms of the practical implementation it is important to be realistic. Livelihoods approaches do not necessarily aim to address all aspects of the livelihoods of the poor. The intention rather is to employ a holistic perspective in the analysis of livelihoods, in order to identify a manageable number of key entry points where intervention could be strategically important for effective poverty reduction, either at the local level or policy level. This requires identifying existing opportunities and strengths and building on them. Rural communities often have well developed local information and communication networks that have frequently been overlooked in the past but there is now growing interest in finding ways to integrate these networks more effectively within new systems.

Key Policy Conclusions

1. Build on existing systems:
Many donor-driven information 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. Experience shows that the most effective systems are simple and modest, and build on existing databases and data collecting routines, to provide specific information to specific users, to inform decisions for which they are accountable. Strong support from internal 'champions' and clear rewards to individuals for contributing information are also important factors. There is a danger the current focus on Internet-based information systems in developing countries will undermine rich and effective existing information networks. There are many good examples of innovative mechanisms to bridge the gap between the Internet and rural areas through rural radio, high frequency radio links or village Internet booths, and rural service providers.

2. Determine who should pay:
Until recently there was an assumption that information for agricultural and rural development is a global public good and should be made freely available to all. More recently donors and governments have been shifting towards the private sector provision of agricultural extension services and information, and so poorer farmers are losing out. Capital investment costs for information infrastructure are high, but they are easy to calculate and there are many examples of successful cost recovery through charges for telephone use and advertising. It is more difficult to calculate the actual and hidden costs of providing information that empowers poorer farmers, and the social and economic benefit of doing so, without which it is difficult to justify public investment. Furthermore, cost recovery or profitability is only one of a wide range of factors influencing the sustainability of information services. More work is urgently needed to explore these issues, to develop a new consensus on who should pay for information for poorer farmers, and how sustainable information services can be provided.

3. Ensure equitable access:
Although the technological capacity to transfer information across large distances has increased rapidly in recent years, there is evidence that if it is not available to all, it may simply perpetuate existing social, economic and political disparities. Television and radio remain much more widely accessible than the Internet, especially in Africa. However there are good examples of initiatives in Africa and Asia where poor people have access to and control over electronic information services with positive livelihoods and governance outcomes. Experiments with telecentres and Internet-linked rural community radio have shown that it is possible to make Internet-based information available to large numbers of people. The challenge is to apply these pilot approaches more widely to enable rural communities, and their governments, in developing countries, to manage information more effectively and develop communication strategies that make information relevant to people's livelihood needs accessible to the poor.

4. Promote local content:
Farmers trust endogenous and local information more than exogenous information. Although issues and problems can be illustrated with examples from elsewhere, farmers are unlikely to believe solutions, or be motivated to adopt them, without substantial discussion of locally specific examples. In this context, information on food and agriculture should be particularly focused on local agro-ecological conditions, weather and topography, as well as local cultural and economic aspects of production, marketing and processing. Supporting communication between relevant local institutions may be more important than providing content from the Internet at local level, although the Internet and interactive television have been used successfully by farmers to discuss specific local problems with remote technical specialists. There is also enormous potential to enrich information in national and international information systems with specialised local knowledge, although this 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.

5. Build capacity:
There is a critical need to build capacity at all levels to improve information for livelihoods. Intergovernmental agencies need greater capacity to work on international information technology infrastructure, policies and standards. International and bilateral agencies need capacity to help governments build partnerships with the private sector to develop national information systems and strategies. At sub-national level there is a need to develop and extend electronic networks, and link these with rural areas. 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 strengthened and encouraged to provide more information locally, for local dissemination, and to contribute to national systems.

6. Use realistic technologies:
Information and communication initiatives for development are expanding exponentially. Coordination is impossible, and the emphasis is now on developing a realistic set of compatible technologies to facilitate the exchange of information between different systems. Even in developed countries there are few good examples of the successful integration of information technology with realistic information strategies. There is little effective monitoring and evaluation due to the lack of new approaches to evaluation appropriate for the new technologies, making it difficult to even identify the key lessons. Nevertheless, computer-based information technologies are increasingly applied to rural development, even in the most remote circumstances, despite the fact that the vast majority of the rural poor – who remain the target beneficiaries of most development programmes – only use information that is communicated by word of mouth. It is essential to be more realistic about information technology. In developing countries the most realistic approach is often to use a combination of the old and the new technologies and link them.

7. Build knowledge partnerships:
Information systems for livelihoods 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 national research institutes and local extension agencies. Vertical systems work best between a few highly integrated hierarchical organisations with compatible information systems. Horizontal systems thrive in an environment where many different organisations form a constantly changing network of partners wishing to share very specific information. In the new network age, a new model for information and knowledge sharing is needed, with more flexible and participatory processes operating within a loose but compatible global information network. Dynamic and flexible partnerships can be established between individuals and organisations at any level and the boundaries between the levels effectively disappear. Community knowledge partnerships that can develop mechanisms to deal with the problems of connectivity and information literacy, and incorporate local and external knowledge, can directly benefit poor people. This approach could replace the traditional process of a 'one-way' flow of information from a scientific, information rich core to a remote information poor community, with dynamic information sharing partnerships with a two-way flow of information at every level.

1. Introduction

In the current context of an information and communication revolution it has been argued that a 'digital divide' is threatening to further undermine many developing countries' already fragile prospects for future development. The concern is that the negative impact of a so-called digital divide would manifest itself in terms of a further reduction in the equitable distribution of information. In the broadest terms, this debate refers to information of all types, including cultural, historical and entertainment. The underlying concern, however, amongst social development agencies is that in a globalising world market, the arrival of truly global communication technologies holds the potential to directly influence people's livelihoods. In fact, it is predominantly to that end that Information and communication technologies (ICTs) are being developed and combined to provide businesses with powerful tools to develop, manage and market a vast array of products and services.

The developed world has entered an information age where more and more people rely on high-tech information services and communication networks. In many developing countries even the most fundamental information resources are unavailable to the majority of the population. Nevertheless, those living in developing countries are only too aware of the importance of information to the way they make a living and information systems exist at many levels despite the absence of new technologies. The information technology revolution is occurring at such a pace that even its impact on developed countries is difficult to ascertain, let alone the predominantly agriculture-based economies of much of sub-Saharan Africa.

Therefore, in order to further understand how information and communication can contribute to wider development objectives of sustainable economic growth which equitably benefits those living in developing countries it is necessary to consider the existing role of information in people's livelihoods, the current communication context and how recent developments might influence them. Knowledge, information and communication have been a strategic focus of development agencies and governments alike for over half a century (Chapman and Slaymaker, 2002). A focus on livelihoods and the multi-faceted context of poverty is more recent, but inherent in these approaches is recognition of the importance of an individual's balanced portfolio of assets in which knowledge, access to information and a means to communicate are essential components.

This report is the result of a desk review jointly commissioned by Department for International Development, UK (DFID) and Food and Agriculture Organization of the United Nations (FAO) to research the theoretical background literature on sustainable livelihoods and the current context of information and communication, to assist with the preparation of a strategic programme on information in support of sustainable livelihoods. Much of the research was carried out during the second half of 2001 and the detailed assessments of DFID's and FAO's programmes focussed on those in existence at that time. However, it was felt that many of the findings of the report are of relevance to a wider readership, including those involved in rural and agricultural development, projects and programmes using sustainable livelihood approaches and those addressing information equity concerns, for example using new information and communication technologies (ICTs). The report has therefore been revised to enable policy-makers and decision-makers from a wide spectrum of development organisations to incorporate strategic approaches to information and communication into their work and build on many of the livelihoods approaches already being implemented.

The study focused on the work of FAO and DFID, particularly in relation to operationalising sustainable livelihoods (SL) approaches, and on inter-agency collaboration. While the thematic focus is on agricultural and rural development issues, many of the issues and recommendations are applicable to information systems more generally. Section 2 provides a useful background to the theoretical and conceptual development of sustainable livelihoods approaches and introduces more recent thinking on the role of information and communication in such approaches. Section 3 looks at the stakeholders involved in using information at different levels, and the importance of information and communication in support of decision-making at every level. The importance of understanding different 'user' requirements is a theme that runs throughout, based on core SL principles that approaches should be differentiated, people-centred and multi-level.

Sections 4 and 5 draw from the literature some of the key issues to be considered by policy-makers to ensure that information interventions are designed with the end user and beneficiary in mind. Given the fact that much of the SL literature does not explicitly deal with the role of information and communication, a particular emphasis is placed on the role of existing information systems in support of livelihoods. Section 4 deals with the key issues that need to be considered by policy-makers in order to understand and analyse existing systems; how they work in terms of institutional arrangements, costs, access and content. Section 5 explores how to build the capacity of information systems and that of their users; and the relevance of SL principles in ensuring system development is dynamic, sustainable and conducted in partnership.

Section 6 provides conclusions and recommendations on the key issues that policy-makers should consider when designing and implementing information and communication programmes or adopting livelihoods approaches for rural development and food security interventions. The comprehensive list of references provides an opportunity for further reading and follow-up. An annotated bibliography is included for selected references as an additional information resource for policy-makers. This is intended to make some of the key points discussed in the background literature easily accessible for rapid reference whilst also encouraging more in-depth research.

2. Sustainable Livelihoods and the Role of Information and Communication

2.1 Sustainable livelihoods approaches

Sustainable Livelihoods (SL) approaches and their application have been subject to considerable debate in recent years. There is now substantial literature available on the topic relating to both theoretical developments and, increasingly, donor and development agency experience of implementation.[1] As noted by Krantz (2001), donor interpretations of an SL approach commonly incorporate the following:

1. **A set of principles**: these specify that developmental activity should be:

- ***People-centred***: beginning with people's own views of their priorities, opportunities and needs, the approach works out technically and financially feasible responses. In this way, it seeks to be responsive and participatory;
- ***Differentiated***: it recognises that the characteristics of poverty, and appropriate policy responses, differ among different groups of the poor;
- ***Multi-level***: it recognises that poverty cannot be addressed by local action alone: approaches are needed which link the local level perspectives obtained by SL into higher-level processes of designing and implementing policies which impinge on the poor;
- ***Conducted in partnership***: between public and private sectors – both NGOs and private commercial agencies have roles to play which complement those of government;
- ***Sustainable***: in several dimensions – economic, institutional, social and environmental, but this does not imply set patterns of livelihoods which must be sustained indefinitely; on the contrary, livelihoods are recognised as…
- ***Dynamic***: in the sense that the poor manage complex 'portfolios' of a number of (usually) part-time activities, changing the balance among them with changes in the opportunities and constraints they face.

The principles are intended as a basic guide to more poverty-focused development and encapsulate the essential aims of SL.

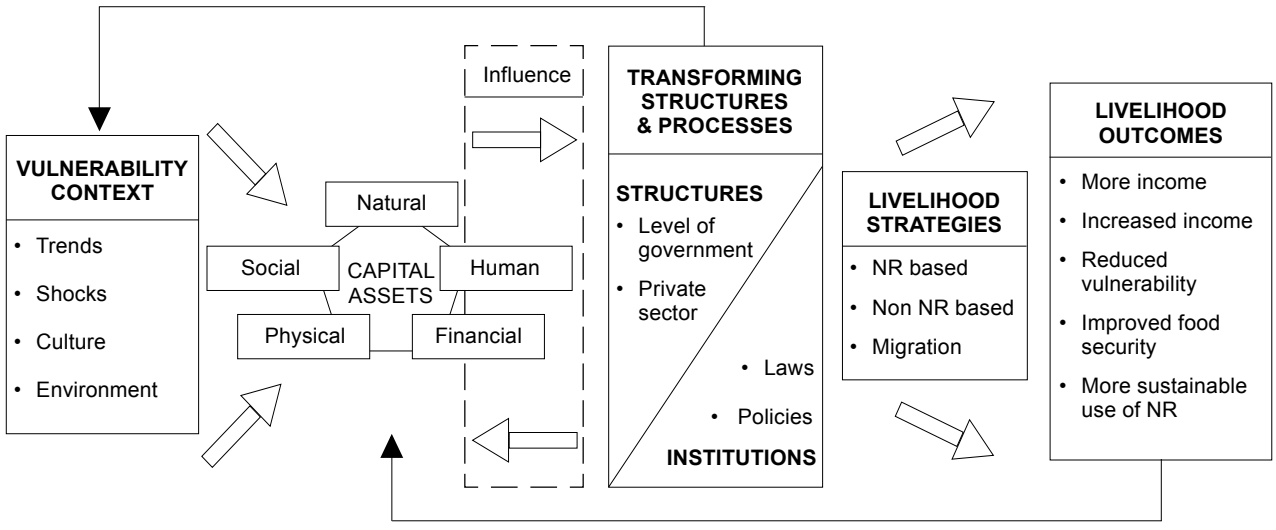
2. **An analytical framework** (providing a broad and systematic understanding of the various factors that constrain or enhance livelihood opportunities and how they relate to each other).

The framework is a useful means of highlighting key aspects of the approach and the way they relate to each other but is not intended to capture all of SL thinking. Rather it is one of many tools which can be employed when implementing an SL approach.

3. **A developmental objective** (i.e. to enhance the overall level and sustainability of livelihoods to reduce poverty).

An SL approach therefore aims to bring together the lessons of 'best practice' in a *set of guiding principles*. It also notably provides a common framework and language for analysts and policy-makers from different sectors, emphasising cross-sectoral collaboration and providing space for different disciplines to work together towards a common goal (Ashley and Carney 1999). The potential of SL as an *analytical tool* is perhaps greatest in project design. A central focus of analysis is in understanding how existing policy and resulting institutions and structures affect the livelihood outcomes and strategies of the poor. Specifically, it recognises that access to different types of capital *assets*,[3] the ability to put them to productive use and to reduce risk and vulnerability are central components of growing out of poverty. Importantly, it emphasises that the poor *do* have assets, options and strategies, and that they are decision-takers.

Figure 1: DFID's Sustainable Livelihoods Framework[2]



Source: after Carney et al. (1999)

As such it provides a useful, logically consistent way of thinking through the complex issues influencing the livelihoods of the poor (Farrington et al., 2001).

SL approaches therefore have an important contribution to make in enriching the quantitative and economics-based frameworks commonly used in assessing and designing policy and programme interventions, and can support the design of development strategies by ensuring that they focus appropriately on the poor. In particular the balance needs to be right between sets of interventions focusing on the productive sectors and those focusing on social protection or consolidation (Norton and Foster 2001). At the level of country programme/strategy design and management the focus therefore is on the pursuit of sustainable livelihoods as an *overall policy objective*. These issues are increasingly being considered in the context of how organisations operationalise SL approaches in their work.

Operationalising SL Approaches

Carney et al. (1999) compared the approaches of four key proponents of SL (DFID, Oxfam, CARE and UNDP). Variations in emphasis and interpretation are revealed but it is noted that at a conceptual level commonality exceeds variation. Elsewhere DFID stresses that there are many ways of applying livelihoods approaches (there is not one single approach), but that the basic underlying principles are fundamental and common to all approaches (DFID, 1999).

A notable feature of the SL approach is its emphasis on multi-sectoral collaboration and coordination. As such it encourages *innovative partnerships* between government departments, public and private sector, civil society and international development agencies. Enhancing information and communication processes within and between agencies is a key area of concern.

An Inter-Agency Forum on Operationalising SL Approaches, held in Siena in March 2000, produced strong agreement on the guiding principles that underpin SL approaches (FAO, 2000d). However, at the same time it was noted that the tools and methods used to implement them are not specific to SL methodology. Furthermore some of the approaches, such as participation, which underpin the SL guiding principles, are already well-established in the work of agencies such as the FAO (Chapman, 2001). The need to understand and facilitate effective linkages between micro-level livelihood systems and their policy environment is well recognised, but the particular role and responsibility of different agencies in interventions at different levels varies according to their comparative advantage, individual mandate and scale of operations. For example United Nations Development Programme (UNDP) and DFID tend to have higher level entry points than non-governmental organisations (NGOs) and agencies working on the ground. However, there is clear scope for greater collaboration and complimentary activity, with different agencies building on their various existing strengths.

The Inter-Agency Forum noted the following key lessons from SL approaches:

- shift the focus from resources to *people* and from livelihood constraints to *people's strengths*;
- emphasise the relationship between people's assets and their resilience in the face of external shocks, highlighting how poverty contributes to vulnerability;
- focus on the synergy between natural, physical, financial, human and social capital;
- stress *outcomes* rather than outputs;
- prioritise early diagnosis, demand-driven implementation and the establishment of feedback mechanisms;
- emphasise project design as an iterative process involving continual learning and adaptation on the basis of feedback from unfolding implementation;
- ensure economic, institutional, social and environmental sustainability through adoption of exit strategies in the early stages of programme implementation;
- foster interdisciplinary teamwork;
- stress the interdependence between 'real life experiences' and the broader policy context as the basis for forging bottom-up micro-macro linkages to bring about policy changes;
- encourage innovative partnerships.

In terms of the practical implementation of SL approaches it is important to be realistic. The SL approach does not necessarily aim to address all aspects of the livelihoods of the poor. The intention rather is to employ an holistic perspective in the analysis of livelihoods, in order to identify a manageable number of key entry points where intervention could be *strategically important* for effective poverty reduction, either at the local level or policy level (Krantz, 2001). Identifying the most effective entry points for SL remains a key issue for further clarification, however there is no reason why priority areas should not be sector specific, provided they adequately address the needs of the poor. Large donors are increasingly moving from supporting projects towards budgetary support and sector-wide approaches (SWAps) and Gilling et al., (2001) notes that SL approaches can add value to sector-based approaches by emphasising diversity and cross-sectoral linkages, and have the potential to make them more effective in reducing poverty.

