FAO's role in Information Management and Dissemination – Challenges, Innovation, Success, Lessons Learned

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ABSTRACT

This article does not attempt to offer a complete description of FAO's activities in the area of information management and dissemination. Instead, it tries to share some of the challenges faced in trying to manage the vast amount of information produced by FAO. This includes online publishing using current standards, ensuring information systems are driven by user needs and preferences, and facilitating information sharing. The paper presents lessons learned and goes on to present the idea of how the organization plans to move towards greater coherence, bringing standards, tools and methodologies for information exchange together under the auspices of an information management standards clearinghouse. The high costs of producing metadata systems is not new, the aim is to bring these costs down by reusing information management standards and reusing the metadata to provide users with new and better value-added services. Additionally, in response to the added requests for support at national levels for improving the information management infrastructure, FAO has responded with the first of a series of e-learning kits for information professionals to develop and improve their capacity to manage agricultural information.

1. INTRODUCTION

Today, more than 80 low-income developing countries suffer from chronic food deficits and over 840 million people go hungry. In 1996 the Food and Agriculture Organization of the United Nations (FAO) held the World Food Summit [1] where world leaders gathered in Rome and committed their countries to reducing the number of hungry by half by the year 2015. FAO was seen to play a major role towards this objective by encouraging and monitoring progress, and re-focussing its own programmes on the goals of the Summit.

To better guide its work for the two decades following the World Food Summit, FAO developed "The Strategic Framework for FAO, 2000-2015" [2], which was approved by the FAO Conference at its 30th Session in November 1999. FAO's Strategic Framework is built on 5 major corporate strategies to:
- contribute to the eradication of food insecurity and rural poverty [3];
- develop, promote and reinforce policy and regulatory frameworks for food, agriculture, fisheries and forestry;
- create sustainable increases in the supply and availability of food and other products from the crop, livestock, fisheries and forestry sectors;
- support the conservation, improvement and sustainable use of natural resources for food and agriculture; and
- improve decision-making through the provision of information and assessments and fostering of knowledge management for food and agriculture.

Having recognized information and knowledge management as one of the five key strategies to achieve the goals of the World Food Summit, FAO reinforced the World Agricultural Information Centre [4] as a corporate framework for agricultural information management and dissemination. The WAICENT framework integrates and harmonizes standards, tools and procedures for the efficient and effective management and dissemination of high-quality technical information, including relevant and reliable statistics, texts, maps, and multimedia resources.

With the advent of the Internet in the 1990s, there have been enormous advances in information technology and the task of managing and disseminating information in a digital environment has become increasingly complex. As a result, at FAO the following tasks are assuming greater importance: to enable better access to FAO's information resources; to promote partnerships with other agricultural information networks; and to assist FAO Member Nations to build their own capacity to manage and utilize food and agricultural information. This paper highlights some of FAO's many activities that support these tasks.

1.1 Improving access through institutional digital repositories

FAO has been one of the first institutions to embrace the concept of institutional digital information repositories. In 1995, FAO established a support structure to foster the dissemination of agricultural information through WAICENT. Among the many such specialized information access systems is the FAO Corporate Document Repository [5] which is described in section two.

1.2 Understanding and improving access to online information

The FAO Web site [6] provides access to information on agriculture, forestry, fisheries, sustainable rural development, economics, food and nutrition. It is a comprehensive source of agricultural information, having approximately 500 000 web pages, over 100 databases, and thousands of documents. With over two million visits per month, the Web site gives access to the accumulated knowledge and expertise of FAO. This information helps to guide decision-makers and professionals in finding solutions to the challenges of sustainable agriculture development and hunger. To understand better the users of the FAO Web site and their specific information needs, FAO has undertaken three rounds of surveys of delegates at major meetings in Rome as well as sent a mission to Ghana. The methodology used and some of the significant conclusions made are presented in section three.

