

**Report of the Workshop
“Towards the creation of a
Knowledge Network
Spanning the Rural
Digital Divide”**

8-10 February 2005

FAO Headquarters
Rome, Italy

Carnegie Mellon



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Executive Summary

Preamble

The workshop was organised by FAO and CMU with the goal of exploring options for harnessing the power of information and communication technologies for developing "Rural Knowledge Networks", which could stimulate and sustain access to knowledge for rural populations, including the illiterate and/or unskilled. The specific objectives were to define the principal stakeholders in developing the networks, together with their needs, contributions, functions and roles, to define methodological approaches and to consider a design for the information system in terms of the nature of its content, the technologies, and the business models. The workshop did enable non-FAO participants to gain a better understanding of the Organization's mandate, scope of work, and current activities to bridge the rural digital divide and build knowledge networks. The overall approach the FAO's strategic Programme to Bridge the Rural Digital Divide was found to be highly relevant.

Findings

- 1) FAO has rich experience and a vast collection of information resources on issues of food security and agricultural knowledge. However, many of the pre-1995 information resources and some of the more recent materials are not in digital format or easily accessible externally.
- 2) Many other sources of information, from member countries, institutions, and local and indigenous sources, of direct relevance to agricultural development and food security, are also not readily accessible in digital form.
- 3) Where information is in digital format, it may not be easily discovered and retrieved if the relevant meta-data and document summaries have not been created.
- 4) Many types of rural knowledge networks of micro- and meso-scale have been implemented by FAO and others. However, many have not been scaled and/or proven durable for a variety of reasons. In addition, experiences have not always been analyzed properly or documented.
- 5) Advances in ICT take too long to reach rural areas, due to lack of awareness, accessibility, and affordability, and there are few credible plans for enhancing the uptake of such technologies into these areas.
- 6) FAO has the opportunity to harness the power of ICT to reach the most vulnerable and disenfranchised, especially women, to facilitate their access to global knowledge.
- 7) The availability of content in local languages and in locally understandable form(s) and format(s) are critical aspects of reaching the vulnerable and disenfranchised.
- 8) Current knowledge networks are only partially effective or efficient. Market forces alone will not lead to the development of global rural knowledge network(s) based on digital ICT.
- 9) There is a need to identify sustainable economic model(s) for creating and operating knowledge networks. The cost of harnessing ICT to achieve the wider goals is eminently affordable.

Recommendations

- 1) FAO should initiate as a high priority digitization and web-enablement of all of its documents, including those that are currently available in print or on CD only. The cost of a priced publication should be set to cover only the costs of media and distribution, and not the costs of the content itself.
- 2) FAO should enhance mechanisms for working with all member states, partnering institutions, and rural communities to make all public domain information resources available in the appropriate digital form, using the FAO-recommended schema and formats.
- 3) FAO should continue to coordinate, internally and externally, the adoption of standards and schemas for metadata and summaries for all documents, including archival documents to be digitized.
- 4) FAO should initiate and coordinate the analysis and interpretation of a range of experiences to date in rural networking initiatives, including those coordinated by FAO, into a set of good practice guidelines.
- 5) FAO should work with member nations to build appropriate knowledge networks based on locally adaptable guidelines, tools and templates covering the 4C framework: Connectivity, Computers, Capacity-building, and Content.

- 6) FAO should define mechanisms for harnessing the power of ICT, to reach the most vulnerable and disenfranchised.
- 7) Affordable information and language technologies that will facilitate access to information and dialogues need to be developed and applied through collaborative research programmes.
- 8) FAO should play a central advocacy role for establishing the necessary public and private partnerships that will accelerate the development of the rural knowledge network(s), with the appropriate blend of human expertise and technological capabilities.
- 9) To determine the appropriate financial and business model(s), FAO should partner with early adopters to conduct a series of pilot deployments to determine sustainability and scalability.