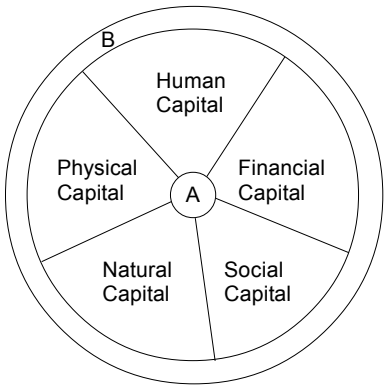
The UNDP[4] has developed a number of notable tools to facilitate the implementation of SL programmes at country level. These include:

- A manual for Participatory Assessment and Planning for SL (PAPSL);
- A programme support document template that can be used by UNDP country offices;
- A discussion paper on how indicators of SL can be developed;
- Guides for the analysis of technology, environment, governance, community participation and monitoring and evaluation (M&E).

Other work in progress includes a typology of SL systems, guidelines for micro-macro cross-sectoral policy analysis, and a policy paper on SL that outlines the policy shifts needed to promote SL (Carney et al., 1999). A further key issue is the need for SL-driven policy analysis to go beyond policy content and consider policy processes. Thomson (2000) argues that

the best possibility for achieving a sustainable improvement in livelihoods policy is to focus on increasing civil society and stakeholder participation in the policy process. This raises another set of issues about the present capacity and resources available to appropriate organisations to actively engage in the policy process, with important implications for donor support strategies.

Figure 2: Livelihoods information wheel



- **A** is the core information that contributes to long-term capacity building for decision-making as to appropriate livelihood strategies, usually through education and training, and technical support and assistance with problem solving.
- **B** is the information that relates predominantly to the local context and needs updating regularly for people to make short-term decisions regarding their immediate livelihood activities. It can also contribute to medium-term diversification and livelihood strategies.

More recently, literature on SL approaches has sought an increased focus on power relations, institutions and politics. There is growing interest in the links between and relative merits of rights-based approaches and SL (see for example Farrington, 2001). Rights-based approaches tend to place greater emphasis on the need to increase the power and rights of the poor if poverty is to be addressed. Moser et al. (2001) assess the potential for fusion between the idea of rights and SL approaches to produce a 'livelihood rights approach' and distinguish between a set of normative, analytical and operational principles. It is useful to note the distinction between the 'demand' and 'supply' sides of rights-based approaches. SL arguably over-emphasises the 'provider perspective', whereas empowerment remains a primary focus of many NGOs, e.g. Save and CARE. Oxfam in particular emphasise the 'right to a sustainable livelihood' but then seeks to deliver against specific objectives/outcomes on food, income, employment security etc. It is also increasingly concerned with value-chain analysis, markets and livelihoods, and issues of power and powerlessness in markets and trade (Hussein, 2002).

2.2 Information and communication in the context of SL

Information and communication issues currently receive only limited treatment in the literature on SL approaches but are central components in the framework in that they provide the linkages that maintain its dynamic structure. The framework (see Figure 1) serves to highlight the *processes* that contribute to a set of livelihood outcomes and is not a static map of the structures alone. In order to achieve desired livelihood outcomes information must be communicated throughout the framework to inform decision-making at every level. Through a process of iterative diagnosis and feedback, information generated within the SL framework should contribute to a constant learning process that influences project design and contributes to poverty focused institutional and policy reform (Pasteur, 2001a). SL thinking illustrates that there are many different livelihood strategies that can be developed by working with the assets, policies, principles and institutions in each context to affect positive change. In each and every case, information and communic-ation are central driving forces of change.

Understanding the local level information needs of the rural poor, as the ultimate beneficiaries, is centrally important to the development of effective projects, programmes and policies in support of SL. The particular role of information at the livelihood level can be usefully conceptualised in terms of a livelihoods information wheel as shown in Figure 2.

In order to help define the role of information in support of SL the diagram separates information into two categories (**A** and **B**). These categories are not intended to represent two completely distinct types of information but rather the dual role that information can play in support of sustainable livelihoods over time.

A represents the information for long-term capacity building involving education, training and technical support appropriate for the livelihood development of individuals or groups. This core information contributes to the enhancement of an individual's knowledge. It improves understanding of the systems and processes that can affect the way that assets are used in the longer term, and assists in the planning of livelihood strategies. **B** represents information for short-term decision-making that is used to maximise the potential of a particular asset at any one time, reduce vulnerability to shocks and respond to immediate needs.

The two types of information can support any one or all of an individual's assets but the relative importance of information relating to a particular asset is largely context specific. The typology (**A+B** information to support long-term livelihood strategies and short-term livelihood activities) is not intended to be comprehensive in its representation of the role of information in support of SL but is indicative of a systematic and differentiated approach to information needs assessment that can usefully inform the design of more people-centred policies and programmes in support of SL. The livelihoods information wheel provides a reference point to help focus project design on differentiated information needs.

Participatory approaches underpin SL and a particular value of the approach lies in the inclusive, non-threatening *process* of designing poverty interventions that it encourages, in addition to whatever improved project/programme outcomes it achieves (Farrington et al., 2001).

Information and communication initiatives are key to enhancing the benefits of this process. A people-centred approach can also help the poor to use information and communication technologies for their own needs rather than just receiving information in the form of messages from

external sources (Norrish, 1998). This requires enhanced two-way information flows between beneficiaries and policy-makers. For example, the Farmer Field Schools developed by FAO as part of an Integrated Pest Management project in Indonesia use a methodology that helps to focus on local knowledge and experience and ensures that the participatory learning process is one that is shared between the farmers (Coldevin, 2000).

Photo © FAO

IPM facilitators assisting farmers to interpret their observations at the Farmer Field School, Cambodia

The lessons from Farmer Field Schools are being integrated into other sectors such as community forestry and are a good example of how many of the principles of SL are already being applied by organisations such as the FAO. SL thinking, however, can further help to reveal the types of information which might best contribute to FAO's food security and poverty objectives, either by providing for the information needs of the poor directly, or by enhancing the quality and quantity of information available to institutions responsible for making decisions which affect the poor. It emphasises the importance of a detailed assessment of the needs of target beneficiaries and stakeholder groups in order to identify the most appropriate institutions and policy processes for effective programme implementation.

Debate regarding new ICTs centres on the identification of opportunities for the poor to use ICTs to manage information that is appropriate for their different needs. This requires 'local appropriation' of ICTs by communities so that they can be adapted to their own social, economic and cultural processes (Michiels and Van Crowder, 2001).

SL approaches focus attention on the relationship between people's *assets* and their resilience in the face of external shocks, in particular the relationship between poverty and vulnerability. This can usefully inform a differentiated approach to information needs assessment by highlighting the potential role of information in enhancing the different *livelihood assets*. Box 2 illustrates some examples of how information can support the livelihood assets of the poor and in particular how ICTs can improve the flow of information to support sustainable livelihoods.

SL approaches aim to be flexible, responsive and participatory, prioritising early diagnosis, demand-driven implementation and the establishment of effective feedback mechanisms. The design and management of SL projects is an iterative process involving continual learning and adaptation on the basis of feedback from unfolding implementation (Pasteur, 2001b). Information in support of SL therefore has a dual function: to supply the information required by the poor in order to pursue sustainable livelihood strategies; and to supply information required by institutions responsible for making decisions that affect those strategic livelihood options. Information relating to market prices, for example, if packaged correctly can respond to the immediate needs of farmers. However, a multi-level approach will both deliver information on market prices to the village level in an appropriate format, and incorporate information (on yields, market prices and farmers incomes) from the local level into national productivity and vulnerability assessments, e.g. Poverty Reduction Strategy Papers (PRSPs). SL provides a holistic perspective which can assist in the identification of priority activities and appropriate entry points, based upon an improved understanding of the potential synergies between targeted interventions at different levels.

It is evident that effective promotion of sustainable livelihoods requires changes in institutions and attitudes, knowledge and information levels, processes and skills. Improved understanding of skills at different levels enables the identification of appropriate systems and institutions for the delivery of information in support of SL. The role of information in decision-making will therefore be discussed in the following section, exploring the importance of information for the information needs of individuals and institutions at different levels and for developing strategies and policy-making.

Box 1: Definition of Information and Communication Technologies (ICTs)

ICTs are those technologies that can be used to interlink information technology devices such as personal computers with communication technologies such as telephones and their telecommunication networks. A PC or laptop with e-mail and Internet provides the best example. Michiels and Van Crowder (2001) have defined ICTs 'as a range of electronic technologies which when converged in new configurations are flexible, adaptable, enabling and capable of transforming organisations and redefining social relations'. The range of technologies is increasing all the time and 'there is a convergence between the new technologies and conventional media' (Michiels and Van Crowder, 2001: 8). This rapid and ongoing convergence means that devices such as digital cameras, digital video cameras and players, personal digital assistants, slide projectors and mobile telephones are also compatible with more traditional media such as radio (digital, satellite), and television (cable, digital, satellite), so that most devices can now be linked to others to share and exchange information and allow it to be used in such a way that they can also be categorised as ICTs. Even books are being incorporated into ICTs, either through the potential for informal web publishing or more formal digital book publishing with designated readers or 'e-books'. ICTs, therefore, are an expanding assembly of technologies that can be used to collect, store and share information between people using multiple devices and multiple media.

(Chapman and Slaymaker, 2002)

Box 2: Information, communication and livelihood assets

ICTs impact on livelihood assets in a number of ways depending on the local context in which they are introduced. Assuming open-access, community models such as telecentres (IDRC: Acacia Initiative, UNESCO: MCTs) and 'knowledge centres' (MSSRF) can be expected to have an impact on livelihood assets in the following ways:

Human Capital: improved access to education and training through distance learning programmes, and education tools in a wide range of different formats. The potential to transfer digital content to remote locations easily in the form of text, images, video and radio, combined with the vast storage capacity of PCs, CDs and DVDs, reduces many of the costs associated with barriers to broad-based information access. The impact of increased information flow on human capital development will depend equally on the effective translation of material into different languages and appropriate formats for the intended users and their local cultural context.

Natural Capital: improved access to institutions dealing with different aspects of natural resource management, including administrative and legal information such as land records. Communication channels can be enhanced with appropriate authorities, landowners, government ministries and local government officials. The experiences of other individuals and communities can also be shared and the information used to compare strategies and develop local solutions to problem and conflict situations.

Financial Capital: Support and strengthening of local financial institutions, including micro-credit organisations, to improve information provision on services and facilities available, such as loans and savings schemes. Extended access to financial information can also improve transparency and more equitable service provision such as through highlighting excessive rates of interest charged by moneylenders. Community-based financial management such as savings schemes can also be introduced, together with extended communication among a wider community of financial institutions.

Social Capital: Improved 'networking' both at the community level with existing networks and potentially amongst a much wider community. The ability to build new social networks at a regional and national level can help to bring benefits to existing networks and institutions at a local level, such as community based organisations, farmers' organisations etc. The reduction in the cost and time taken to travel to pursue social networking goals can also have a positive impact at a household level with family members spending less time away and less money on transport. Expanded social networks may also result in increased opportunities for employment both locally and further afield.

Physical Capital: Access to markets and market information helps to improve choices for the sale of goods on local markets according to enhanced information on prices and comparative supply and demand for products. In the longer-term new markets, techniques and processes for production, processing and marketing of products, both farm and non-farm, can be explored.

[1] Livelihoods Connect (www.livelihoods.org) is a web-based platform designed to promote information sharing and lesson learning between agencies implementing Sustainable Livelihoods approaches. It is funded by DFID-UK.

[2] Diagrammatic frameworks used by different agencies to think about SL tend to vary.

[3] SL approaches typically distinguish five asset categories: human, social, natural, physical and financial.

[4] See www.undp.org/sl

3. Better Information for Better Decisions

3.1 Information for farmers, institutions, governments and donors

Information is a basic and fundamentally important element in any development activity. Finding ways to harness it more effectively to assist those making decisions affecting the sustainability, productivity and profitability of their livelihoods is a priority concern (DFID 2000, 2002). Information about food and agriculture is vital for both individuals and institutions in developing countries in order for them to make effective decisions on issues ranging from household level food security to local, district and national rural development strategies. Better information and information systems can greatly assist decision-making at all levels and enable the information that is available to be used more effectively where it is needed within the system. The goal of the FAO's World Agricultural Information Centre (WAICENT) Outreach Programme is:

> *'..to enhance the ability of individuals and communities in Member Countries to improve the efficiency, quality, and relevance of information and knowledge exchange among the various stakeholder groups involved in agricultural development and food security, with a focus on the most vulnerable and deprived groups'* (FAO, 2000a: 1).

The effective provision of information on food and agriculture is therefore fundamentally important as it informs both the livelihood strategies of the rural poor themselves, and the policies and strategies of agencies and institutions responsible for reducing rural poverty and food insecurity. In each case, it is only through improved information that individuals and institutions can make informed choices about the opportunities and constraints associated with agricultural development strategies (FAO, 2000b).

In order to prioritise information programme activities and effectively target different information needs, it is important to identify different stakeholders (FAO, 2000c). A recent assessment of stakeholder participation in FAO Field Programmes, by FAO's Informal Working Group on Participatory Approaches and Methods to Support Sustainable Livelihoods and Food Security (Warren, 2001), identified more than 25 different stakeholder types. Primary stakeholders include community and societal 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. Evidently these various stakeholder groups have highly differentiated food and agriculture information needs.

The distinction between stakeholders at the government, decision-making level and more local level stakeholders helps to illustrate the diversity of information requirements. Further analysis of information needs differentiated by gender also follows logically from the people-centred focus of the SL approach. However, a differentiated approach to information needs on the basis of gender should also recognise that most people fall into multiple stakeholder categories according to their livelihood options and assets. In this regard the policy-makers and farmers discussed below represent comparatively distinct stakeholder groups, although, needless to say, they refer implicitly to both men and women. Table 1 illustrates some of the decisions that are made at each level and the type of information that is needed.

Photo © John Terry/NR International

Filming of a workshop for farmers on weed and soil management in maize for a broadcast on Ghana national television

However, improved information is necessary but not sufficient for improved decision-making. Decision-making is a political process and stakeholder *participation* in decision-making processes is crucially important. Enhancing the quality and quantity of information therefore also relies on attention to the *flow* of information, such as the means of communication, format and content. Information can potentially have a *catalytic* role but must be reliable and relevant to the needs of the particular user group. Improved information can enable people to better defend their interests and articulate their needs; and it increases their bargaining power and ability to influence decision-making processes which affect them. Transparency is equally important if information is to empower people to make better decisions. Improved communication systems can enable individuals to organise themselves, use information to hold institutions accountable and put pressure on relevant authorities to deal with their problems (CTA, 2001). However, identifying appropriate type, quality and quantity of information depends on understanding the capacity of decision-makers at different levels to make use of the information provided.

Table 1: Types of decisions and information needs

Decision-making level	Decision type	Information required	Examples*	Implications for projects
Rural poor household	Livelihood strategies (prioritisation of livelihood activities & investment decisions)	Availability of agricultural inputs & services, output market prices, institutional & policy context	IPM in Philippines; Farmer Field Schools; Bare foot vets; IIRR workshops.	Strengthening extension, education & training systems to better assist & support farmer decisions
Producer organisations	Collective strategies (production, processing & marketing)	Information on opportunities & constraints in agricultural sector	Rural Group Enterprises, Mozambique; Marketing organisations, Mali.	Capacity building for networking & communication
Local NGO	Design of projects to support the rural poor	Information about existing livelihood opportunities & constraints	Community radio e.g. Kenya; Acacia telecentres; Grameen Shakti.	Community-based education & training. Local content. Wireless connectivity
Local government	Local and District policy-making (prioritising resource allocation)	Information about the status of agriculture & poverty	Early Warning Systems.	Strengthening local capacity for information collection & management
Public service providers	Formulating national, district & local technical assistance programmes	Context specific information agricultural systems constraints	Agricultural Liaison Officers; Internet; GIS mapping;VERCON.	Strengthening capacity for information collection & management
Private sector organisations	Assessing market demand for agricultural goods & services	Market information & agricultural system constraints	Financial service providers, Mali; Cotton buyers in Zimbabwe; DELIVERI, Indonesia.	Encouraging innovative partnerships with private sector
National NGOs	Advocacy work & informed engagement in policy-making processes	Agricultural policies institutions & decision-making processes	IIRR workshops.	Enhanced stakeholder participation in policy processes
National government	Formulating targeted national policies & strategies for Agriculture	Monitoring national food production status & trends in poverty & food insecurity	National FIVIMS PRSPs	Assessment of poverty, productivity & vulnerability; Strengthening linkages between micro & macro level decision-making
International Donor agencies	Setting priorities for donor assistance programmes	Monitoring global food production & status & trends in poverty & food insecurity	GIEWS VAM FIVIMS PRSPs	Improved linkages between global & national information systems

* Many of these examples are discussed in subsequent sections of this report.

Local level information for rural livelihood activities and strategies

Some three quarters of the world's poor live in rural areas and, according to projections, a majority of the poor will continue to live in rural areas well into the 21st century (IFAD, 2001). The rural poor depend primarily on agriculture and related activities for their livelihood; agriculture provides the bulk of their income and their main source of nutrition. A complex range of information is required by rural people and community organisations to pursue individual and collective livelihood activities and formulate sustainable livelihood strategies.