1.3 Establishing and sharing normative standards, methodologies and open-source tools

Effective information integration, retrieval, and exchange require agreed standards. For over 20 years, FAO has been setting standards in information management in agricultural development and food security. FAO works with Member Nations and other partners to develop and disseminate global standards and procedures for agricultural information management and exchange. For example, the agricultural metadata standards initiative [7] and the Agricultural Ontology Service [8] are two internationally-recognized initiatives led by FAO and aimed at improving standards globally within the WAICENT framework. With partners such as the Consultative Group on International Agricultural Research [9] and National Agricultural Libraries of Member Countries, FAO promotes the adoption of standards for agricultural data exchange and retrieval through the adoption of XML and other new techniques [10]. Section four of this paper gives an overview of FAO's activities in this area.

1.4 Capacity building and outreach in information management

FAO works closely with stakeholders in Member Nations and fosters international partnerships under the WAICENT framework to develop facilities and networks for access to and sharing of agricultural information. Some areas of collaboration include improving efficiency, quality and relevance of knowledge exchange in agriculture, and using electronic media to enhance communication for rural development. The following two activities are discussed in section five.
- Capacity Building Activities - advice and technical assistance for governments, institutions and rural communities to strengthen capacities in agricultural information management and the effective use of information and communication technologies.
- The Information Management Resource Kit - a partnership-based e-learning initiative comprising a comprehensive suite of distance learning resources covering concepts, approaches and tools for agricultural information management.

2. THE CORPORATE DOCUMENT REPOSITORY

The Corporate Document Repository was launched in 1998 and currently contains more than 17000 FAO publications in digital format. The repository has been developed using Web technologies. The metadata is stored in an Oracle relational database together with all the information related to the workflow and the security rules, while the documents are saved in a file server in order to have a standard file system repository and a structured database engine for retrieval and workflow management. This architecture ensures stability, scalability and robustness.

State-of-the-art technology, using XML based import and export procedures, are used to facilitate the exchange of data with external partners and member countries and to improve the search functionality. For instance, FAO shares a common Information Finder with 16 centres of the Consultative Group on International Agricultural Research (CGIAR) [9], where documents from these Centres and from the Corporate Document Repository are presented together [11].

The first issue raised when the development of the Corporate Document Repository started was to find the most appropriate format for document storage, which can be retrievable and re-usable also in the future, regardless of which direction the technology development takes place. It was decided that the format of storage for the Corporate Document Repository should be the XML, because it is a non-proprietary format and allows separation of content from layout and hence can be repackaged and presented in different formats. Based on this decision, and considering that Microsoft Word is the most widely used authoring tool, Word templates have been created in FAO to ensure that styles are applied properly to a document and that the content is kept well separated from the layout. This facilitates the conversion process because it is possible to 'map' the styles used in Word to elements in XML or in HTML (see figure1).
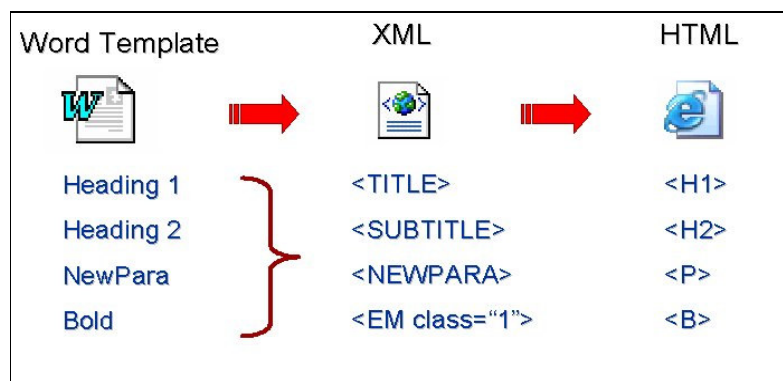

Figure 1. Converting styles used in a Word Template into XML and HTML tags.