Acronyms

4C framework	Connectivity, Computers, Capacity-building, and Content
AEs	Analysis Engines
AGNIC	Agriculture Network Information Center
AGORA	Access to Global Online Research in Agriculture
AGRIS	International Information System for the Agricultural Sciences and Technology
CABI	CAB International
CDR	Corporate Document Repository
CGIAR	Consultative Group on International Agricultural Research
FAOSTAT	FAO Statistical Databases
GOs	Government organizations
HTML	Hypertext Markup Language
ICT	information and communication technology
NGOs	Non-governmental organizations
OWL	Web Ontology Language
PDF	Portable document format
RDF	Resource Description Framework
UIMA	Unstructured information management architecture
XML	Extensible Markup Language

Contents

Executive Summary.....	2
Acronyms	4
Contents.....	5
1. Introduction	6
2. Workshop approach	6
3. Key Concepts.....	7
4. Working Group 1: Network Design	7
4.1 Fundamental Issues.....	8
4.2 Critical success factors	10
4.3 Roles and Responsibilities	10
5. Working Group 2 : Technical Issues	11
5.1 Opening comments and initial discussion (guided by A. Mangstl)	12
5.2 Resources and Technologies (guided by S. Katz)	12
5.3 Opportunities.....	14
5.4 Recommendations/Questions for the Knowledge Network Workshop Follow-up.....	15
6. Recommendations	17
Appendix 1 - Agenda	18
Appendix 2 – List of participants.....	20

1. Introduction

Knowledge is central to development. Sadly, though, much of the world's information and knowledge, including that related to food and agriculture, does not reach the rural poor. Modern forms of information and communication technology (ICT) offer great potential to improve the access that rural people have to knowledge and, thus, also the opportunities they have to benefit from it. This is recognized in the Millennium Development Goal of ensuring that the benefits of modern information and communication technologies are available to all. In particular, there are opportunities to enhance existing rural knowledge networks by harnessing internet-based technologies in a more strategic manner.

Given its mandate of ensuring food security and reducing poverty through sustainable rural and agricultural development, one of the main missions of FAO has always been to generate, collect, manage, analyze, index and disseminate information and knowledge related to food and agriculture. The goal is accomplished by working with each nation's governmental institutions, the agricultural scientists, extension workers, farmers' groups, etc. However, the ultimate potential beneficiaries, the farmers themselves including many who are illiterate, often do not acquire this knowledge and continue to struggle to solve the day-to-day problems that they face.

FAO is collaborating with Carnegie Mellon University to develop the concept for a global Rural Knowledge Network consisting of a range of stakeholders and content resources, linked by an ICT network. This would require collaboration at a global level among all key stakeholders, linking thousands of experts knowledgeable in hundreds of subjects with the ultimate user, the illiterate farmer, by the use of high speed networks and multimedia databases with GOs and NGOs providing human translators and facilitators.

2. Workshop approach

2.1 Workshop Goal

To explore options for harnessing the power of ICT for developing Knowledge Networks which could stimulate and sustain access to knowledge for rural populations, including the illiterate and/or unskilled.

2.2 Workshop Objectives

- To define the Stakeholders in Developing the Knowledge Networks, with their functions and roles, and their needs and contributions.
- To define methodological approaches and system design in relation to the content format, the technologies, and the business and economic models.

2.3 Workshop Sessions

The main feature of the morning of the first day was a plenary meeting, starting with a description of the "Lifeline" model for the Rural Knowledge Networks, developed by CMU with input from FAO. This was followed by short presentations from each of the

participants on their work and experiences at national and international level, which included a wide range of FAO's validated conceptual models and case studies on rural information and communication systems. The latter provided highly relevant evidence to support the consideration of the workshop objectives. This plenary session concluded with a discussion on the overall conceptual framework, covering the scope, nature, and scale of the "Knowledge Networks", leading towards a collective understanding of the need for knowledge networks as an essential foundation for fighting hunger and reducing poverty.

On the second day, two Working Groups were established to consider issues, with pre-defined tasks to be achieved.

Group 1 : Knowledge Network(s) Design: to consider and define the possible roles and responsibilities of stakeholders (people and organizations) at local, district, regional, national and international levels, and the most appropriate approaches to business/economic models to address the needs of the rural network participants.

Group 2 : Technical Issues of the System Design : to consider possible requirements for information management technologies to address the needs of the rural network participants.

The two Working Groups were provided with a resource document laying out some of the issues and challenges. The Working Groups selected a chairperson and rapporteurs, who were responsible for putting together the output of the Groups into a report.

3. Key Concepts

The vision for the Rural Knowledge Network(s) is to reduce hunger and food insecurity by providing direct access to knowledge and know-how to rural people who need it through the enhancement of rural knowledge networks.