Richardson (1997) in a report for the FAO stresses the need for an integrated approach to information for rural and agricultural development. An approach that 'begins with the needs of rural people and grassroots agricultural organisations and works to establish vertical and horizontal channels of communication' is consistent with a participatory, people-centred, SL approach to information management. Richardson notes that 'participatory development is fully dependent upon communication and information sharing processes' and that in order to deal with the unprecedented challenges of food insecurity and poverty, people at *all* levels of society 'must be able to access critical information and communicate' (1997:7). Understanding the information needs of these primary stakeholders is an essential starting point if higher level policy and planning processes are to effectively support sustainable livelihoods in rural areas.

Promotion of sustainable rural development strategies, including sound management of natural resources, is a central concern of agricultural information systems. Smallholder farmers in many parts of the world reach productivity levels that are only one third of the potential yield under optimum conditions (IFAD, 2001). Principal reasons for low productivity include weak (or non-existent) extension services, lack of competitive markets and lack of suppliers for seeds, fertilisers and rural financial services. Together these factors reduce either the possibilities or incentives for increasing agricultural productivity. The lack of information available to the rural poor is a major constraint to increased agricultural productivity.

Agricultural extension, education and training can help many farmers maximise the potential of their productive assets. Farmers need up-to-date information on sources, availability and cost of agricultural inputs, and also on the potential of different techniques and technologies used for the production and processing of agricultural goods. Smallholders can

substantially increase their yields by adopting better methods, seeds and fertilisers whilst delayed adoption of new technologies among poor farmers can lead to exclusion from market opportunities. Tripp's (2001) assessment of future agricultural technology policies for rural development emphasises that most of the new technologies that will become available to farmers will be 'information intensive', i.e. requiring increased levels of knowledge for appropriate management. In addition to basic technical knowledge, the rural poor need to be able to operate in increasingly sophisticated input and output markets.

Photo © Frances Kimmins/NR International

Farmer in Uganda showing her groundnut crop destroyed by rosette disease

However, it is not sufficient to focus on production and crop specific information alone. The information required by the rural poor on agricultural techniques includes that relating to forestry, fisheries and livestock. In addition, information on rural off-farm activities is increasingly important in many areas. In many cases the information that is most relevant to improving support to livelihoods is wide-ranging information that informs diverse household level strategies. Effective information systems need to integrate the productivity based needs of rural communities with information to support *broad-based rural development strategies*, including diversification of household activities both within and outside the farm sector. For appropriate choices to be made at the local level, information regarding rural development strategies also needs to incorporate issues of environmental and not just economic sustainability.

Strengthening developing country capacities for research and development of more responsive extension services is a key concern in order to support farmers to make better decisions relating to overall household strategy. Extension of agricultural information has evolved beyond merely transmitting messages (although this is still important). It is becoming more open, more participatory and more demand-driven, involving interactivity, negotiation and two-way information exchange between extension agents and farmers. There is new emphasis on the acquisition of information; farmers need to be able to request information specific to their particular livelihood needs and the options available for building more diversified activities. Information communication systems must therefore be designed so as to facilitate dialogue and questioning (Jafri et al., 2002). It is also important to note that the impact of increased information flow is dependent on its effective translation into a format and language appropriate to the intended users and their local context, and also on the capacity of farmers to analyse and act on it.

Information about the role and responsibilities of different institutions in the provision of key services is equally important. The rural poor also require better information about rural development programmes supposedly designed to benefit them. Farmers also need to know where to go and who to ask for different types of 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 (Mundy and Sultan, 2001). Agricultural credit is another crucial topic. Legal and financial disputes are common because rural people do not have access to basic legal and financial information. This creates a climate of distrust, which constrains investment in agriculture.

Longer-term strategies are increasingly going to be dependent on information relating to international markets, to determine opportunities and potential challenges to sustainable livelihoods. Globalisation and continuing liberalisation of agriculture has substantially changed the policy and institutional environment in which poor farmers operate. Previously the cost of inputs and output market prices were fixed and known, but now smallholders are increasingly exposed to the vagaries of the open-market. Most poor farmers are ill-equipped to cope, they do not understand how markets work or why prices fluctuate and are vulnerable to rapid changes in market conditions. Accessing information on market conditions, prices and quality of produce from physically remote locations is extremely difficult. Groups of poor farmers are often isolated from each other with little collective organisation, limited experience of market negotiation and little understanding of ways in which to influence the terms and conditions under which they enter the market.

For example, rural producers commonly sell cheaply during the glut immediately following harvest and then buy at higher prices in the lean season, thereby losing out twice. The lack of information means that poor farmers are ultimately passive, rather than active players, in the market and are vulnerable to exploitation by others. As a result they often fail to realise the full potential value of their produce. Farmer groups or associations can help overcome this problem. Where rural producers are able to communicate better, enabling them to organise themselves and have access to up-to-date market information, they are able to develop strategies to achieve better and more stable prices. Improved systems for the management and communication of agricultural information can help poor farmers organise as groups, manage production jointly, exchange experiences, obtain technical and economic information and make appropriate livelihood choices.

3.2 Strategic importance of information

Information for strategic planning and policy-making

Strategies for information in support of SL-friendly policy-making focus primarily on enhancing the quality and quantity of information available to institutions responsible for making decisions which affect the poor. It is important to note that information needs at different levels of government

decision-making (local, district, national and international) are highly differentiated. However two broad types of information can be usefully distinguished:

- Information on the status of agriculture and poverty as the basis for policy and regulatory decision-making (including population, productivity, poverty and vulnerability etc.);
- Information to support management and implementation of policy interventions (monitoring and evaluation, constraints analysis, micro-macro links, diagnostic feedback etc.).

Adoption of an SL approach can provide policy-makers with a changed perspective. The further an SL approach underlies the collection of information on the status of agriculture and poverty, the better the quality of the information flowing up to policy-makers. It follows that improved understanding, among policy analysts and decision-makers, of the diversity and complexity of livelihood opportunities facing the poor is likely to lead to more appropriate policy choices. SL approaches to information collection and analysis can certainly enrich quantitative and economics-based frameworks commonly used in assessing and designing policy and programme interventions. In particular, participatory approaches to eliciting more relevant information in support of decision-making are fundamental to improved understanding of livelihood issues. It is however important to be pragmatic – Krantz (2001) notes that successful application of the approach depends less on, for instance, a particular definition of vulnerability, and more on the interpretation of reality against the principles underlying the approach.

FIVIMS website

At the government level information needs refer to both the quantity and quality of information that is required by decision-makers to formulate effective policies. Heeks (1998) (cited in Kenny, Navas-Sabater and Qiang, 2000) prioritises four main types of information required for governance institutions:

- Information to support internal management, including staffing and budgeting accounts;
- Information to support policy and regulatory decision-making, including population, economic, financial and other data;
- Information made publicly available, including laws, statistics and health information;
- Information to support public services such as education, health and transport.

It should be further noted that enhancing approaches to information collection and analysis is necessary but not sufficient to realise SL objectives. Thomson (2000) argues that the best possibility for achieving a sustainable improvement in livelihoods policy is to allow for greater civil society and stakeholder participation in the setting of priorities and formulation of policy. However the extent to which different stakeholder groups engage in policy debates on food and agricultural issues depends largely on their ability to access relevant information.

Governments therefore require improved information on the nature, extent and distribution of food insecurity and poverty, but also, crucially, on the complex linkages between policies designed to solve these problems and actual livelihood outcomes. FAO has a number of specialised information systems and tools (e.g. Global Information and Early Warning System (GIEWS), Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (EMPRES), GeoWeb), but it is important to examine the ways in which this information is actually used by policy-makers, as well as if and how it translates into targeted policy interventions.

A recent evaluation of FAO's policy assistance (FAO, 2001a) shows that it is widely appreciated by the countries and international partners, and that its technical quality is as good as, or better than, that of other agencies, making considerable contributions to the policy-making processes. However significant areas for improvement were found, including the integration of multi-disciplinary input. The report also recommends that, in the light of the Strategic Framework, FAO's policy assistance should be oriented towards rural development policy rather than just agricultural policy.

FAO has been effective in introducing more consultative approaches into policy-making between government departments, but this could be still further strengthened. It is recommended that FAO continue to encourage participatory modes of policy formulation that include not only other line ministries, but also NGOs, the private sector, and other UN and bilateral agencies. There is a particular need to increase the capacity for more rapid flexible responses to the information needs of policy-makers. This is partly a question of improved targeting of government information needs and partly a question of supporting and training governments in information management and analysis for policy-making.

Inter-agency collaboration and coordination of information activities

A particular strength of the SL approach is its emphasis on multi-level, multi-sectoral collaboration and coordination. As such it encourages innovative partnerships between government departments, public and private sector, civil society and international development agencies. Enhancing information and communication processes within and between agencies is a key area of concern. FAO's role as a neutral forum to discuss and resolve issues related to the management and dissemination of agricultural information gives it considerable comparative advantage in this area.

The Food Insecurity and Vulnerability Information and Mapping System (FIVIMS), which is coordinated by FAO, links information systems measuring and monitoring food

insecurity and vulnerability at the national level, collectively referred to as a 'national FIVIMS'. A national focal point is usually identified, someone who can play a catalytic and/or coordinating role, usually located in a Ministry or NGO. The FIVIMS initiative aims to establish national information systems which are required to develop dissemination plans and approaches that ensure that information generated reaches those who need it, can be easily understood and is actually used. A starting point therefore is a *user needs assessment* to ensure that decision-makers' real information needs are correctly identified. National FIVIMS are encouraged to involve decision-makers in the preliminary stages of planning. Prepared reports are designed to address the particular interests of different types of users. Workshops to present and discuss results with subsets of users are also encouraged as an extremely effective means of helping decision-makers to interpret and internalise results, and their implications for policy (FAO, 2000f).

A recent report on the development of national FIVIMS noted that progress in establishing FIVIMS at country level has been slow. One of the reasons identified is the problem of supply–demand imbalances. The demand for better, more coordinated, inter-sectoral information and mapping on food security is supposed to come primarily from countries involved in setting their own development policy agendas, but in fact demand is often greater from partner agencies who have greater capacity and resources to allocate to information needs. Different development agencies typically invest in gathering and disseminating information that meets their own specific needs/agendas resulting in frequent duplication of effort and information overload, side by side with significant information gaps. Many developing countries lack the capacity to make use of the available information to improve their planning and resource allocation decisions. The great potential of FIVIMS is that it is a multi-agency programme that can be conducted collaboratively with countries. At present the potential of substantial existing resources available at country level is not being realised as these resources are being used in an uncoordinated way (FAO, 2001b).

Box 3: Balancing quality and utility of information

The debate on quality, technical and methodological issues such as improving the FIVIMS 'undernourished' indicator and integrating information on food security with poverty data, transparency and accountability also depends on human capabilities to make use of the information (FAO, 2000f). As with all information, there is a necessary trade-off between the level of technical detail involved in information collection and analysis, and the practical usefulness of that information. Standardisation of techniques of information collection, storage and presentation is important, both to improve efficiency in information handling within agencies and also to ensure that information can be used externally by other agencies, thereby facilitating greater cross-sectoral communication and coordination. This is a key part of FAO/WAICENT's normative role in information management. However, this requires changes in management and organisational processes and skills, as well as in the tools and techniques of information handling. Attention to both the social and technical processes of 'informatisation' is therefore important.

'The information explosion means there is a continually expanding supply of information [concerning fisheries and aquaculture] but a large part of the most easily available information is local in scope …this body of information is frequently too large and heterogeneous to be useful to senior managers and needs to be monitored, evaluated, consolidated and shaped into scenarios of plausible future developments.'
State of the World Fisheries and Aquaculture (FAO, 1996: 1)

The FarmNet concept, developed by FAO, aims to address the needs of a range of users from small-scale limited resource farmers to semi-commercial family farms and producers of high-value export commodities. Participatory information audits and needs assessments are used to understand the differentiated constraints, opportunities, resources and skills of farm groups. Depending on the results of these needs assessments, other activities such as rural networking and capacity building can be developed. FAO carried out a study with the Uganda National Farmers Association to design a FarmNet and farmers indicated the need for information on markets, improved agricultural technologies and weather conditions. Community-based service providers and institutions participating in the FarmNet can now be targeted for appropriate capacity building to strengthen their ability to manage the appropriate information sources and media that will respond to the farmers expressed needs. Different institutions and networks are likely to be appropriate for supporting the differentiated information needs of the rural poor and the programme design should aim to establish holistic interventions that build information capacity at the multiple levels.

Livelihood activities/strategies are multiple, diverse and dynamic, involving on-farm as well as off-farm actions, and since inter-household links and relationships at community and macro levels are constantly changing as they adjust to new situations, rural development and food security approaches must also become more comprehensive, multi-sectoral and flexible (FAO, 2000d). It is important to note that there is a significant *disconnect* between on-the-ground efforts to address local information needs and policy-making processes. This disconnect applies to the activities of many development agencies and is reflected in the growing separation of FAO's technical support operations and its normative activities. The local context has a significant impact on whether generally accepted policy reforms are actually adopted and impact at the local level. Effective policies and processes must be grounded in real life experience, in local circumstances and on real user needs. Both ground level initiatives and policy reform are necessary, but information flow between the two is generally poor and must be improved if the potential developmental impact of each is to be enhanced.

4. Existing Information Systems for Rural Livelihoods

4.1 Importance of existing systems

There is limited access to formal information systems in many rural communities, but systems and processes for information exchange do exist. Governments and service providers using the traditional 'top-down' approach to information delivery provide information that is often generated in an external environment to that of the end user. In this context information can be, or appear to be, irrelevant to user groups whose information systems cannot easily assimilate the external data being provided. New initiatives should aim to build on the strengths of existing systems of information exchange. The potential for enhancing these systems depends on identifying the most appropriate institutions to work with and also their constraints.

Institutions

Institutions from government departments and extension services, to non-governmental organisations, farmers' organisations and women groups all rely on information to perform their basic functions of coordination and management of member activities. This has been true for institutions throughout history. Today, new institutions are being formed in the context of a global information society that relies increasingly on electronic networks and digital information to function. Those institutions that remain somehow unconnected to these new networks are being described as information poor. The UN Centre for Science and Technology (in Zijp, 1994) for example, states that:

> *'The distinction between the information "haves" and "have-nots" is the basis for the dichotomies between developed and developing, rich and poor…It is within this context that the concept of development might be understood in "information term".'*

An inherent assumption in this perspective is that information being generated by and circulated within global networks has the capacity to make southern institutions richer, not just in terms of information. For this to be true the information systems from which these institutions are being excluded need to be able to provide information that is relevant to their local social, economic and political context. A further assumption of this perspective is that the 'have-nots' are 'have-nothings' and do not have existing information systems of any substance. This exemplifies the overly optimistic 'technologically deterministic' approach that is prevalent in the digital divide debate and can lead to unwarranted conclusions that require the replacement of existing networks with new 'modern' systems that are superimposed on the diverse, local systems (Heeks, 1999).

EMPRES website

CAB International (CABI) manages a wide range of information resources of existing agricultural information, through publications, CD ROMs and research studies. A recent example of building on collective experiences and partnership between institutions is the development of the Crop Protection Compendium which provides a CD ROM or Internet based database of information on 200 crops and 150 countries, including images and descriptions of over 1,800 pests, diseases and weeds. The compendium has been sponsored by over 40 organisations including development agencies, private sector and NGOs ranging from Monsanto to the Rockefeller Foundation. It also collaborated with international organisations such as the FAO and many research institutions, universities and specialists have contributed. The compendium represents an example of a collective effort to provide the appropriate institutional support for funding, research and management that was required to develop an information resource on this scale.

As previously stated, FAO has developed a number of *specialised information systems* for the supply of information needs on all aspects of agricultural development and food security, and these are coordinated under the framework of the World Agricultural Information Centre (WAICENT). The systems are predominantly *global* in geographic scope, focusing on food and agriculture, plant and animal diseases and agricultural genetic resources. Notable examples include: GIEWS (Global Information and Early Warning System), EMPRES (Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases), and ARTEMIS (Africa Real Time Environmental Monitoring Information System). Each of these provide policy-makers throughout the world with the most up-to-date information available on various aspects of agricultural development and food security. These global information systems 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. The development and capacity of national level information systems varies considerably in developing countries.

FAO is also developing a number of generic information management methodologies and tools within the WAICENT framework, which can be offered to its member countries for customisation to suit local needs in management and analysis of information. Some, such as the Key Indicators Mapping System (KIMS), are relatively mature, while others are in the early stages of development and testing. In addition, developing

and promoting the use of international and open standards and norms for content management and information exchange is a central part of FAO's normative role.

As part of recent changes in priorities within FAO, a group has been established to develop a programme of capacity building and outreach to strengthen the capacity of Member countries to manage and exchange information and knowledge about agricultural development and food security. A notable example of FAO's shifting focus from global information systems to national information systems is the establishment of national FIVIMS. FIVIMS aims to support and strengthen national information systems. However, development of national FIVIMS has been slow and varies according to the capacity of existing information systems and networks. Initiatives such as FIVIMS emphasise the importance of building on and strengthening existing sectoral information systems. It is important to note that formal sectoral information systems could themselves benefit greatly from building on existing capacities of extensive informal knowledge networks. This is also likely to result in greater institutional sustainability.