However, to use XML as the standard format for a digital library requires that all internal electronic publishing workflow is XML-based and not 'paper-oriented', as usually is the case. In an organization such as FAO – where there are close to three thousand persons working around the world – it is not easy to quickly change established rules and procedures. As of today, the MS word templates are used only by a small part of the organization, mostly where the production process is centralized, such as that for FAO's governing body meetings. The Document Repository also accepts PDF files. In the trade off between having the most suitable formats and the necessity to disseminate FAO's information, this has shown to be a necessary compromise.

Together with the Corporate Document Repository, a workflow system was proposed to collect metadata through the course of the document/publication production process. Some of these processes include content preparation, translation, editing, desktop publishing, printing, conversion for the Web. Customized version of this tool, which incorporates metadata gathering as well as workflow control, were offered to FAO technical Departments. The idea was to have authors or producers of documents to deliver the necessary administrative and descriptive metadata.

This experiment suggests that the complete decentralization of metadata production is not possible within FAO. It will not only bring down the timeliness and completeness of the resource acquired but also the quality of the metadata provided unless adequate incentives are provided to the authors.

3. UNDERSTANDING THE USERS AND THEIR NEEDS

Since its first appearance online in 1996, the FAO Web site has grown exponentially to more than half a million pages. The need to obtain data to measure the effectiveness of FAO's Web publishing activities, into which considerable resources are invested, was the impetus to start user research. While some quantitative data on the numbers of visitors and pages viewed and visited is available, they raise as many questions as they answer. There is a need for qualitative analysis to examine how well FAO information is being disseminated and supporting sustainable agriculture. Some basic questions are leading the user research endeavour:
- Is FAO reaching its target audiences?
- Where and how do target users look for information?
- What do they use the information for?
- Is relevant information available to the appropriate people?

The main purpose of user research at FAO is to then find ways to make information more accessible to FAO's target audiences on the basis of their information needs, online behaviour and goals, and the possibilities that disseminating information in a Web environment offers.

A pilot Web site user study that comprised three rounds of surveys and interviews with delegates at major meetings at FAO Headquarters was initiated in 2003. This study had the following purposes:
- to open dialogue with users about the FAO Web site.
- to obtain indicators about the types of information most important to users, how users look for information, and to identify some immediate solutions to improve the FAO site.
- to develop a model and methodology for future user surveys
- to develop a mechanism to evaluate FAO's Web publishing activities from the point of view of Web site users

During this pilot study 85 questionnaires were received and 21 delegates were interviewed about their FAO Web site use, information seeking preferences, and priorities for the future development of the FAO Web site. Because direct dialogue with participants allows for more complex issues to be addressed, interviews yielded complementary results and discussion not possible in questionnaires. They provided good insights into how this target audience uses or would like to use the FAO Web site, and the information obtained from the interviews were consistent with the questionnaire results. Delegates who gather at FAO's major meetings include Permanent Representatives to FAO, officers at National Ministries of Agriculture, and policy advisors and are a specialized audience of the FAO Web site. They were found to be a group of users with similar information needs and usage of the Internet and the FAO Web site.

At the end of this pilot study, four basic components of a user research strategy to pursue with a broader audience were laid out:
- Develop profiles of information needs and preferences of major user groups
- Conduct qualitative research (observability tests, focus groups) on major Web sites (both at early design stages and as evaluation methods).
- Continue with surveys with identified groups of users on major FAO Web sites
- Improve analysis of Web statistics (How can meaningful data be collected? How can log analysis provide insight into how users behave on the Web site?)

This strategy has been pursued through two major recent activities: an online survey of a wide range of members of FAO's target audience and usability testing in a sample developing country.

Building on the survey and lessons learned from the pilot survey at Headquarters, a survey aimed at a wider audience was developed. A number of divisions within FAO with an interest in disseminating information participated in its design, and technical officers and divisions were consulted to obtain relevant e-mail lists to which an invitation to fill out the survey was sent. To date, all survey respondents have received the invitation by e-mail to fill the survey out online, or in a MS word document that can be returned by e-mail. While an invitation to fill out the survey will be posted on the FAO Web site at a later date, the approach of targeting members of FAO's audience through various FAO staff members or FAO networks ensures relevancy in the response that a general posting on a Web site would not.