This proposed approach to rural knowledge networks has four fundamental differences over other initiatives:

- Participation/facilitation by a global organization such as FAO, with its intergovernmental and normative mandate and rich experience;
- Global inclusivity, with a scale eventually involving millions of villages;
- Breadth and complexity, with multiple dimensions of institutional and subject coverage;
- High throughput, in terms of multimedia and complexity of technologies, using high bandwidth and advanced ICT and experts.

4. Working Group 1: Network Design

Present:

- Dr. P. Anandan, Microsoft Research
- Mr. V.S. Arunchalam, Carnegie Mellon University
- Ms. Karyle Butcher, Oregon State University

- Mr. M. Srinivas Rao, ITC
- Prof. Raj Reddy, Carnegie Mellon University
- Dr. Gloriana St. Clair, Carnegie Mellon University
- Dr. Rahul Tongia, Carnegie Mellon University

FAO (Some or all of the meeting)

- Mr. A. Mangstl, GILD
- Mr. R. del Castello, SDRE
- Ms. Florence Egal, ESNP
- Mr. Francisco Perez Trejo, GILD
- Mr. John Reid, AFIT
- Mr. Stephen Rudgard, GILF
- Ms. Sophie Treinen, GILF
- Ms. Marcela Villareal, SDWD

4.1 Fundamental Issues

The fundamental issues to be addressed in the network design were found to be:

- 1) **Network components** : Three major components of the network which are linked but are distinct need to be distinguished.
 - a. Structural framework (local/national/international) – should be decentralized and must avoid being hierarchical and bureaucratic, should allow dialogue, and especially peer-to-peer exchanges at local level. The networks should include governmental research and extension organizations, as well as relevant NGOs and civil society organizations. The community-level structural framework needs to work at low as well as high population densities, and in different social political and economic contexts.
 - b. Information access – toolset of applications and systems e.g. search engines, aggregators, language tools etc, that is adaptable enough to change as new resources become available, and should be affordable and accessible.
 - c. Mobilization of digital content especially output from major national and international public domain sources, including FAO itself and the CGIAR, and from rural communities.
- 2) **Credibility and trust** : There is a credibility threshold which any network has to cross, which is defined by the availability of a critical mass of content and participation of sufficient individuals including a range of subject-matter “experts”.
- 3) **Perceived value** : The network must be useful and good value for users/stakeholders. It is essential that networks provide demand-led and action-oriented information and that one or more attractive applications and/or services are included in the package(s) offered (some free and some paying) e.g. computer skills, data processing, link to government, education, family communications, wiring money, help with transactions (e.g. e-Governance or e-Commerce). Agricultural and non-agricultural. Partnerships would be necessary, as the scope of the initiative would reach beyond FAO’s and CMU’s mandate and range of expertise.
- 4) **Non-technology factors** : Factors that are essential for improvements in information exchange need to be identified and addressed adequately e.g. the

human factor at community level using participatory approaches to overcome social/cultural/gender barriers, including the most marginalized and vulnerable. A critical success factor would be the profile of the “Knowledge Officers” (as Gatekeepers and Gate-openers), trustworthy, respected in the community, availability, accessibility, business mentality, teacher, gender-sensitive, ability to ask questions, facilitator of local (farmer-to-farmer) dialogue – also consideration must be given to the motivation of the knowledge officer. Analysis of existing models would allow the development of an “ideal” personal profile of the essential and desirable characteristics of a Knowledge Officer, with local variations, which could be used as a set of selection criteria.