Existing informal systems and networks for communication used by many institutions in developing countries are capable of transferring location specific information to rural populations and should therefore be integrated into formal information networks through the processes and methodologies used to design learning and extension initiatives. The relationship between the institutional source and the user group has been located within the context of three knowledge systems, namely endogenous sources from within the wider group, indigenous (or local) sources from within the immediate community, or exogenous from outside the local community (Carter, 1999). A study of grassroots farmers in Uganda and Ghana compared the use of information from the three sources by farmers in the two countries. The level of use of endogenous information was similar but far more exogenous information was used in Ghana (46% compared to 31%) and far less local information (12% compared to 22%). This relates not only to the availability of the information but also to the reliability of the information sources. Examples of exogenous sources include radio, extension agents and NGOs, and the study found that trust in those sources correlated very closely to the use patterns. The greatest trust in both countries was in endogenous sources such as experience and observation, with trust in exogenous sources such as extension agents and radio being slightly higher in Ghana (Carter, 1999).

Photo © Chris Sattlberger/Panos Pictures

Radio station in Tanzania

Box 4: Integrating informal knowledge networks into formal information systems

The National Innovation Foundation (NIF) was set up with the support of the Department of Science and Technology, Government of India, to provide institutional support to grassroots innovators and develop national strategies for coordinated research, design and development to promote learning from indigenous knowledge. A specific objective of the NIF is to 'build linkages between excellence in formal scientific systems and informal knowledge systems and create a Knowledge Network to link stakeholders through the use of information technologies and otherwise'.

The Honey Bee Network is one such knowledge network, created by the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), that collects examples of contemporary innovations and outstanding examples of the use of traditional local knowledge in the sustainable management of natural resources. Local innovators benefit from appraisal from an advisory committee of Science and Technology experts and expert grassroots innovators from informal sectors. 10,000 examples have been collected so far and disseminated within local communities in India in six local languages and amongst a wider community across 75 countries in English and Spanish. Patents and funding are also sought on behalf of innovators to help promote private sector development and safeguard intellectual property rights. The Honey Bee Network is based on the observation that '*innovations in technological, cultural or institutional subsets often remain isolated and unconnected despite an otherwise reasonably robust informal knowledge network in existence. An extensive knowledge network that connects innovation and enterprise in an institutional context is what appears to be the most viable approach for sustainable development.*'

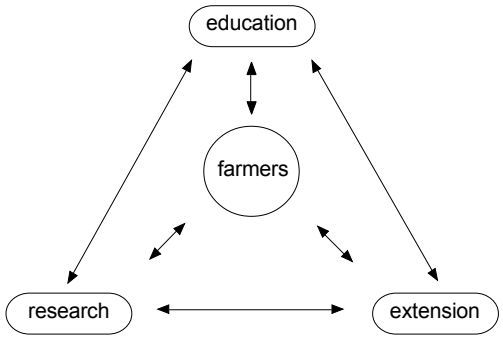
(National Innovation Foundation http://www.nifindia.org/)

One approach to making information more acceptable locally is to use vernacular languages and local actors to perform radio plays that are followed by a panel discussion of the issues raised (Chapman et al., 2003). The importance of building on a group's assets and institutional relationships to support information infrastructure is emphasised through the SL approach. The use of existing networks should therefore be encouraged, although Starkey (1997) warns that some centralised networks with top-down planning are not true networks based on active participation and interaction of autonomous members. Information may also be deceptive where dominance and power are the principle preoccupations of the institutions involved. Networks should be identified that are effective at empowering local institutions and not simply functioning to perpetuate the existing power structure (Chambers, 1994).

Processes and methodologies

The desire to superimpose new 'technologically advanced' information systems on those that exist in developing countries is reminiscent of the top-down approach to agricultural extension. Changes to this concept of extension have been widely recommended (Neuchâtel, 1999; Chistoplos et al., 2001, 2002; Roling, 1995; Rivera, 2001; Berdegué and Escobar, 2001).

Figure 3: The Knowledge Triangle of an AKIS/RD



One approach that is recommended is the use of an Agricultural Knowledge and Information System (AKIS) as an institutional framework that can be used in both vertical and horizontal technology transfer. The AKIS has been adopted by the FAO and the World Bank. Agricultural Knowledge and Information Systems for Rural Development (AKIS/RD) aims to establish the institutional framework and dynamic processes of information integration and exchange that are necessary to promote agricultural development.

Agricultural researchers, extension providers and educators form the knowledge triangle within which farmers are located and interact in a two-way information flow process with each of the three institutions (FAO/World Bank, 2000).

The extent to which learning and feedback from farmers is integrated into the AKIS framework depends on the underlying conceptual model that determines the process by which extension is carried out in practice. Roling (1995) outlines three alternative models of extension practice, the first being the *linear model* of technology transfer, which is the pervasive top-down approach that works to reinforce established institutional hierarchies. The other two models are more holistic and allow attention to be focused at the level of the farmer rather than the research station. *Advisory work* stems from a bottom-up approach that relies on innovative and enquiring farmers who seek advice from external sources. Farmers' needs are therefore the starting point for advice and information is required to support the farmers existing knowledge rather than to challenge it. This process relies on the sharing of information between a broad array of extension workers to enable the farmers' requests to be answered. The individual extension workers are unlikely to be experts on every issue but they should have a broad knowledge and be supported by a network of specialists. The key role of the extension worker in the process of advisory work is to improve the farmer's problem solving ability. The process of *facilitation,* such as used by the Farmer Field School, also centres on the farmers own learning ability and encourages a reliance on observation based decision-making, especially in the context of low external input agricultural development. Farmers themselves become the decision-makers in this process through participation and improved networking. This corresponds with the SL approach to development that places ownership of the learning process with the stakeholder as the decision-maker. The role of information in the processes of advisory work and facilitation is to support the needs of farmers in decision-making and problem solving to improve their livelihoods.

The capacity of agricultural research and extension to provide knowledge for development as demonstrated by the Green Revolution perpetuates the demand for publicly funded agricultural research to generate knowledge as a public good (World Bank, 1999). However, the combination of a reduction in public research budgets, a globalising market and the information explosion has contributed to a more complex knowledge landscape. The role of international development institutions is increasingly to act as intermediaries in the transfer of knowledge and to manage knowledge as an international or global public good (World Bank, 1999). This role is particularly important in the context of 'levelling the field' between the knowledge and information available to poor rural farmers and non-poor commercial farmers, and for developing countries with limited public sector information management capabilities (Berdegué and Escobar, 2001).

Box 5: Digital divides

The 'digital divide' debate is founded on numerous statistics comparing the telecommunications and information technology infrastructure between the developed and developing regions of the world. The infrastructure context in which these processes must operate can be shown by regional comparisons. For example, North America and Europe account for 89% of all Internet hosts and Africa only 0.25%. This can help to illustrate not only the divide but also the rate at which it is widening – such as the difference between the number of Internet hosts per thousand inhabitants in Africa (0.17) and North America (46.28) was a multiple of 267 in October 1997 but this had grown to 540 (0.31 and 166.68 respectively) in October 2001. However, these figures can mask huge disparities within regions between countries. In the Africa region North Africa and South Africa are home to 1.2 of a total of 1.7 million dial-up Internet subscribers on the continent (in mid 2002) which means there are only 500,000 in the remaining 49 countries (Jensen, 2003). It is perhaps more useful to focus on the opportunities for harnessing the potential of the new technology to leapfrog costly infrastructure investments, for example in fixed lines, and work towards the wireless and digital networks that promise wider reach and cheaper data transfer. Liberalisation of telecommunications services has been the key to both the growth of access to lines and the reduction in prices in many countries (OECD, 2001). There are also often considerable disparities within countries at the sub-national and district levels, for example in the case of Uganda the particular growth of mobile telephone access is concentrated around the Kampala area and more than half of the sub-counties in the country do not have a telephone service.

4.2 Information costs

Underlying FAO's mandate is the assumption that information for agricultural and rural development is a global public good and therefore should be made available to all. The concept of a public good is that the benefits are non-rival in consumption and non-excludable. This characteristic of non-excludability means that public goods are less likely to be provided by individuals or by normal market mechanisms and are therefore commonly under-supplied, especially where the costs of provision are high. In cases of under-provision, it is the poorest and least powerful groups who generally suffer most as they

are least able to pay to access such public goods. The marginal value of public goods, at least in terms of utility, is therefore often greatest for the poor, hence the argument for using development assistance to correct under-supply. In this context the provision of ICTs could also be considered appropriate for public sector investment where the flexible characteristics of existing technologies can be adapted to support rural livelihoods. Public funded research could assist in identifying those technologies currently available that have the most immediate practical applications for the rural poor. However, the benefits flowing from the provision of such technology and information vary according to the ability of different groups to make use of it. The relative value of agricultural information is largely context specific. Sustainability concerns have led to a shift towards more demand responsive approaches and better targeting of information needs.

Determine who should pay

Income generation is essential for financial sustainability and could help to facilitate knowledge sharing, e.g. through group or communal payments for the use of facilities, information output and through general membership or subscription payments. Other factors that contribute to longer-term sustainability are local ownership and the development of services that respond to local demands, including training.

Information cost is a key issue. In the light of a continuing decline in the absolute value of aid to agriculture, projects and programmes have come under increasing financial pressure. Subsequent debates in agricultural extension have led to a re-evaluation of the roles of public and private sector in service provision (Hoffmann et al., 2000; Chapman and Tripp, 2003). However experiences in reforming agricultural extension services vary substantially between countries and the question of who can reasonably be expected to pay (and how much) for these services remains largely unresolved. Quantifying 'demand' for information from poor farmers who are unable to pay is problematic. In the livelihoods context, many of the basic information needs for livelihood support may correspond with an inability to pay, which renders economic arguments about willingness to pay and price irrelevant.

Successful information and communication initiatives often represent large sunk costs. For example, establishing an agricultural radio programme series or agricultural research bulletin requires investing a significant amount of time, effort and skills. However once such initiatives are established and the basic physical and organisational infrastructure is in place, the technologies and media are extremely versatile and can be used to do all kinds of things. Recent success stories include the use of mobile phones in Uganda and Bangladesh, and fixed-line telecentres in Senegal.

Elsewhere rural newspapers can cover a significant proportion of their costs from sales and advertising. The same is true of rural radio where advertising, sponsorship, and payments for basic services, such as announcements, can provide revenue (CTA, 2001). To-date, advertising is less 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.

Photo © Robert Chapman

Africa online Telecentre

Differential strategies are required that take account of the linkages between the household level asset-vulnerability context, and institutional relations and decision-making processes governing production, exchange and accumulation. Three types of strategies have been described for the development of Agricultural Knowledge and Information Systems that focus more explicitly on the direct and indirect links to poverty reduction. The first is termed 'market-driven AKIS' which focuses on identifying and building on opportunities for further development of profitable commercial farming. This strategy does not set out to provide information and services that benefit poor farmers directly, but develops the agricultural sector in order to reduce the cost of food for the urban poor and rural net food purchasers. There are also likely to be increased rural employment opportunities in the farm sector and the rural non-farm economy. The development of this type of AKIS could still benefit from public sector investment but this would need to be in creating the enabling environment in terms of policies and institutional frameworks rather than direct service provision.

Second, a 'market-oriented, asset-constrained AKIS' could have both direct and indirect impact on poor farmers. This strategy is appropriate when the farmers' assets are constrained in some way but opportunities exist to improve agricultural production and incomes. Direct poverty reduction can be achieved through the provision of services for small-scale farmers and attention to improving income generation through market-oriented innovations. Indirect impacts on livelihoods will also be developed through the opening of linkages between farm and non-farm activities. Public sector investment and activities are required to promote market-oriented agricultural and rural development, but the market cannot be expected to work on its own given pre-existing asset constraints. Third, a 'context and asset constrained AKIS' represents the strategy for areas where agricultural innovation can only have a very limited direct poverty reducing impact on rural livelihoods. The public sector will be required to provide information and services for subsistence farmers to ensure household food security and for a diversified portfolio of activities to achieve rural development and sustainable livelihoods in the longer term. This type of situation requires a strategy that supports local institutions and creates links to external networks.

Local level innovation needs to be supported through farmer-to-farmer extension systems, on-farm-adaptive research and participatory technology development (Berdegué and Escobar, 2002).

The private sector and demand-driven information services cannot be expected to operate effectively in all these various situations of asset and context vulnerability. The debate on public and private provision of extension services could be considered to be more of an issue about accountability and organisational management than the funding alone. Katz (2002) identifies four emerging paradigms and approaches in this area:

- Privatisation and the withdrawal of the state: based on the belief that extension services essentially provide private goods and that private extension services are more effective;
- Financial participation of farmers: This is intended to reduce the cost to the state, make services more demand-driven and promote a sense of ownership;
- More effective use of public funds: Assuming public funding is justified for the provision of useful extension services, something has to be done to offset costs and generate income where possible, otherwise the funding will not be able to cover the perceived need;
- Ownership and accountability through producers' own extension services: gives greater control to the users and relies more on management through local level organisations.

Despite ongoing debates on the funding of existing agricultural information systems, new information and communication technologies are expected by many to ease the task of providing information services for rural livelihoods. DFID(2002: 13) anticipate that, 'agricultural extension agents can more effectively access and share local and global knowledge on crops, pest management, irrigation and other aspects of small-scale agriculture relevant to the needs of the poorest.' The cost to donors of facilitating the use of ICTs by their beneficiaries should not be considered from a sectoral perspective alone. For donors operating with a livelihoods and poverty focus, funding for ICTs should be mainstreamed into policies and programmes, especially when considering their role in addressing the International Development Goals (IDGs) (DFID, 2002). More broadly for governments and NGOs, information and communication components should not be seen simply as an additional cost, added on to development projects as an afterthought. They are an integral part of the development process and are directly related to the use and transfer of information within a project. Therefore, there should be less focus on whether information systems are financially sustainable in the short term and more on how development initiatives can achieve longer term sustainability by paying greater attention to their information and communication components (Ernberg, 1998).

Political and social sustainability

It has been established that participation is centrally important to the SL approach. However, Warren (2001) identifies 13 different types of costs associated with the participatory process. These include direct costs (economic or financial), as well as opportunity costs (economic or financial value of lost opportunities), and intangible costs (losses of a psychological, social or political nature). Firstly, participatory information and communication projects require a greater number of well-qualified staff than conventional projects which obviously entails increased costs. Opportunity costs include the time invested by participants and any unpaid labour provided to support implementation, e.g. provision of information or sharing experiences. Perhaps most significant are social costs, such as the loss of social privilege or status, relating to changes promoted by the participatory process, e.g. women's empowerment leading to a decline in the primacy of men. Related to this are political costs, such as the loss of authority or leadership, caused by increased transparency and accountability associated with participation. 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. These are key considerations in the planning and implementation of effective and sustainable information and communication initiatives. It is important to identify early on areas of potential conflict and resistance to participatory processes.

Sustainability is a key issue emerging from the telecentre literature (Gomez et al., 1999; McConnell et al., 2001). Financial issues are just one of a number of identified components of sustainability, ranging from technical and organisational to cultural and political. These have important implications for the effective design, planning and implementation of telecentres. Many of the issues identified also apply to other information and communication activities.

The issues include:

1. Technical issues – basic infrastructural requirements and systems development (telephones, electricity, telecoms service providers), also availability and responsiveness of technical support and expertise.
2. Institutional issues – locating a telecentre within the existing institutional framework and building on existing knowledge networks (formal and informal) i.e. in partnership with local government schools, libraries, universities, etc., and civil society organisations.
3. Economic issues – income generation, cost recovery, ability to pay, participatory market demand assessments to identify optimal location of information services.
4. 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.
5. Political issues – participation in planning and implementation, political networks, local power relations and access, discrimination and exclusion.

(based on McConnell et al., 2001)

There are many factors influencing sustainability, and information and communication initiatives must take account of, and satisfy, the needs of intended users, otherwise the services will remain under-utilised and will be unsustainable in the long-term. The specific types of information and communication activities undertaken and the technologies and techniques applied must be context specific and focus upon aims and objectives based on clearly defined goals.

Michiels and Van Crowder (2001), in a review of community-based ICT initiatives, stress the need for improved monitoring and evaluation, and participatory impact assessment, especially with regard to impact on the economic and social livelihoods of communities which remains poorly understood. Evaluation of such initiatives is found to be generally weak. The report notes that participatory needs assessments are rarely performed prior to ICT applications and the emphasis tends to be more often on providing access than on innovative ways of applying ICTs to the specific information needs of communities and local groups. Gomez et al. (1999) stress the difficulties of measuring the impact of information on development and the lack of appropriate indicators. There is a growing literature on how to assess the impact of information and communication initiatives (Menou, 1999). However, '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) (June 2000) where it was noted that the full value of information activities is not always appreciated. Information is often seen as a subject for librarians or computer technicians, rather than as an integral part of every agricultural programme. As a result most information programmes are not systematically monitored, evaluated, or assessed and public sector organisations in particular tend to place insufficient emphasis on the measurement of information programme results. 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 (IA) becomes an integral part of the planning and implementation cycle.

The following mechanisms should have priority:
- Sensitisation of policy- and decision-makers;
- Development of a cadre of individuals trained in the processes and procedures of IA;
- Establishment of guidelines and standards for IA;
- Exchange of IA experiences between individuals and organisations.