5) **System architecture :**

- a. Information flows - The network(s) must allow two way information flow, and also allow modes such as dialogue and broadcast, “push” and “pull”.
- b. Open nature – allow open access at all levels and enable other initiatives and multiple networking solutions to contribute, leveraging and linking (building on) existing networks and institutional frameworks wherever possible.
- c. Content – it will be important to recognize that :
 - agriculturally-related subjects will be only part of the information needs of rural communities, and the network should be able to accommodate requirements in other areas;
 - mechanisms need to be built in for improving the quality of “questions” and “answers”, and for the generation of local content in digital format;
 - some content may be ephemeral, and could be removed from the system once its usefulness has passed;
 - in addition to time factors, locational and cultural context of the information are also important;
 - adequately structured reference interview are necessary to elicit information needs accurately;
 - “questions” reaching the international level of the network will often be unanswerable – but will instead highlight policy issues or one that requires research, and it will be necessary to distinguish operational and action-oriented from policy-related questions;
 - a high priority needs to be placed on developing practical tools for improving language interfaces;
 - feedback loops for quality of content, across dimensions of accuracy and perceived usefulness.
- d. Flexibility – It will be necessary to accommodate local, political, cultural, and institutional issues in the design of the network.
- e. Business models – Some of the alternative models to be considered include: (i) Free access vs. Pay-to-use (e.g. “Google answers”) model vs. Subscription model; (ii) Ownership by Civil Society and/or Co-operatives and/or Governments. The lowest level of the network has to be self-sustaining financially, which could be based on a mix of public and private services and funding sources determined by the local conditions. Recurrent costs of personnel, ICT, connectivity, etc should be presented and charged separately from information services, of which a basic level should be free. Considerable experience, documented and publicly available, exists on

business models for “telecentres” and other networks, which could be built up into a set of “good” practices.

- f. Sustainability and durability of the network.

ICT as one of the necessary ingredients for achieving poverty reduction, food security, and human development, itself requires elements such as infrastructure (e.g. electricity) and skilled human resources.

4.2 Critical Success Factors

The following critical success factors in establishing the Rural Knowledge Network(s) were identified:

Policy

- Enabling policies for network development.
- Adoption of open intellectual property norms.

Content

- Sufficient relevant content in an appropriate digital format.

Human

- Quality of the knowledge officers, supported by continuing education/training.
- Adequate treatment of social/cultural/gender constraints.
- Stakeholders/users trust in the network is essential, with components related to the human elements of the network and the quality of the content.
- Availability of subject experts.
- Literacy and e-literacy, and stakeholders' sophistication.
- Outreach into communities to stimulate demand at grassroots level.

Technology

- Availability of a minimum technology and connectivity package.
- Low threshold of technology adoption.

Cost

- Adequate and sustainable economic support.
- Low costs of digitization of content and rendering it accessible.
- Clear and conducive incentive structures.

It was agreed that it would be necessary to create pilot sites or test beds to test the interaction and relative importance of the above critical success factors. This should be accompanied by the use of strategic case studies from existing rural networks to document and share lessons learned.

4.3 Roles and Responsibilities

1) **FAO**

FAO has a range of roles to play in establishing the Rural Knowledge Network(s):

- Advocacy for establishment and/or strengthening of rural knowledge network(s)
- Make its own accumulated knowledge more “accessible” by developing appropriate policies and by putting more of its information in digital form, including making available its priced information products to those who cannot afford them.
- Analyse, formulate, and disseminate good practice guidelines, standards, templates, tools, etc on creating and sustaining “rural knowledge networks” at

national and sub-national levels, and the policy dimensions of these issues, based on existing experiences.

2) **Governments, NGOs and the private sector**

Governments, NGOs and the private sector have a range of roles to play in establishing the Rural Knowledge Network(s):

- Development of the enabling policy environment for the rural networks, including public-private partnerships.
- Building the physical, institutional and human components of the network, including the rural access points such as telecentres.
- Facilitation of the collaboration between national components of the network and inter-national links.

3) **CMU and other resource organizations:**

CMU and other resource organizations have a range of roles to play in establishing the Rural Knowledge Network(s):

- Create and communicate appropriate technology solutions, designed to suit the needs of the network(s), and disseminate them in collaboration with FAO. These solutions will include:
 - multilingual translation;
 - multilingual indexing;
 - semantic searching;
 - multimedia document synthesis e.g. "encyclopedia-on-demand";
 - query pattern analysis data mining;
 - metadata and ontologies;
 - low-cost, easy-to-use, and secure computing and connectivity solutions.

5. Working Group 2 : Technical Issues

Present

- Dr. Robert Frederking, Carnegie Mellon University
- Dr. Salim Roukos, IBM.
- John R. Smith, IBM.

FAO (Some or all of the meeting)

- Mr. A. Mangstl, GILD
- Mr. S. Katz, GILW
- Mr. J. Keizer, GILW
- Mr. F. Snijders, SDPP
- Ms. M. Sini, GILW
- MS. A. Liang, GILW
- Mr. G. Lanzarone, GILW
- Mr. N. Waltham, GILW
- Ms. G. Salokhe, GILW
- Mr. R. Hoad, AFIS
- Ms. Y. Gonzalo Balmisa, AFSI
- Mr. S. Valenzi, AFSI
- Mr. V. Reina, AFSI

5.1 Opening comments and initial discussion (guided by A. Mangstl)

In the context of machine translation and machine assisted translation, Mr. Mangstl commented that for official documents, because of their political nature, quality is of paramount importance so human translation is necessary. However, at the current moment there are other potential uses for these automated technologies in FAO. For example, he mentioned that for AGORA there would be great potential for a tool which could allow a scientist to determine the relevance of a scientific document to his work. The reader could then determine if this was worthwhile getting the whole paper accurately translated.

It was noted by participants that for on-the-fly translations that were correctly labelled as such, people are often happy with the lower quality that you get. This is sometimes referred to as gist translation.

Another important role for the tools is to improve the speed of human translation.

Machine translation can also be used for making cross language searches. This is in fact easier than doing translations of documents, since when translating a document you need to decide which of the synonyms is most suitable in a particular context, however, when translating a search query, you can in fact use all the synonyms available in a language thus significantly improving recall.

Mr. Mangstl commented that the Director-General as well as being interested in the official UN languages is also interested in technologies that covered Italian, German, Japanese and perhaps the Nordic languages.

5.2 Resources and Technologies (guided by S. Katz)

1) **FAO resources**

FAO presented a list of resources which exist in house which could be made available as an experimental test-bed in order to help improve the various technologies being researched and developed at CMU and IBM.

- **FAO Corporate Document Repository** 15,000 documents mostly in HTML and PDF and growing at a rate of 3,000 to 4,000 entries a year. An entry may be a publication or part publication.
- **FAO Library Catalogue**, a catalogue of print documents available in the library. 150,000 entries of FAO material.
- **FAO Web Site**. Started in 1995 now contains between 600,000 and 1,500,000 pages of unstructured information comprising of both static and some dynamically generated pages.
- **AGROVOC**, a multilingual thesaurus available in the 5 official UN languages and also Thai, Portuguese, Japanese and Czech. There are three to five downloads a month. It is being used in cataloguing systems around the world. The number of terms available in each language varies, but at least 35,000 terms are present in at least one language.
- **Various ontologies**. GILW is experimenting with OWL and RDF ontologies and there are some domain specific partial ontologies under development. GILW is

also developing a concept server, a system for the distributed editing of ontologies.

- **Other thesauruses.** Although not owned or managed by FAO there are other Agricultural thesauruses that were mentioned, since they are widely used. CABI has their own which they use in their abstracting service. There is also another one developed by the National Agricultural Library in the USA and used primarily by the AGNIC network.
- **AGRIS database,** a bibliographic database with more than 80 countries regularly contributing through a network. There are now 3 million entries.
- **Various photo repositories,** Photos with varying degrees of metadata.
- **Various map repositories,** Maps with some metadata.
- **FAOSTAT** –is an on-line **multilingual statistical database** currently containing over 3 million time-series records from over 210 countries and territories covering agriculture, nutrition, fisheries, forestry, food aid, land use and population. The time series go back to around 1965
- **Video library.** Around 100 clips on average about 15 minutes long. There is some metadata associated with them.
- **Various project databases** which contain information on people, expertise, institutions, projects, documents and events.
- **Intranet** (from the Records and Archives group – corporate memory). Around 5 million documents including emails with attachments.
- **Verbatim transcriptions of some meetings** in 5 languages. There may also be audio and video recordings of these proceedings.

2) **IBM technologies from IBM Research**

Technologies were presented which could be of interest. Many of the technologies presented are not actual IBM 'products' but in some cases could be plugged in to products. In some cases these technologies are in fact in use by IBM customers, but because they are not products the support from them comes from the IBM research group rather than the normal product support channels.

Search Technologies

There are various kinds of search that can be applied on top of their standard search offering. The commercial product is **Omnifind** which provides an enterprise search capability, and supports an extensible architecture called '**Unstructured information management architecture (UIMA)**'. <http://alphaworks.ibm.com/tech/uima> UIMA is an architecture in which basic building blocks called Analysis Engines (AEs) are composed in order to analyze a document. At the heart of AEs are the analysis algorithms that do all the work to analyze documents and record analysis results (for example, detecting person names). These algorithms are packaged within components that are called Annotators. AEs are the stackable containers for annotators and other analysis engines.