(FAO, 2000e)

4.3 Access, empowerment and democratisation

The technological capacity to transfer information and communicate across large distances has increased rapidly in recent years. With this increased technological capacity comes a responsibility to provide equal access to information (Arunachalam, 1999). The benefits of the technology could be applied democratically to empower individuals with information that is relevant to their livelihoods, rather than to perpetuate existing social, economic and political disparities between the information 'haves' and 'have nots.' Disparities in information transfer exist for a number of reasons from government resource limitations, to inefficient or unequal communication strategies, but the opportunities to improve access, empowerment and democratisation are increasing with technological advances in communications (Skuse, 2000). The challenge is to harness these opportunities to enable rural communities and developing country governments to manage information more effectively and build strategies that can promote the transfer of information that is more relevant to people's livelihood needs.

Access and empowerment

There are a number of distinctions between different types of information that are more or less publicly or freely available. In many developing countries the demands for greater access refer primarily to the publicly available information that (due to a lack of infrastructure) is not communicated to the majority of those living in remote rural areas. Public information such as market prices should be accessible (in order for the market to be open and efficient) and freely available throughout the year, so that decisions on the purchase of inputs, credit, equipment and labour can be made on the same terms as other farmers. The distinction made by the World Bank and FAO, between the high and low excludability of information in an Agricultural Knowledge and Information System (AKIS/RD) shows that certain types of information can be more easily restricted from 'public' use, usually through a system of tariffs or charges for its essentially 'private' use. The extent to which the value of certain information is diminished by sharing it with others can also be described as its subtractability, such that the most freely available 'public good' information has both low subtractability and low excludability (FAO/World Bank, 2000). Information that supports livelihoods is likely to consist of both public and private information and, depending on the degree of local competition, varying degrees of subtractability will apply. The problem of information being available but unaffordable (high excludability) is relevant to some of the private sector extension services that commercial farmers networks are able to enjoy, but for the most part there is far more 'public information' that is freely available in the developed world that developing country farmers are excluded from, simply because of accessibility problems and not inherent characteristics that make the information exclusive.

There are numerous organisations, from 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 harness the potential of telecommunications, digital information networks, computer databases and multimedia tools to improve both the quality and quantity of information that can be accessed locally. The Pan Asia Networking programme aims to improve information networking in Asia through the use of ICTs and the development and sharing of information resources. This initiative promotes knowledge sharing, research collaboration and information exchange, and helps to develop appropriate Internet policies, technologies and systems through applied research. A pilot project in the Philippines, in *barangays* (townships) in Mindanao, uses a range of approaches based around multipurpose community telecentres (MCTs) from Internet access and telephone access, to a computer processing centre and training resource centre. The focus is also on

providing useful information on a range of subjects of relevance to the communities, ranging from health and education to rural enterprise development and agriculture. The MCT represents a partnership of support between government, private sector, community and academics that aims to empower the villagers themselves to develop their knowledge-sharing capabilities. The PAN Asia initiative has a networking focus and connects institutions such as universities and education and research centres on a regional basis. Partners have been identified in Bangladesh, Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Mongolia, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand and Vietnam and are supported to improve networking capacity at the national level in the first instance. Tibet University is also receiving support to help local institutions such as the Tibet Academy of Agricultural and Animal Sciences and the Tibet Agricultural and Animal Husbandry College. Farmers are also targeted as the intended beneficiaries of the Farmknow website established by the China Agricultural University, to allow farmers such as those 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 questions sent via e-mail.

The Acacia initiative in Africa builds on the existing partnership of African governments and donors under the African Information Society Initiative (AISI). The initiative aims to increase community access to information and communication and to develop, through its research, models for sustainable solutions that can improve information sharing and communication. The disparities between Africa and other regions' communication infrastructure, and within the continent itself, illustrate the long-term support that is needed. The Acacia initiative takes a 25 year perspective and aims to demonstrate particularly how disadvantaged groups and communities can be empowered to solve local development problems through the use of information and communication. The programme strategy therefore is not simply to provide access through IDRC support, but to integrate national information services with community needs. The provision of innovative technical infrastructure and equipment represents one practical aspect of the programme, but equally important, although perhaps less visible, aspects involve the formulation of policy advice to reduce rural–urban disparities in service provision, human capacity building, extending existing communication networks and improving public information delivery. The programme was established in 1997 following a planning phase and initially focuses on the countries of Mozambique, Senegal, South Africa and Uganda and will be continually assessed through the Evaluation and Learning System of Acacia (ELSA). The pilot phase involves the development of telecentres (MCTs), many in partnership with UNESCO and the International Telecommunications Union (ITU), as well as national governments. Further partnerships with the private sector (such as Nortel) are being encouraged, both to support the programme generally and to expand the telecentre network.

Farmknow website

Box 6: InfoDev

One initiative that is aimed at assisting developing country governments to improve their information systems is the Information for Development Programme (*info*Dev, http://www.infodev.org) managed by the World Bank. The programme aims to support key decision-makers at the national level, based on international experience of best practice in terms of policy and technical advice. The programme focuses on the following activities:

- Consensus Building
- Information Infrastructure Development Strategies including Knowledge Assessments
- Telecommunications Reform and Market access
- Demonstration Projects

The activities can be centred on one or more sectors and the objective is to develop and promote workable information strategies in participating countries.

There appear to be few international organisations that are doing more than the IDRC to tackle the problem of community access head-on and although it is difficult to evaluate the extent to which communities and individuals have been empowered by the early stages of the programme, the participatory and partnerships based approach is likely to encourage further international efforts in the future. There is a growing need to identify existing national programmes and initiatives that can be supported and use the lessons learned from international experience to develop effective national strategies. One approach to improving lesson learning at the national level is to build networking capacity to promote knowledge sharing and partnerships. IFAD has formed a number of partnerships, such as with IDRC, to improve knowledge sharing between organisations and their project activities. The Electronic Networking for Rural Asia/ Pacific (ENRAP) aims to improve the use of the Internet by partners' development projects for improved communication and information sharing and also to develop more local level networking. The strategic focus for ENRAP to build the knowledge management capacity of its projects and promote knowledge sharing between them led to the identification during the project of a further need to use knowledge more effectively within projects. This requires a shift in emphasis from knowledge management to knowledge for empowerment that is necessary to enable the long term sustainability of knowledge management beyond the life of the project. Communities are empowered when they become more able to take control of their knowledge environment and the conventional paradigm of knowledge management on its own

has a tendency to increase, rather than decrease, dependency. Knowledge for empowerment therefore aims to recognise the local power structures that influence local knowledge management disparities and target the groups that are most marginalised. 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).

> *Information is useful only if it is available, if the users have access to it, in the appropriate form and language – i.e., if it is communicated, if it circulates among the various users with appropriate facilities, if it is exchanged* (Mundy and Sultan, 2001: 1).

Local NGOs and national research centres; such as the celebrated M.S. Swaminathan Research Foundation (MSSRF) and Simputer initiatives in India, are also experimenting with innovative technological solutions to the problem of increasing opportunities for rural communities to access information relevant to their livelihoods. Swaminathan's e-villages are managed at the community level to respond to the information needs of particular user groups, such as the wave height and weather forecast information for the fishermen in the village of Veerampattinam. The 'demand-driven' and location specific information centres are run mainly by semi-literate women and students, and a specific objective of the MSSRF initiative is to empower them through their role as information managers and providers (see http://www.mssrf.org/). In Bangladesh, many women have been similarly empowered through their role as private telephone operators. Grameen phone has established a rural mobile telephone network in Bangladesh and women are targeted in the villages to operate the telephones so that they can earn extra income for their families by renting them out to others in the village who wish to make calls. The deliberate targeting of women, such as in the case of the information managers in MSSRF's e-villages in India, aims to address the unequal power relations that exist between men and women in these communities. By including marginalised groups in the processes of knowledge sharing and helping to define their role, it is possible to erode the existing hierarchies and promote development goals that are based on more broad based and bottom-up knowledge strategies.

Mass media such as television and radio still have the potential to provide access to a wide audience through their 'broadcasting' networks. In Africa, radio has the opportunity to disseminate information to a wider audience than other media, and this is set to increase with digital and satellite communications. The number of radios has been increasing rapidly over the past 40 years and it was estimated that there were over 120 million in 1995, with over 45 million television sets. 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 (Mytton, 2000). However, when compared to 700,000 Internet connections, of which 600,000 are in South Africa, the traditional media continue to have a considerable head start when it comes to 'universal access' to information. Innovations such as the wind-up radio (see Box 7) and World Space digital radio receivers are also helping to extend the frontiers of communication to many remote rural areas of the World and reduce the cost of access for poor communities. However, the need to decentralise information networks to make them more locally relevant remains, and integrating old and new media is likely to be important during the transition phases. Rural and community radio initiatives such as those promoted by the FAO and other UN agencies (e.g. UNESCO and UNICEF) enable the target audience to be more clearly defined and more importantly for community participation in the development of programmes to be 'broadcast' or 'narrowcast'. The process of participation itself and ownership of programme content can be empowering for many communities, but it is the opportunity to interact that is likely to lead to the provision of the most relevant information at the local level as people learn to ask questions that relate directly to their livelihoods needs. The potential for interactive community radio to answer questions and respond to identified needs can be greatly enhanced by linking local radio stations to the Internet. The FAO has been pioneering work in this area in West Africa and initiatives under the Global Knowledge Partnership, such as the Kothmale radio station in Sri Lanka, have received wide acclaim. In all cases the emphasis should not be on the type, specification or cost of the technology being used, but whether livelihoods focused information needs are being addressed and whether broad based and equal access to information is being provided.

Democratisation

There is considerable debate over the role that development plays in the promotion of democracy. The challenge to the current political hegemony ranges from analyses that highlight the present (but not necessarily inherent) incompatibilities between capitalist economic development and democracy (Koch, 1998), to a view of global power relations that equates international development with a form of neo-colonialism that uses 'low intensity democracy' as a cynical tool to achieve its goals (Escobar, 1995; Gills and Rocamora, 1992). These debates are raging and cannot be ignored, but it is not the place to discuss them further here. Suffice to say that information is integral to governance within any political system, be it democratic or autocratic, and power is vested mainly in those most able to control knowledge for their benefit.

Information that flows between groups, that can be accessed and used by any group for its own purposes, is likely to be democratising. The information does not necessarily have to be freely available, but the terms of access must be equitable, which means that those that are unable to pay for information have to be allowed access by other means. Many international journals provide differential subscription rates in an attempt to provide more equitable access, charging Southern institutions less than their Northern counterparts. In the context of rural development, the remote nature of many communities and the scale of agro-ecological diversity makes it difficult for government institutions such as the National Agricultural Research Systems (NARS) to provide information that is relevant to all farmers' needs. This problem is often exacerbated by the tendency of agricultural research to focus on technologies and solutions for the commercial farming sector. This is not only inequitable in terms of the

Box 7: Easy Internet access and Freeplay

Easy Internet access

There are a number of efforts to make Internet access easier and more widely available, such as through simpler and cheaper hand-held devices (e.g. Oracle and Simputer) and public access points (BT experimenting with Internet connect phone booths, BP Connect). One solution that promises a very cheap and simple solution for people who have difficulty accessing the Internet due to the cost or availability of the appropriate infrastructure is to use e-mail. Initiatives such as www.4mail.org developed at the Abdus Salam International Centre for Theoretical Physics will send off-line Internet pages on request. The service is free and allows up to 500 requests a week, depending on the size of the files sent. All the user has to do is send the web address of the required document or site and they will receive it in return as an e-mail attachment that can be browsed without the need for an Internet connection or paying for the cost of downloading the information.

Freeplay

The wind-up radio has caught the imagination of many and turned its inventor Trevor Baylis into a household name. BayGen has developed the concept and is now marketing radios through www.freeplay.net that are powered by wind-up (manual), solar and rechargeable battery power. The potential for community empowerment and easy access in developing countries has been recognised by a number of aid agencies. For example, The Red Cross have used the radios for community empowerment and reconciliation through community radio programmes in Kosovo. The radios can be used in communities with no electricity or access to batteries and can be shared between a number of users.

information that is being generated, but it also ignores the needs of smaller-scale farmers for information on which to base their livelihood decision-making. There is therefore a dual penalty involved in iniquitous information provision that supplies one group or individual with information that can be used to support their livelihoods and enhance their competitiveness in the market, whereas those that are excluded or to whom the information provided is not relevant are less able to make effective livelihoods decisions or enhance their competitiveness.

Democratisation can be seen as one of the principal pillars of contemporary development programmes and aid policy, along with poverty alleviation, sustainable development and economic growth (Bebbington and Thiele, 1993). In Latin America the need to incorporate indigenous *campesino* interests into rural development institutions and strategies, for example, is seen as part of the process of democratisation and a step in the right direction to make these institutions responsive and accountable to the rural poor. More direct involvement and participation in the institutional processes can be facilitated both by information transfer between representatives and by more opportunities to become involved in local decision-making. The integration of inclusive decision-making processes within agricultural research is one example of how promoting the flow of information can be used to enhance livelihoods and the process of democratisation. The participatory varietal selection (PVS) methods used by the West African Rice Development Agency (WARDA) to decide which new rice varieties should be developed aims to give farmers the opportunity to interact with rice breeders to share information on their needs and choices. Through processes such as these, information can be used to directly influence decision-makers, thus democratising the development process; and by making decisions more effective (such as by selecting rice varieties that respond to farmers needs) contribute to the other development goals of poverty alleviation, sustainable development and economic growth (Bebbington and Thiele,1993).

Information can contribute to democratisation and information to support livelihoods can contribute to the process in a number of ways by ensuring:

- Equality of access to information;
- Information for decision-making that is relevant to all groups;
- Participation in wider decision-making, such as through the 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.

There are problems as mentioned previously relating to deliberate preferential treatment of one group, such as commercial farmers, to the detriment of others, such as small-scale farmers. The process of democratisation in this sense can only help to reduce inequality by preventing information blockages from denying certain groups information that would be useful for their livelihoods. In many developing countries the problems of information transfer, such as through the extension system, are as much a result of a weak state with limited resources being unable to provide a service on the scale required, as they are about active repression, political or otherwise. A recent study of the extension model as part of the Neuchâtel initiative (Christoplos et al., 2002) has 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 (1993), in Latin America or other means, will relieve the state of unrealistic resource allocations resulting in wasted expenditure. One suggestion for extension 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 (Farrington, 2001). This model could address many of the practical issues for providing information for sustainable livelihoods and the process of democratisation can be further enhanced by ensuring local level capacity building to identify information needs and promote suitable 'information intermediaries'. Public sector resources could focus on the training of information advisers and the provision of services at the district level with adequate policy level support for the agricultural and rural development sectors. Methods of information transfer at the village level in rural areas could be coordinated within a broader range of support for community groups, NGOs and sector specific initiatives for targeted livelihood needs.

Information on a wide range of government activities is only recently being made available to the wider community in many countries. The media represents a powerful government tool and for information to flow freely government control will invariably need to be reduced. Where the media does remain largely controlled by the government there is a need to ensure that information on the government is as open as possible and available equally to everyone. Freedom of the media from control by national or foreign governments or interests, such as political parties and the private sector, should ensure open and honest information that provides a positive incentive for good governance and democratic participation. The broadcast and print media can assist government to inform people of their rights and entitlements, as well as mobilising public support for government initiatives. However, there is a further responsibility that government has which is to ensure that all its constituents are able to access information equally. This involves effective policies and regulatory mechanisms for improving the communications infrastructure, such as through pluralistic ownership, to encourage private sector investment and the decentralisation of services. This can help to extend service into otherwise 'remote' rural areas and ensure that the information is relevant to local audiences in terms of both language and content. Decentralisation can also help to improve local government information services as they become responsible for providing transparent information on their services that respond to the more local needs of their constituents (DFID, 2001b). In India many district level information services are becoming available with Internet sites that provide useful information on governance and contacts on related markets and private sector services (e.g. http://www.tarahaat.com/) as well as to respond to a wide range of local livelihoods needs.

4.4 Appropriate content and context

The relevance and role of information varies according to the context in which it is used. Moetsabi (1998) describes a hierarchical information flow process as being between different levels, from village farmers, district level, provincial level, central level. The demands for information are commonly related up and down the hierarchical levels through a process of participatory information sharing. A less hierarchical process of horizontal information sharing can also be promoted with information being transferred directly between any of the levels.

Linking micro and macro-levels

Information can provide a *catalyst* for people identifying and setting their own goals and priorities. Information systems should be inclusive. Once a process of exchange has been stimulated with the help of external actors (NGOs, development projects, extension service, etc.) it is important to ensure the system can be locally adopted (Michiels and Van Crowder, 2001) and used to ask questions and seek answers of local relevance with increasing frequency. This can support immediate livelihoods needs and longer-term experimentation and training. Information must also be reliable in order to support the decision-making process of poor farmers and their communities. For this reason longer term monitoring and support may be required. The quality of local information has already been the focus of farming systems analysis developed by the FAO and it has been recommended that micro-level information should be further utilised for agricultural programme and policy analysis. Although a livelihoods approach would put a greater emphasis on the use of micro-level information, quality monitoring at this level is equally important. Relevant types of local information (qualitative and quantitative) can be categorised as *biophysical*, relating to factors such as soil fertility and crop yields and *socio-economic*, including cultural patterns, prices and household incomes (Dixon et al., 1994). The types of micro-level information that are identified as being useful for an improved diagnosis of agricultural problems and the identification of policy options can be expanded to include a range of community information for broader rural development strategies. The monitoring and analysis of micro-level information could contribute to the process of stimulating local solutions based on reliable and comparable information.