The tools and technologies available also include:

- Tools which can **search XML fragments** and do semantic searches.
- **Machine translation (gist translation).** Gist translation is where around 50% of the meaning comes across.
- **Multilingual searching,** the ability to search using terms from one language and retrieve documents in another.

- **Text of mining** of documents, the extraction of entities from text and the relations between them. Entities can include such things as dates, ages, places, people, events, relationships, companies, positive and negative opinions.
- **Email mining.**
- **Data driven tools producing graphical and statistical output.**
- **Tools which enable semantic searches.**

Image Research

This group is developing tools and technologies in the following areas

- **Semantic search of image and video**
- Investigation of **how well pictures work in a multilingual environment**
- Development of **techniques for the annotation of images**. Images are not self describing in the same way as text
- **Matching pictures**. Using a picture a query and getting pictures back. This might be useful in identifying crop diseases for example.
- Some work on covering **audio content** where the audio content will help with the **indexing of video**.

3) **Carnegie Mellon University**

There is some overlap with the IBM technologies mentioned above. However they are active in developing techniques in the following areas:

- **Machine translation** using a **knowledge based approach** rather than a data driven approach. This is particularly good for narrow subject domains.
- **Machine translation of low data density languages**. These languages included indigenous languages such as those found in North and South America.
- Search engine technologies which include **cross language search and retrieval**.

CMU also provided a demonstration of software running on an iPaq, called '**Speech-a-lator**' which is able to translate from speech to speech in Arabic to English and English to Arabic for the medical domain. The tool was designed to facilitate doctor patient interaction.

5.3 Opportunities

1) **Sharing of resources and sample data**

FAO has extensive resources already mentioned in this document. The following are highlighted as being particularly interesting to the participants

- IBM Image research would find our multimedia resources and associated metadata useful test material
- Both CMU and IBM would be interested in accessing the parallel document corpuses (one document translated into more than one language)

- IBM and CMU would be interested to be able to use the verbatim transcripts of conference proceedings, since the spoken work is structured differently to the written word, this is a valuable resource for them

2) **Piloting tools and technologies on FAO data sets**

The participants see the following opportunities to improve information flow in FAO and accessibility to FAO's information.

The overall aims would be to examine tools and technologies which:

- Improve language coverage of FAO's information resources.
- Lower the cost and improve the effectiveness of metadata production and translation support.
- Improve multilingual and multimedia search capabilities
- Improve the user interface for interaction with multimedia material
- Improve the exchange of data and metadata for multimedia
- Improve the integration of multimedia with documents and other knowledge objects

Prototypes and pilot projects could be considered using the following tools and technologies:

- Automatic translation of Document Repository documents where a human translation does not exist.
 - Translations done this way should be suitably flagged so that it is clear they are machine translations.
 - The translation could be done ahead of time, rather than on demand so there is no waiting (The documents in the CDR usually don't change once published anyway).
 - The translation engines could be trained using FAO data and weighted using FAO thesauruses to improve the quality of translation.
- Multilingual search (though careful consideration is required to how to build the user interface to make this useful)
- Concept detection and text mining in support of searching information resources and generating ontologies.
- Clustering of search results based on concepts and entities.
- Automated indexing support and computer assisted indexing.
- Standards and tools for the exchange and aggregation of who, what, where, when type information (entities).
- Introduction of standards and best practices for metadata for audio and video.
- Search by photo and photo matching as well as assisted metadata generation (annotation) of multimedia material.
- Computer assisted translation

5.4 Questions for the Knowledge Network Workshop Follow-up.

- What gap will the network will fill?
- How will the "questions" be posed (perhaps looking at the role of a reference librarian to see how that process works in a the physical world)?
- Could the questions also be photo/image driven?

- Where will the knowledge be accumulated/aggregated (e.g. village, and district and other levels)?
- What would be stored in the distributed database? Where would it be housed? There are so many different types of information and knowledge the need to be stored (text, audio, video, statistics) the knowledge would need to be treated as blobs with metadata attached describing what it is, and how to deliver it.
- A mechanisms needs to be established for 'new learning' in the system. What is the workflow for ensuring the system is continuously updated?
- FAO's current information base may not be in an appropriate format for knowledge networks. What would need to be done to make FAO's knowledge base more active rather than passive?
- Who decides what is relevant at what level?