Types of micro-level information identified for use in policy analysis (Dixon et al., 1994):
- availability and quality of farm resources
- access to common property resources
- household and community goals and strategies
- farm gate input and product prices
- input use, productivity and market surplus
- structure and function of local institutions
- use of infrastructure and services
- historical responses to programmes and policies

Further local information for collection and assimilation into rural development strategies could include:
- opportunities for diversification within agriculture and rural non-farm economy
- access to credit, availability of group borrowing facilities
- household poverty data
- marketing, processing, transport information including capacity, costs, service availability and market trends
- general information services such as weather, news, health and education campaigns

The relevance and reliability of information should therefore be monitored not just for improved policy analysis, but also to promote adoption at the local level. The importance of the reliability of information systems applies equally to different sources of information. The reliability and relevance of information should to be understood and monitored within the local context of the user group, in order to build on local patterns of use and trust to improve information quality.

In this context, information on food and agriculture should be particularly focused on local agro-ecological conditions, weather and topography, as well as local cultural and economic aspects of production, marketing and processing. The information needs to be transparent and up to date with change-related information, supported by local cases of successful implementation and adoption of new approaches. Historically, agricultural information transfer at the local level can be seen to have contributed to technology transfer on a large scale, and therefore acting as a catalyst for widespread adoption.

Box 8: Information content development

The Agence de la Francophonie has established a network of rural radio stations in Africa to encourage the sharing of costs and programme materials through a programme bank. The Centre Interafricain d'etudes en Radio Rurale de Ougadougou manages the website and programme bank, and provides training for new technologies and a central facility to purchase equipment and supplies. The network includes 48 local stations in 10 countries and aims to assist them in diversifying their programmes by helping each other, such as through co-production of programmes on topics of common interest. The stations can get the programmes from the website (www.radios-rurales.net), via CD ROM or on audiocassette in local languages (Dioula, Pular, Malinke) and in French for translation into other local languages.

A programme on rural law was co-produced during a workshop on law in Senegal, which included lawyers from six West African countries and topics ranged from identity cards, marriage and birth certificates to women's rights in marriage and to land. The programmes sparked such interest in each country that they formed the starting point for a series of broadcasts on related issues, such as divorce, inheritance, access to justice, conflict resolution with local NGOs, magistrates and community rights organisations participating in the discussion. Further development of interactive question and answer programmes has begun with questions collected from the villages and then answered on air by lawyers. Other networks such as those of the CTA and Panos will also help to build the programme bank by linking their own networks and helping to organise forums for discussion and exchanges among stations.

This process has been identified by the language diversity associated with the spread of crops in West Africa. For example, the diffusion of cassava in the Southern zone of Nigeria is reflected in extreme lexical diversity, suggesting that the plant was carried from one farming community to another and lexical innovation took place based on comparisons with existing plants in the area. Similarly, the range of vernacular terms for groundnut suggests that the plant was spread from farmer to farmer and not by one dominant political or ethnic group (Blench, 1998). The processes of information transfer need to be understood in the context of local adoption if the potential role of information as a catalyst is to be realised.

Linked local learning

Technology is meaningless without content and context, and in order to achieve social development this needs to be locally centred on the specific needs of the poor and the constraints to their livelihoods. Supporting communication between relevant institutions may be more important than providing all the content of the Internet at the very 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 farmers, government departments and NGOs to donors, to deal with the social changes at the district and village level that are occurring due to decentralisation policies. The purpose of developing community level learning strategies is to assist groups such as farmers to identify their role as managers of their local context. This brings with it the responsibility to demand effective services such as research and extension from the government to support their activities.

Intermediaries that represent community and farmers' organisations can assist in inter-institutional communication to build on both formal and informal communications linkages. The community, therefore, should benefit from local linked learning by the establishment of multi-disciplinary groups that can enhance local content resources and locate them within the context of existing institutional relationships. 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 more traditional means of information and communication at the village level (ISG/TDG, 2000). Village level pilots can then be added where appropriate to provide additional infrastructure for the benefit of targeted village level stakeholders. 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. The LLL approach illustrates that technology at the local level should support the existing processes of communication between institutions and help communities to define their own context in relation to the wider information landscape (ISG/TDG, 2000).

FAO's Special Programme for Food Security (SPFS) applies an extension of the linked learning concept, encouraging South-South sharing of expertise to enhance their communal knowledge. One example is the linking of Egyptian irrigation experts with farmers in Tanzania to promote learning about irrigation, plant nutrition and soil fertility, amongst other issues. The benefit of promoting international linked learning is in the combined experience of relating specialist expertise to the constraints identified by local farmers in their own context. An integral part of the SPFS is the constraints analysis itself that can help farmers to define their local context in terms of the obstacles that they face, such as to the adoption of new technologies and improved management practices. At the local level, as with LLL, the constraints analysis is part of, if not a precursor to, the linked learning process, as it is the particular obstacles faced by one group that determine the institutional relationships that need to be developed. Capacity building amongst local institutions may also require support to assist the process of knowledge and information sharing. The local context must also be understood in relation to other constraints that may be of a technical, economic, social, or policy nature. Without an appropriate analysis at the local level, knowledge and information relating to solutions to obstacles elsewhere or at the regional and national level are unlikely to contribute to the community learning processes. 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.

5. Building on Existing Systems

5.1 Building capacity of existing systems

New initiatives should aim to build on the strengths of existing systems of information exchange. The potential for enhancing these systems depends on identifying the most appropriate institutions and their existing infrastructure constraints. The focus on rural systems for improved information exchange will also depend on a better understanding of the relevant national and international systems. A key principle of SL approaches is to:

> *'build on people's perceived **strengths and opportunities** rather than focusing exclusively on their problems and needs'* (FAO, 2000d: 2).

Information strategies designed to support sustainable livelihoods need to start by supporting and enhancing existing information and communication systems. An important element is to define how existing institutions and networks can be supported and enhanced through capacity building to manage the information better in support of SL. Davies (1994) recognised a number of barriers to the use of knowledge. These barriers relate principally to an inability to convert data into information in time for decision-makers to use it and that increasingly far too much information is being generated. The process of selection and analysis greatly affects the quality of information that is passed on to other users. It is important to carry out an assessment of the capacity of those institutions that are going to be responsible for converting information into accessible and useable packages for others.

Supplement not substitute

Information systems at the international and national level support agricultural development through policy formulation, dissemination and sharing of research, and capacity building of government decision-makers. Information relating to agricultural and rural development should be integrated at the national level into the information system as a whole, through a multi-disciplinary and cross-sectoral approach. The objective should be to coordinate information management at the national level and identify opportunities for maximising resource efficiencies and knowledge sharing. Government policy-makers who rely on information across the sectors, such as agriculture, health and education, can benefit from improved complementarity between the information systems at their disposal. Improved coordination of the activities of both international and national agencies is an important part of the process of planning and strategy making for poverty reduction that is being spearheaded by the PRSP process. An information strategy should aim to integrate where possible the relevant information content components into the development of a coordinated national information system.

The integration of information initiatives at the district and local levels should also 'provide a supplement, not substitute, to existing information systems' (Heeks, 1999). The tendency for hierarchical control of information resources within a wide range of institutions makes it difficult to avoid a concomitant desire to control the systems themselves at many levels. The Internet was designed as a decentralised network (Berners-Lee, 1999) but not all information systems allow so much control of the information by the end user. The Internet allows users to access information from a wide range of sources, use it for their own purposes and manage it for others to use in a more specific context. In this type of information system the public sector will increasingly be expected to monitor the quality of information, rather than attempting to manage and control all the information without the capacity to do so.

The emergence of new modes of knowledge production and exchange has profound implications because it creates problems and tensions for existing institutions. Developing countries may find that they are 'locked in' to a mode of knowledge production that is increasingly less relevant to their specific developmental needs. Organisational change and flexibility go hand-in-hand with the adoption of new modes and methods of learning. However, historical practices and routines, and social, economic and political events make these processes of institutional innovation and change highly unpredictable.

Government Capacity

Government capacity to use, manage and disseminate information varies according to a number of factors, including the political system, the financial resources available, the strength of the state, and the motivations and capacity of the decision-makers. In many developing countries the intention exists to manage and provide information in a democratic way, but the resources are not available to provide the infrastructure and training required. Where governments are themselves working to improve information management and dissemination there is a role for international organisations to assist in the process of capacity building at the government level.

There are a number of international policy mechanisms for building developing country capacity and engaging governments in the process of sharing experience and lesson learning for improved policy-making. The Commonwealth Telecommunications Organisation (CTO) and the International Telecommunications Union (ITU) are, for example, engaging policy-makers in developing countries in discussions regarding the potential for improving telecommunications infrastructure and pricing through improved regulatory frameworks, including sector liberalisation. The focus for policy-makers should be on establishing an effective regulatory environment to promote appropriate infrastructure investments, avoiding development of exclusive monopolies and encouraging interconnection and non-discriminatory terms for network access. They also need

to ensure that suppliers take into account a wide range of user needs within the wider spatial and demographic context.

A number of key lessons and principles for building the capacity of knowledge management systems can be identified through analysis of the practical reality of those systems (Richardson, 2001). Many of these apply more generally to information systems. Effective systems have specific users who demand specific information to inform decisions for which they are held accountable. Users tend to contribute and use information when there are clear rewards for doing so. There is a tendency to overestimate the demand for information management by policy-makers and assume improved information management will lead to improved decision-making. Systems tend to be over-designed, whereas those with the highest use and downstream adaptation tend to be simple and modest in scope. In most cases, more information is collected than actually analysed and applied towards decision-making. Systems should first concentrate only on information that directly informs priority decisions. Effective systems also often build on existing databases, taking advantage of current data collection routines. Many information management interventions tend to focus on technical solutions created by technical teams, and overlook the organisational processes and institutional incentives that drive information use. New information can create 'losers' who may actively resist implementation, therefore stakeholder/user consensus is important and broadening information use at all levels tends to increase the likelihood of ownership (Richardson, 2001).

The World Bank Institute (WBI) provides a forum for government capacity to create knowledge strategies by providing discussion and training events for high-level decision-makers. A knowledge policy forum, in collaboration with the British Council (in 2001), helped high-level government officials from India, China and Brazil develop national knowledge strategies and discuss their respective solutions to the problems of information management for effective government. The Brazilian government, for example, developed a centralised information management system with a private sector company using satellite monitoring and communication equipment to alleviate the drought in the North Eastern Region following widespread drought warnings for the region in 1998. The Asa Branca scheme trained government staff to use vehicles equipped with tracking and communication devices to report on the drought situation and closely monitor events in a defined area of the affected region. As reports were made, government resources could be used to send relief to the exact location most in need of assistance, avoiding waste of resources and delays caused by local government. The planning centre was also monitored by trained staff who were able to anticipate the situation on the ground using the regularly updated information and develop coordinated rescue packages for the whole area. This example illustrates how a combination of information and communication infrastructure and training can be used to provide specific information that enables the government to function more effectively.

A broader inter-governmental collaboration to discuss the policy issues relating to knowledge and information for food security and agriculture exist in the Consultation on Agricultural Information Management (COAIM). The first COAIM held in June 2000 at FAO was attended by 161 representatives from the 91 Member countries of the organisation, and the second COAIM was held in September 2002. FAO's WAICENT Outreach activities play a key role in capacity building in member countries as part of the ongoing process of decentralisation. Training in member countries could also be part of a collaborative process with other organisations, overseen by the FAO to ensure that international standards are applied in the context of national and local information needs. International organisations with regional networks such as the CAB International (CABI), the Technical Centre for Agricultural and Rural Cooperation (CTA) and the International Institute for Communication and Development (IICD) represent potential partners for collaborative approaches to government level capacity building in information management. Bilateral donors such as the IDRC and DFID are also widely involved in promoting inter-governmental dialogue and capacity building amongst decision-makers and could form the basis for future partnerships together with national private sector and civil society organisations. In order to identify and address the diverse information needs in developing country governments and design relevant training programmes, a wide range of organisations will need to be coordinated in partnership.

The key areas for future capacity building initiatives will involve assisting governments to:

- Engage in inter-governmental policy processes;
- Develop and implement national strategic plans for information and communication;
- Integrate national networks to provide comprehensive information systems;
- Decentralise control to allow local government ownership and adoption of information;
- Design innovative solutions using new technologies within an appropriate policy framework (e.g. for private sector development, research and academic institutional involvement).

The importance of collaboration for capacity building initiatives will depend on the relative expertise of the organisations involved. Some organisations are better suited to providing technical assistance in information management more generally, whilst others are more suited to providing sector specific information content and tools. There will inevitably be some overlap and organisations, such as FAO, in building capacity for the management of food and agriculture information will, at the same time, build capacity more generally (FAO, 1998). This should not only be regarded as a positive outcome but should be identified within collaborative partnerships to avoid unnecessary duplication of the activities of international organisations. There is a danger that a plethora of uncoordinated international initiatives promoted by different agencies of the UN system (e.g. UNESCO, UNITes), multilateral development banks and bilateral donors overlap unnecessarily in certain regions and sectors whilst leaving others under funded. New initiatives should be clearly located within the context of existing programmes for capacity building and aim to contribute to overall information management strategy for the countries and governments involved.

Social capacity to use information

Policies are required to build local capacity as developing countries need to mobilise their human capabilities and combine them in the most effective way. New technologies can mediate knowledge-related activities, but do not automate these activities by themselves (Crede and Mansell, 1998). In order to assist governments and service providers to become more demand driven, local capacity in information collection, storage and dissemination will also need to be enhanced in order to bridge the gap between the users and providers. Education leading to basic literacy and numeracy, especially for marginalised groups, is a priority for improving local capacity to use and generate information (see Box 10).

Capacity building support from government should encourage local information systems to generate more information locally, for local dissemination. Governments and service providers could assist in making information accessible according to the demands of local institutions, in terms of identifying the range of information that is available to choose from, rather than making that choice for them. Local level government can also assist in the management of information in a format that can be easily accessible and usable to the institutions and communities that are the ultimate beneficiaries of local government services.

Support to grassroots organisations and local level government for improving information management can take many forms. The FAO has been involved in a number of projects, such as the example in Box 9, 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. The important factor to be mentioned here is that many of the processes of training local groups and individuals are themselves essential for the promotion of contextual information, due to the confidence that is gained from developing communication skills, often through the simplest methods available, such as face to face meetings and discussion. The farmer field schools developed by the FAO are a good example of a process approach that could be promoted in a wider context of capacity building for improved local level information management that corresponds with more formal training mechanisms, such as those for literacy. Processes that encourage local ownership, self-learning and the sharing of information 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 through the informal and decentralised processes that occur.

Box 9: Audio-visual production services centre (CESPA)

CESPA was established in the early 1990s as part of FAO's support to the Office des Produits Agricoles in Mali. It built upon the initial success of rural training projects, targeting a large number of local agents, using a mass training method of using videos. With additional support from UNDP, the aims of this FAO-run project were multi-sectoral: farmer training covered crop-farming as well as animal husbandry, health, environmental education, culture and village water supply. Between 1990 and 1992 the project recruited and trained a number of audio-visual trainers and produced a range of multimedia training packages. Later phases were affected by political upheaval. Under increasing pressure to generate returns to investment and demonstrate sustainability, CESPA was transformed from a State service into a legally registered and financially autonomous company supporting public, industrial and commercial enterprise.

Between 1990 and 1998 CESPA successfully strengthened the centre's human resources, those of rural communities and of development agents, and increased their skills. It produced 23 training specialists and a range of audio-visual communication for development tools which were used to train 48,000 people in over 183 towns and villages in Mali. The methodology is based on a participatory approach, aimed at discovering the needs and expectations of the populations concerned, with a view to producing videos and manuals, and providing practical training for trainers and local people. Born of the need to create new, appropriate and immediate learning methods so as to provide isolated rural populations with education opportunities, the CESPA philosophy encourages local populations to participate in development programmes in response to their own specific needs. Experience shows that villagers who receive this kind of training acquire a greater ability to cope with their problems, make good use of their knowledge and become competent agents in raising awareness of neighbouring rural communities. In the sub-region, the CESPA has become a recognised provider of services for the communication components of development projects.

Communication for Development Report 1996–1997 (FAO, 1999b)

Technical capacity

There are a number of technological developments that will undoubtedly improve the way that information is managed and disseminated. The COAIM recognised the important role that FAO has in the area of technical capacity building, both through developing standards and ensuring appropriate use of ICTs. The need for developing information management standards is a growing one as more information is generated and the potential for sharing information increases. Standards such as the AGROVOC agricultural vocabulary already have wide support, but the need to build technical capacity at the national and regional level was highlighted by COAIM, together with a number of initiatives to achieve this. FAO is also developing the Extensible Mark-up Language (XML) for use in document management, and technical capacities will need to be developed to implement such tools, 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. The use of other more generalised information and communication technologies will also require significant capacity building. In many remote rural areas the use of ICTs will depend as much on technical capacity building for local institutions to use them effectively, as on the infrastructure itself (Ballantyne et al., 2000).

Box 10: Basic literacy before computer literacy?

There are many different software programmes that range from easy to difficult to use, depending on a users experience. Computer programmes are easier to use after some basic training has been completed, to enable the user to perform commands and simple tasks, and learn how to interact with the computer through the keyboard and mouse. This, however, relies on basic literacy skills to type, read instructions and navigate the menus on the software programme. There are 876 million illiterate people worldwide and therefore many of the poorest, who are most in need of information to support their livelihoods, are restricted to oral and aural communication. This is one of the reasons why rural radio has such potential to communicate with farmers in developing countries – it does not require them to be able to read or write before being able to access the information being broadcast. Television and video can also be used in this way to promote learning without literacy and can also be used as a multi media tool to assist learning of all types, including basic literacy. A review of the impact of video technology in education found that 92% of teachers interviewed in North American schools considered that television and video helped them to be more effective teachers. Video tapes can also be interactive and allow teacher or student control over the pace of the learning process. Direct training by experts can also be achieved by interactive television and was used by the Indira Ghandi Open University to provide more primary school teachers as part of a governmental initiative to expand elementary education to all children in India. The Indian Space Research Organisation assisted in the two-way video and audio interaction, broadcast via satellite with pre-recorded video instructions and face to face interaction with facilitators at remote sites. This enabled direct communication and a larger number of teachers, even in remote areas, were able to receive training from the experts (Jurich, 1999). According to a DFID (2001a) report on the Challenge of Universal Primary Education, ' there is a growing body of evidence that locally managed and maintained technologies, such as radio and electronic networking of teacher and community resource centres, can facilitate and sustain distance learning and reduce or contain the costs of teacher education.'

There are other technological initiatives relevant to basic literacy education. The Simputer, developed by the Indian Institute of Sciences in Bangalore and Encore, a local software company, incorporates text-to-speech software called Illiterate Markup Language (IML) that can also translate English text into a variety of Indian languages. At present the Simputer can translate and read in Tamil, Hindi and Kannada and other languages should be possible. E-books are also being developed (such as the EB dedicated reader www.everybook.net) that can store 500,000 pages and can display text on LCD touch screens that enable the reader to make notes, underline and look up the meaning of words. Future versions are likely to be books that read themselves aloud, have added sounds and music to accompany the text (TechKnowlogia, 1999). Literacy, therefore, should not be considered apart from computer literacy, but should be incorporated into the wider information and communication strategies that include the development of computer technologies and electronic networks in their policies and planning. A key message emerging from the DFID conference in Nepal on 'Literacy for Livelihoods' was not only that literacy can be an effective vehicle for empowerment for poverty reduction, but that the concept of literacy needs broadening to that of 'communication and information' strategies with a particular focus on local context and needs. The conference also concluded that the Sustainable Livelihoods Approach provides a helpful framework for linking literacy and human capital needs with livelihoods and that future activities should include cross-sectoral knowledge management programmes in close partnership with other organisations.

Photo © Margaret Kieser/NR International

Adults at an evaluating session for a computer-based information network, South Africa

Literacy for Livelihoods

The benefit of the literacy for livelihoods approach is that it helps to set illiteracy in the complex, multi-dimensional context of poverty, vulnerability and social exclusion that impacts on an individual's health, economic and educational opportunities and self-esteem. Literacy as a fundamental educational requirement has in the past failed to include a holistic analysis based on the local context, priorities and needs. Literacy for livelihoods approaches focus on the empowering potential of education, and access to education, like information, helps to break down the barriers of social exclusion. In Uganda, Literacy and Basic Education (LABE) provides literacy training to other organisations working in areas such as agricultural production and marketing. LABE teaches trainers how to teach people to read and write and how to create reading materials in local languages. Community groups, such as women's groups and youth groups, help to identify potential 'Literacy–instructor trainers (LITs)' who receive training, then return to the community and each teach a further 20 to 25 people to teach village classes up to twice a week for two hours. This cascading approach is in contrast to the two-way video and audio interaction broadcast via satellite used by the Indira Ghandi Open University mentioned above. However, the focus on developing local reading material for the community groups and the scalability of the cascade approach make it appropriate for this type of informal decentralised training.* In December 1999 there were 413 LITs and a further 1,296 Learning instructors teaching 677 classes in 46 Districts throughout Uganda. Over 80% of the roughly 15,000 learners were women.

(Mundy and Sultan, 2001 and DFID, 2001b)

* For further discussion on literacy and livelihoods see Scott-Goldman, J. (2001)

Training programmes need to address the institutional demands for capacity building at different levels that are relevant to the actual technologies available. FAO has a role to assist in the coordination of capacity building and training activities to ensure that institutions are receiving appropriate training to suit their information management needs. This may involve building partnerships with other organisations that are involved in training at the national, regional and local level, to ensure the best use of existing agricultural information and the integration of standards into capacity building. The importance of face-to-face and other 'low-tech' communication methods should not be underestimated and the links between technical capacity building initiatives and the more traditional information users need to be developed (Munyua, 2000).

Efforts to bridge gaps in information systems, digital or otherwise, need to address the question of what infrastructure is available that can be built upon. The Acacia initiative and PanAsia discussed previously use basic ICT infrastructure and shared access models such as telecentres. Although the underlying infrastructure capacity differs between these two regional initiatives, the objectives are similar, namely to promote e-mail and Internet access, to promote knowledge exchange through networking, and to identify the most appropriate technologies, systems and policies through applied research. Community telecentres are being promoted as a cross-sectoral approach to meeting the information needs of the poor and in remote rural areas they can dramatically reduce the physical distances that need to be travelled to support a range of livelihood needs. Telephone services, computer training, e-mail and Internet are being promoted as knowledge sharing tools that can benefit the poor, however, based on the prevailing context of low literacy rates and non-existent infrastructure (for electricity and telecommunications) it is important not to ignore the existing systems and networks of rural radio, village plays and theatre music and oral traditions.

Photo © Rhodri Jones/Panos Pictures

Dogon women in Mali listening to the radio as they work

5.2 Realistic technological approaches

Information and communication initiatives for development are a fairly recent phenomenon, but the rate at which they are being adopted by all manner of institutions throughout the world is testimony to the perceived potential. In fact the possibilities for improving all systems and processes through improved access to information and better communication are endless (because blockages to totally 'free' and universal information flow will always exist and therefore there will always be room for improvement). Attempts to monitor the existence of new initiatives, let alone their impact, are increasingly heroic as the scale of the task rapidly expands, and innovative applications of new technologies and combinations of new and old technology are applied to both new and old social, economic and political processes. A report by Bridges.org (2001) identifies over a hundred, mostly large scale international initiatives, ranging in scope from the private sector to NGOs, volunteer programmes, healthcare and the digital divide. It is clear that the scale of initiatives is vast and with even greater opportunities for small-scale decentralised applications at the national and local level, any real coordination is going to be increasingly difficult. Instead, common models and approaches are being developed that echo the call for realistic approaches to the technologies that avoid technocratic determinism because 'it is not about the technology, it is about the people' (Brideges.org, 2001). Heeks (1998) identifies a number of reasons why technology is not used properly in public sector reform in India, reasons that are largely due to the level of understanding of both the technology and its potential by decision-makers. This results in a range of reactions by public sector officials, including ignoring its potential, isolating it within the computer department, idolising it and promoting unsustainable schemes or more realistically integrating it within an information focused strategy. These reactions and responses to new technology could be observed in managers and organisations around the world and a realistic integration approach would not necessarily predominate any more than it did in Heeks' Indian study.

The importance of documenting and monitoring the experience of others, as noted by Bridges.org (2001), is to improve lesson-learning across organisations that may find it easier to observe the failure of approaches in the experiences of others. The Commonwealth of Learning (COL) aims to strengthen the learning capacity of organisations by building collaborations and working with a wide range of organisations. The COL is partnered with a number of Consultative Group on International Agricultural Research (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 monitoring and evaluation of initiatives across a wide range of different contexts such as this can help to ensure that realistic approaches to technology can be applied to social development goals through improved lesson learning and the formulation of collective approaches (Latchem and Walker, 2001). The Rockefeller Foundation has also published a comprehensive review of over 50 case studies. One of the findings of the report is that the evaluation process tends to be less participatory and people-centred than many of the projects themselves. This is due mainly to the fact that new approaches to evaluation have not been developed as quickly as some of the approaches to using new technology and communication methods for development. The tendency towards donor driven and external consultant-led evaluations does not necessarily help to identify the lessons to be shared for developing realistic approaches to technologies amongst a wide range of user groups from their own perspective (Dagron, 2001).

The World Bank, amongst other organisations, has attempted to highlight the wide range of information technologies available and their potential application to information for agricultural and rural development, with particular emphasis on their own projects. Information technology such as CD ROM, computer networks, desktop publishing, Geographic Information Systems, interactive video, pocket radio, mobile and satellite communications, can all be assessed in the context of rural development needs and costs helping to identify the real advantages for people's livelihoods. The ease with which technology can be used, the increases in computing power and the reduction of costs, all combine to make technologies increasingly applicable to rural development needs. The importance of using technology to tackle rural development issues has been widely recognised (Zijp, 1994), but the problem of reconciling scale with available resources is ever present. Identifying the scale of technological and infrastructural requirements is the starting point for a realistic approach to using technology for development.

The wide array of case studies and pilot programmes, such as those in the reports mentioned above, portray an almost universal application of 'some' technology, even in the most remote circumstances (e.g. International Telecommunications Union pilot projects from South Africa to Bhutan and Mongolia). However, these belie the reality that the vast majority of the rural poor, who remain the target beneficiaries of many development programmes, use information that is only communicated face–to–face and by word of mouth. FAO has developed a number of monitoring systems such as Food Insecurity and Vulnerability Information and Mapping System (FIVIMS) to provide a detailed profile of the location and context of those suffering from food insecurity. The State of Food Insecurity (2000) estimates that 792 million people in 98 developing countries are undernourished (1996–98) and that the number is declining by approximately 8 million per year. Although daunting, it is also essential to analyse the full extent of telecommunications and IT infrastructure deficiencies in order that realistic measures that address the scale of the problem can be planned with effective monitoring of implementation against targets (DOT Force, 2001).

IFAD (2001) assesses the international and regional scale of poverty, estimating that 1.2 bn people world-wide live on less than a dollar a day and that 75% of the world's poor live and work in rural areas. There are also a number of recent studies by organisations, such as the World Bank, ITU and UNDP, that help to define the digital divide and more general technological disparities between nations through international and regional comparisons. The UNDP (2001) has developed an innovative approach to mapping the scale of technology disparities through a Technology Achievement Index (TAI), which identifies how well a country is developing and using technology, as well as building its human skills base. The composite index is comprised of the following factors:

- Creation of technology, focussing on the ability to innovate;
- Diffusion of recent innovations, based on the use of the Internet and technology based exports;
- Diffusion of old innovations, focussing on telephones and electricity;
- Human skills, amongst both creators and users of technology.

Nations have been ranked according to their index value into four categories: leaders (TAI above 0.5); potential leaders (0.49–0.35); dynamic adopters (0.20–0.34); and marginalised (below 0.2). (UNDP, 2001). India, for example, is categorised as a dynamic adopter which is a lower ranking than might be expected due to the poor diffusion rate for old technologies and Ghana is ranked as marginalised for the same reason, although it does not have the dynamic approaches to new technologies and exports that helps to elevate India's ranking. (Uganda does not yet have a ranking due to insufficient data.) 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.

Box 11: Assessing the scale and context of information needs

Listening to the Poor: Central to any efforts to expand useful ICT access to the poor is knowledge of their needs and current degree of access. This is especially true for publicly supported subsidy programmes designed specifically to assist the poor. Examples include the following (Kenny et al., 2000):

- Data on users and their needs, including comprehensive information on excluded areas and groups, along with nationwide user surveys on needs and priorities;
- An audit of infrastructure in place, including physical, educational, and institutional resources;
- A survey of business services and electronic commerce experience and practices, including existing electronic commerce and banking initiatives.

Household or community surveys are key – either stand-alone surveys or 'piggy-backing' on other poverty research efforts. Unfortunately, household use of and access to infrastructure services have not been a primary topic of interest in Living Standards Measurement Surveys (LSMS). As a result, most surveys collect only basic information about how households supply themselves with communication services. The surveys rarely contain information about the sources available to households or about the quality of the service they receive. For the ICT sector, useful additional information might include:

- Whether the household has a radio, telephone, Internet-enabled computer, (and if so, what type);
- If not, why not;
- Whether the household has *access* to a radio, public phone, telecentre, or post-office;
- Distance to public communications services;
- What households spend on radio, telephone and Internet per month;
- What the household spends in total on communication.

(Kenny et al., 2000)

In developing countries the most realistic approaches being implemented today directly address the issue of scale, both spatial and demographic. A combination of linking old and new technologies, use of mass media and technology sharing can reach the greatest number of people, over the largest distances and with the least infrastructure investment. Telecentres are based on a model of community access that enables rural people to share technologies, such as computers and telephone lines, to use and transfer information for their livelihoods. 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 a lower cost. Old and new media can therefore be effectively combined to achieve both widespread coverage and locally relevant information, such as the example of connecting the Kothmale radio station to the Internet given in Box 12. Appropriate models for the widespread coverage of information must also consider the users ability to access information. Ilboudo (2000) emphasises the importance of knowing the audience and the need for radio to be decentralised for local ownership through rural radio networks. Bridges.org (2001) emphasises this further with reference to the importance of 'real access', of which only one factor is physical access and the local relevance and socio-cultural factors are seen as a priority. FAO has supported a wide range of rural radio initiatives over the past 35 years in order to promote agricultural information transfer and training (FAO/CTA, 2001). In Benin, for example, a programme to improve disease control in the rabbit-breeding sector was designed with a communication component using rural radio to provide rabbit breeders with relevant information and launch a radio campaign to promote the use of rabbit meat. Panos and the World Association of Community Broadcasters (AMARC), are attempting to build the capacity of rural radio stations by hosting a database of radio-clip resources that are made available to local radio stations for translation into local languages via transcripts or direct re-broadcasting.

Box 12: Rural radio as an Internet intermediary

Rural radio as a method of information delivery has several advantages. Firstly, both the radio unit and programming and delivery mechanisms are among the cheapest forms of mass media. Secondly, radio signals can penetrate remote geographic regions, and any individual with access to a radio set can receive information, regardless of literacy or educational level. Finally, rural radio provides region-specific information, easily incorporates local concerns and feedback, and can operate in local languages. Radio programmes have been used widely in education, but also to support gender training, as part of drought mitigation programmes, and to promote a range of health issues and practices.

Rural radio can also benefit from the presence of the Internet. In Kothmale, Sri Lanka, a joint project between UNESCO, the Ministry of Posts, Telecommunications and the Media, the Sri Lanka Broadcasting Corporation, and the Sri Lanka Telecommunication Regulatory Commission uses radio as an interface between rural people and the Internet. A daily one hour live radio programme in which an announcer and a panel of resource persons browse the Internet at the requests of listeners, has proven to be capable of overcoming linguistic barriers in using the Internet experienced by non-English speakers. The radio station adds value to the information by interpreting it into a local context, by broadcasting it in vernacular languages, and by providing a platform for feedback through local discussion and networks of local correspondents. In addition to the radio programme, the Kothmale Community radio station is developing a rural database (http://www.kirana.lk), primarily by packaging public domain information often requested by listeners for off-line use.

(Kenny et al.,2000)

Many poor communities live very close to existing infrastructure without any of the benefits 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. There is a need to tackle the policy and market based obstacles and inefficiencies through more comprehensive national strategies and the mobilisation of resources for more equitable information infrastructure. However, in the context of existing infrastructure, realistic approaches to technologies need to maximise their potential for those most in need of information in support of their livelihoods. (See Table 2 for examples of approaches.)

Information sharing can be extended not only by significant infrastructure investments, but other methods such as the use of video and overhead projectors or even silk-screen duplicators. CD ROMs and DVDs can store very large information resources such as from existing Internet gateway initiatives (e.g. Humanity Development Library) and can easily be used to make information more widely available. There is a need for a broader understanding of the role and application of the technologies in order to assess the most realistic approaches and to identify the most effective methods of using ICTs to achieve development objectives (Burke, 1999).

5.3 Strengthening partnerships

The purpose of this section is to outline the different approaches to knowledge sharing, help identify existing knowledge and information gaps, and suggest ways to improve information systems through the innovative partnerships.

Knowledge transfer

Knowledge transfer occurs when information is passed between a group of individuals, such as the members of a farmers' organisation, or between one group and another. Institutional structures have been described according to way they interrelate with one another and facilitate information exchange through hierarchical, horizontal and networking processes (Moetsabi, 1998; Starkey, 1997). Knowledge transfer at each level takes place between individuals and organisations increasing capacity at that level and enhancing knowledge in the whole system. The transfer of information *between* the different levels depends on the extent to which the different levels are able to communicate with each other within a particular information system. Figures 4 and 5 attempt to illustrate some of the different knowledge sharing processes from a hierarchical (vertical top-down) institutional knowledge transfer system to a more pluralistic horizontal knowledge sharing and networking approach.