6. Recommendations

1. FAO should initiate as a high priority digitization and web-enablement of all of its documents, including those that are currently available in print or on CD only. The cost of a priced publication should be set to cover only the costs of media and distribution, and not the costs of the content itself.
2. FAO should enhance mechanisms for working with all member states, partnering institutions, and rural communities to make all public domain information resources available in the appropriate digital form, using the FAO-recommended schema and formats.
3. FAO should continue to coordinate, internally and externally, the adoption of standards and schemas for metadata and summaries for all documents, including archival documents to be digitized.
4. FAO should initiate and coordinate the analysis and interpretation of a range of experiences to date in rural networking initiatives, including those coordinated by FAO, into a set of good practice guidelines.
5. FAO should work with member nations to build appropriate knowledge networks based on locally adaptable guidelines, tools and templates covering the 4C framework: Connectivity, Computers, Capacity-building, and Content.
6. FAO should define mechanisms for harnessing the power of ICT, to reach the most vulnerable and disenfranchised.
7. Affordable information and language technologies that will facilitate access to information and dialogues need to be developed and applied through collaborative research programmes.
8. FAO should play a central advocacy role for establishing the necessary public and private partnerships that will accelerate the development of the rural knowledge network(s), with the appropriate blend of human expertise and technological capabilities.
9. To determine the appropriate financial and business model(s), FAO should partner with early adopters to conduct a series of pilot deployments to determine sustainability and scalability.

Appendix 1 - Agenda

Tuesday 8 February 2005

Plenary Session Mexico Room D211		
08:00 – 08:10	Opening of Workshop and Welcome Statements	FAO and CMU
08:10 – 08:30	Introduction of Participants	
08:30 – 09:00	Objectives of Workshop	FAO
09:00 – 10:00	“Lifeline” : A Concept for Rural Knowledge Networks - PowerPoint	Professor Raj Reddy, CMU
10:00 – 10:15	<i>Coffee/Tea Lobby Mexico Room</i>	
10:15 – 12:45	Statements of Individual Experiences of “Developing and Enhancing Rural Knowledge Networks”	Participants
12:45 – 14:00	<i>Lunch</i>	
14:00 – 15:00	General Discussion in Conceptual Framework	Chairperson: tbd
Working Groups		
15:00 – 15:15	Introduction to the Working Group Process <i>Participants will be divided into Working Groups, each with a facilitator and a rapporteur. Topics, guidelines and template reports will be provided to each Group.</i>	FAO/CMU
15:15 – 15:30	<i>Coffee/Tea Lobby Mexico Room</i>	
15:30 – 16:30	Working Groups: Session 1	Espace Gabon Queen Juliana UEMOA Press
Plenary Session Mexico Room D211		
16:30 – 17:00	Interim Reports from the Working Groups	Chairperson: tbd

18:00 – 20:00 ***Reception Aventino Room 8th floor (back of Cafeteria)***

Wednesday 9 February 2005

Working Groups		
08:30 – 10:00	Working Groups: Session 2	
10:00 – 10:15	<i>Coffee/Tea Lobby Mexico Room</i>	

10:15 – 12:00	Working Groups: Session 3	
Plenary Session Mexico Room D211		
11:00 – 13:15	Presentation of Outline Reports from the Working Groups	Chairperson: tbd
13.30 – 14.30	Lunch	
<i>Afternoon Cultural Activities</i>		
14:30 – 18:00	<i>Rapporteurs to work on Reports of Working Groups</i>	
20:00	Dinner and Discussion on Working Group Reports	

Thursday 10 February 2005

Plenary Session Open Discussions Mexico Room D211		
08:00 – 09:00	Discussion on Working Group Reports	Chairperson: tbd
09:00 – 10:00	Framing a proposal : Recommendations on Action Plan, Deliverables, Timeframes, Targets and Resources	Chairperson: tbd
10:00 – 10:15	Coffee/Tea Lobby Mexico Room	
10:15 – 12:00	Framing a proposal (continued)	
12:00 – 12:30	Conclusion and Closing Statements	FAO and CMU

Appendix 2 – List of participants

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