In Figure 4 information flows between the organisations and individuals within the respective levels and facilitates knowledge transfer. Information flows between the hierarchical levels tend to be vertical between certain points or individuals in one level that have established links with the level above or below in the hierarchical structure. The level of overlap is

Table 2: Examples of realistic approaches

Initiative	Realistic approach	Organisation
Vercon, FarmNet	Linking farmers, research & extension together, enhancing communication networks two-way information flows, & building information database resources.	FAO
Acacia, PanAsia	Telecentres for community shared access.	IDRC, ITU, UNESCO
e-villages	Community access & women's empowerment through role as information managers.	MSSRF
WorLD Links for Development	Teacher training in the use of the Internet for teaching & connections made between secondary schools in developing & developed countries.	World Bank
Grameen phone	Mobile telephone networks with coverage in rural areas in Bangladesh. Women's empowerment as telephone operators using micro-loans to buy handsets & pay for line rental.	Grameen Shakti
Worldspace/ Worldspace Foundation	Digital radio via satellite increasing the number of channels available & potential for access/service in remote rural communities.	Worldspace
Linked Local Learning (LLL)	Community networking for innovative extension models using ICTs including the Internet, e-mail, computers & radio to integrate existing National, District & Village level systems.	CTA, Neuchâtel Initiative
Freeplay Radio	Wind-up radio technology combined with solar power & rechargeable batteries for cheaper long term radio access in developing countries.	Freeplay Foundation

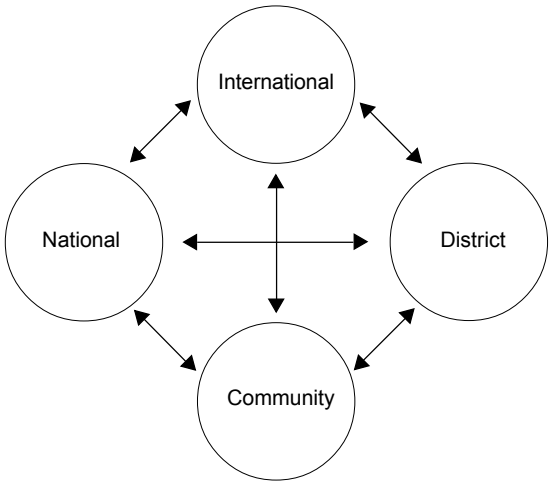
determined by the number of linkages or contacts that exist between the adjoining levels in the hierarchy. Where the overlap is limited, gaps can be identified in the hierarchical knowledge transfer process and efforts can be made to strengthen the links and information exchange between targeted institutions and individuals.

The information systems at the various levels in the Figure 5 model remain independent, but far more interaction and knowledge transfer can take place between any level through a pluralistic or horizontal knowledge sharing process. This reduces the potential for blockages as organisations and individuals have a greater chance of communicating directly with organisations at different levels, accessing other information sources and increasing knowledge transfer. This process requires transparency and openness, together with appropriate communication networks and infrastructure to facilitate the enhanced information exchange. Starkey (1997) identifies a number of different network models that exist to facilitate improved information exchange and knowledge transfer relating to a particular subject or membership organisation. Horizontal networking avoids the tendency of one group within a network to dominate the others and can assist in promoting further decentralised networking. The importance of clear strategic objectives and a committed core group of active members is greater in horizontal networks to maintain the focus of activities across multiple levels because a reliance on hierarchical control is no longer appropriate.

A distinction can also be made between those organisations that exist solely for networking purposes and those that perform some networking functions. Nelson and Farrington (1994) identify the different types of organisation as information exchange networks (IEN) and organisations with a networking function (ONF), distinguishing clearly between the participatory process of communication exchange involved in networking and the more centralised, unidirectional information services provided by organisations such as CAB International, CTA and FAO. Decentralised networking is more representative of the type of information and knowledge transfer that is facilitated by the new information and communication technologies, such as the Internet, and is likely to become increasingly popular (Berners-Lee, 1999; Negroponte, 1995). The extent to which some form of central control or institutional

Figure 4: Hierarchical model of information flow and knowledge transfer between multiple levels

Figure 5: Pluralistic 'horizontal' model of information flow and knowledge transfer between multiple levels



authority is required in future will largely depend on the resources available for communication infrastructure, training and the degree of information quality monitoring needed. Electronic communication tools enable greater participation and feedback into information service provision that will improve the opportunities for both networking and decentralisation of information management.

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.

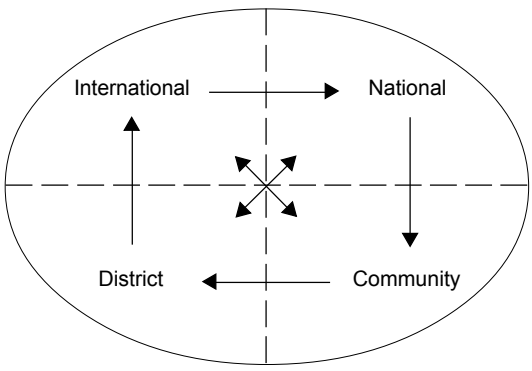
Promoting partnerships

The network age, the information society, the decentralisation of knowledge networks all describe the current social processes that are creating a plethora of opportunities for developing new partnerships. In Brazil, the Information Society Program (SocInfo) has a budgeted US$1.33 bn to promote information projects through partnerships between government, private sector organisations, civil society and the academic sector. A wide range of activities have been identified for the programme for the period between 2000 and 2003 along seven lines of action, ranging from government for all, to contents and cultural identity. The seven lines of action and over 150 specific project activities are the result of a national consultation process culminating in the Green Book. Together with the lines of action and specific activities, the Green Book provides guiding principles for the project activities and recommends the use of balanced partnerships, including NGOs, government, the private sector including small businesses, and universities, to promote the economic and social development of Brazilian society. This type of knowledge sharing across sectors and between agencies is desirable and is a key principle of SL, but is inherently difficult. Responses to the needs of the poor are likely to be required from several sectors, yet in reality project preparation generally has to be 'owned' or 'championed' by a single government department. This might be overcome in rural areas by working with cross-cutting departments, such as Rural Development, but it is generally the sectoral departments (agriculture, forestry) which are the strongest and tend to work in the most compartmentalised ways (Krantz, 2001).

In the partnerships model (see Figure 6) information and knowledge sharing effectively take place within one 'global' information system, within which individual partnerships are established to serve the knowledge and information needs of the partners, through a flexible and participatory process of knowledge transfer. Partnerships can be established between individuals and organisations at any level and the boundaries between the levels effectively disappear. The partnership becomes a dynamic and flexible relationship for information exchange and knowledge sharing that supports the needs and objectives of the partners involved. Partnerships can be long or short term, resulting in permanent or infrequent interactions and the communication capacity within the whole information system is enhanced by *each* partnership, helping to develop large-scale knowledge transfer.

Knowledge transfer and sharing at a local level can have a particular impact on livelihoods because it is at this level that the majority of the poor are located within local knowledge and information systems. The demands for external information are high, but due to limited supply or access to external knowledge and information, local systems have developed to utilise those existing networks (such as family and friends, neighbouring farmers) that are reliable and readily available. These systems could benefit greatly from increased access to information and a wider choice of information sources that can contribute to livelihood decision-making. Delivery mechanisms and appropriate institutions need to be identified to help facilitate knowledge sharing at a local level, through the development of community knowledge partnerships. Existing programmes, such as those funded by DFID and the FAO, could usefully be located within the above models for information and knowledge sharing, in order to identify the current processes of knowledge transfer between the multiple levels and opportunities for improving programme design. The potential for managing and disseminating information at different levels can be identified which then requires the identification of appropriate delivery mechanisms and institutions that can be used to promote knowledge sharing for sustainable livelihoods.

Figure 6: Partnerships model for information and knowledge sharing between multiple levels



In developing countries, knowledge transfer at a localised, rural community level often requires the most support. This is due to the limited formal education services available, and the lack of infrastructure and access to wider information networks. Support at this level, however, does not mean simply delivering external information that is of little direct relevance to the local context, but instead building local capacity to request and access information according to their specified needs. To provide better information for improved livelihoods at this level, community knowledge partnerships could be established between those individuals and groups at a community level that generate and hold locally relevant information; and between external partners that can share other information sources for the benefit of the community. The partnerships need to be established in such a way that they can continually learn from each other and use the sharing of information to enhance their own knowledge system. In this way a virtuous cycle of learning can develop that relies on the local adoption of information received into a specific contextual knowledge system and integrated to produce results that can be shared with other partners.

In the context of information management and delivery, this approach could help to reduce the 'one-way' flow of information from a scientific, information-rich core to a remote information poor community. In its place, dynamic information sharing partnerships can be developed through a constant 'two-way' flow of information between knowledge systems at every level. Every knowledge system is then seen as information rich and through participation in knowledge partnerships communities can decide for themselves what information is relevant to their context and needs. The choices that communities make may themselves be of interest to other partners such as researchers, and this information forms part of the 'two-way' flow.

In order to avoid top-down, one-way information interventions the design process should include a number of questions to be answered such as those in Box 13. This aims to prevent projects being pigeon-holed according to the specific catalyst for the intervention that may in time become irrelevant. The process should allow for greater flexibility and greater responsiveness to changes and lessons learned during the information initiative. Partners and collaborators can also express their needs and capabilities. This can improve the support given to community knowledge sharing and technology transfer as an explicit investment with additional resources allocated to networking activities such as newsletters, information bulletins for notice boards and local radio, agricultural fairs, group discussions and workshops. Knowledge sharing venues such as markets and agricultural fairs that can be serviced by polyvalent personnel should be identified. The Agricultural Liaison Officer (ALO) network in the South Pacific, for example, provides trained ALOs as 'one man information departments' linking together the different pieces of the agricultural information system such as research institutions, extension agencies, ministries of agriculture, NGOs, farmers, universities, international research agencies and radio stations. ALOs perform a range of functions that can support community knowledge partnerships, from librarian and information officer to radio programme producer, newsletter editor, trainer and extension worker. They are generalists acting as intermediaries who can also identify and call on appropriate specialists to provide more specialised assistance (Mundy and Sultan, 2001). Trained intermediaries are essential to assist organisations from all sectors develop partnerships to improve the dissemination of information and share expertise.

Box 13: Considerations for inclusive, partner oriented information systems

What information is needed?
- Government department, sector specific
- Local government, community or group specific
- User focused, relevance and reliability

What approaches/methods of implementation are appropriate?
- Multisectoral/sectoral
- Livelihoods, participatory, empowerment
- Capacity building, local ownership

What are the appropriate institutions?
- International agencies, Government, private sector, research, extension, NGOs, Community groups – farmers' organisations

What information and communication technologies are appropriate:
- How will it be used? Identify skills and language requirements
- Why will it be used? In support of livelihoods, communication with suppliers, clients, markets, social networks, knowledge transfer and training.

6. Conclusion and Policy Recommendations

6.1 Conclusions

Information can support sustainable livelihoods in a number of ways. The multiple uses for information correspond to the diverse needs of different users, their assets and their opportunities. To address this array of information needs a pluralistic approach is necessary to enable a wide range of flexible and targeted methods for promoting information transfer between relevant groups. The set of seven key issues helps to identify the range of priorities and concerns that should be considered when attempting to use information strategically for development purposes. Initially, however, these diverse information needs have to be understood in relation to each other and the design of any new information intervention must relate directly to the existing information infrastructure, both physical and institutional. There is no blueprint for how many stakeholder groups should be included in a differentiated information needs assessment but it is clear that information interventions must be flexible enough in their design to allow for a high degree of local diversity. This requires a decentralised approach to be applied either to the information system as a whole or at least to the way information is shared locally.

Information costs need to be considered in the context of neoliberal economic structures and weighed against the benefits of achieving development goals and promoting information equity. The cost question for information interventions is therefore not simply 'who can pay how much for what information?' but 'what information should be provided and at what price?' This focuses on information needs and whilst not ignoring the need to define costs, information cannot be provided solely on the basis of an ability to pay. The cost implications of any information intervention can be greatly alleviated by improved information sharing and using existing public information more efficiently. The sustainability of information systems does not simply rely on the level of funding or subsidy, but the extent to which information can be integrated into different systems and shared between them. Sustainability, therefore, is not only related to cost recovery ,as much of the information that is needed can come from public information sources that are free to the user and are publicly funded. It is often the equipment and the physical infrastructure that costs more than the actual information, such as in the case of new information and communication technologies. Without further experimentation with emerging technologies and the information sources they can provide, it is unlikely that the true nature of their sustainability in terms of supporting developing country information systems can realistically be assessed.

The notion of combining mass media, electronic and local information systems to overcome well established gaps in information and communication provision presents an unparalleled opportunity. The opportunity lies in being able to increase the number of people who are able to access the information they require for their livelihoods which could then empower them to be a greater force for change in their own lives. The democratic principles of personal freedom and equality of opportunity are directly related to open access to information, and as people become aware of their rights to access information they are more likely to pressurise the government to provide the services they need. This can enhance both the sense of responsibility within government and the sense of community amongst groups who are able to coordinate their demands collectively. Information interventions need to address these opportunities positively and encourage two-way information flows that can work towards the development of improved institutional structures.

Information relies on both its content and context for its meaning and relevance. Many different groups with essentially similar information requirements experience diverse micro-environments that are only relevant to relatively few. Language and dialect are easily identifiable and yet are all too often ignored. Other socio-cultural factors can transcend language groups within some regions or may be specific to a tiny group of communities elsewhere. Information can be shared between groups on a wide scale and a vast amount of information currently available is relevant to the majority of people. However, there is no way that this information can be shared through a centralised information system that ignores the contextual diversity that applies a meaning to that information. This can only be provided through flexible and decentralised information systems. It should also be a priority to ensure that information is made available locally where it is collected, even when a centralised system is necessary, such as for regional planning purposes. The integration of formal and centralised information systems with local, flexible and decentralised information systems offers real potential to build on all the existing networks and systems to improve the flow of information and its applicability to people's livelihoods.

Information interventions are increasingly related conceptually to the use of new technologies. This reflects both the perceived potential of new ICTs and the scale of the problem of addressing development goals through use of information resources. The technologies exist to provide large scale distance education programmes, health campaigns and disease awareness such as to combat HIV/Aids. Adult education, technical skills in agricultural production, processing and marketing, financial training, and government services can all be provided to millions of the poorest individuals through improved information systems. However, the technologies available today can still only provide a means for information transfer and communication, albeit on a much larger scale than ever before. The benefits of improved information and communication will only be felt by those who learn how to use it. The technologies must be embraced for their ability to address the disparities in information provision on the scale that is required, but this should be coupled with a corresponding focus on capacity building. Individuals need capacity building not simply

in using new technological equipment but in using and sharing information in a way that supports their livelihoods.

The opportunity for decentralised information networking to develop local solutions to development problems stems from the potential for increased partnerships. Innovative partnerships can develop around common objectives and information can be exchanged between individuals and groups that share these. Partnerships based on information sharing and communication can help to transcend more formal institutional barriers to change. Partnerships can help to develop a wide range of new social, economic and political networks that can represent alternative opportunities to individuals according to their livelihoods. Information sharing therefore represents a catalyst that releases opportunities to individuals and groups. Partnerships can be developed to harness these opportunities for short term and mutual benefits or for longer term societal and developmental change.

6.2 Recommendations for policy action

1. Build on existing systems

- Identify information infrastructure that can be built on using existing institutions and resources.
- Encourage multi-disciplinary knowledge sharing and information exchange to develop agricultural information systems that correspond with cross-sectoral rural development strategies.
- Build on existing systems to develop more decentralised information management and exchange.
- Explore new mechanisms to increase availability of the Internet in rural areas, through partnerships with government and private sector companies.
- Develop new ways of building on existing agricultural information systems rather than creating new ones.
- Promote the integration of Internet, ICT and traditional information systems within the new pluralistic approaches to agricultural extension.
- Develop approaches to help the process of introducing new information systems in government.
- Develop methods for making external information sources compatible with the requirements of existing systems, rather than the other way around.
- Support the information systems that farmers currently rely on especially endogenous information, through continued efforts to shift the extension process towards a facilitatory and advisory focus.

2. Determine who should pay

- Develop a consensus on who should pay for information provision for poorer farmers and who has a role in providing free information as a public good.
- Develop tools to gather empirical evidence to ascertain the benefit of improved information, especially for poorer farmers.
- Develop tools to assess the social and political costs of more participatory information systems, and approaches to overcoming them.
- Promote the information components of agricultural programmes as essential elements for their long-term sustainability.
- Promote impact assessments for agricultural information programmes and information components in all rural development projects, with the aim of ensuring that they become an integral part of the planning and implementation cycle.
- Explore options for and promote new partnerships between government agricultural information services and the private sector which can benefit poor farmers.

3. Ensure equitable access

- Identify and target the most marginalised groups to 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.
- Governments and multilateral organisations, such as the FAO, can use their own information systems to demonstrate how new technologies and approaches can be used to make public information more accessible (e.g. bridging Internet-based and traditional media in rural radio).
- Current experiences of sharing agricultural information need to be harnessed through improved networking and partnerships.
- Farmers need to be empowered to ask for the information they need and therefore FAO and others need to support the provision of 'Question and Answer' material and services.

4. Promote local content

- Micro and macro level information needs to be linked to enable better information flows between policy-makers and local level users, such as farmers, resulting in the availability of more appropriate information sources for decision-makers at different levels.
- Promote information as a catalyst for community initiatives and adoption of technologies within decentralised and locally owned processes.
- Capacity-building programmes for micro-level information managers should be designed to be flexible and responsive to the local context in which information is used and generated.
- Develop new systems to manage the integration of external and local information.
- Develop new mechanisms to link ICTs with traditional face-to-face communication.

5. Build capacity

- 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 SL approaches.
- Promote 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.
- Improve local institutional capacity to choose from a range of information sources.

6. Use realistic technologies

- Develop models for realistic approaches to information technology that can be used more widely according to the scale of the infrastructure and resources available.
- Provide a forum for discussing and evaluating international experiences that contributes to lesson-learning within FAO and other institutions.
- Advocate the use of realistic approaches based on a full understanding of the extent of telecommunications and IT infrastructure deficiencies.
- Use innovative project experience, such as linking old and new media to develop rural development strategies that integrate technologies with development objectives.
- Develop tools for participatory evaluation of SL-focused information approaches and projects.

7. Build knowledge partnerships

- Ensure that existing vertical and centralised networks are serving multiple-levels and target beneficiaries as intended by addressing the gaps and constraints.
- 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.

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Short summaries of the documents marked ⋆ are provided in Appendix 1

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