To date, the survey has received a very good response, with more than 2700 responses. Some of the preliminary findings include: the high use of statistical data (70% of respondents access FAO statistics), high use of browsing the site (75% of people access information through a thematic site or browse through the site as opposed to 66% using the search box on the home page), the high use of local libraries and colleagues to supplement FAO online information (more than 35% of respondents use local libraries and colleagues to obtain FAO information), and that more than 80% of people either agree or strongly agree with the statement "It is easy to locate information on the FAO Web site". There is also a high demand for both e-mail updates on all new information as well as subject specific information (each option was chosen by more than 60% of respondents). A third of the participants would also like to receive information by CD-ROM and/or printed materials shipped to their offices (36% and 32%, respectively).

The user research strategy has also recently been pursued through usability testing in Ghana. Ghana is the location of the FAO Regional Office for Africa and was therefore selected as an appropriate sample country to begin conducting usability tests in developing countries. These tests provided the opportunity to get in-depth perspectives of real users in a sample developing country, and to understand how location of information on the FAO Web site takes place. They provided qualitative information on:
- the user experience with the systems;
- the level of expertise with computers, the Internet and database searching;

- the effectiveness of thematic aggregation of FAO online information;
- reasons for accessing and using FAO online information.

The tests were undertaken with 22 people from FAO's target audience who use the FAO Web site: policy makers, statisticians, and extension workers at the Ministry of Food and Agriculture, programme coordinators at NGOs, staff at FAO's regional office for Africa, information management professionals, and lecturers, researchers and students at universities and research centres. They consisted of asking the participants to demonstrate how they would locate an item they have previously looked for on the FAO Web site, as well as to locate specific items through major FAO search tools, the WAICENT portal and the FAO Country Profiles. Participants were requested to think aloud while performing the tasks to allow the FAO evaluators to understand what were their expectations and goals in searching for the information, as well as their experience with the interface and the content organization.

This approach yields findings not possible with surveys or log analysis. For example, the majority of the participants were very positive about the FAO site in the questionnaire they were asked to fill out, and usually said it was easy to locate information and that they saw no problems with the site. Yet, in demonstrating how they look for information, they stumbled on numerous difficulties that are apparent to people familiar with the systems and who know when something that is available is not being found. This approach is also an excellent public relations tool, as many participants became aware of FAO systems they said they would use again and gained a familiarity with the extensive amount of information available to them.

A few of the overall findings from the mission to Ghana were:
- Based on the positive feedback on the information people often chanced upon in doing the tasks, as well as on learning about the major FAO information systems, it appears the FAO site is **underutilised in comparison to the variety and quantity of information it offers**.
- There was a wide range of Internet and database searching skills. In many cases, **the need for developing skills in searching the Internet and databases was either explicitly mentioned or observed.** This is likely related to the length of experience with the technology and the medium
- While **reliable Internet access is not currently accessible to many of FAO's target audience** in Ghana (several tests had to be abandoned due to virus outbreaks or slow connections and several more had to be relocated), clearly **the medium holds great promise for the future**. Use of the Web and email is widespread, as witnessed by the booming Internet café business. Interviews with university professors and students also confirm a growing use of online resources and use of Internet cafés. Internet costs are still prohibitive to many people, but visits to Internet cafés for work and study reasons are far from unusual and pricing schemes are comparable to leisure expenditure. For example, in Accra, usage of a fast Internet connection in the city's most popular and well-known Internet café is roughly the price of a beer.

Overall, observation-based usability testing revealed contextual factors that influence ease of access: experience with the medium, quality of Internet connection, and user understanding of the design and results of information systems. It complemented the quantitative data from log analysis and surveys by connecting data with the experience of the people the systems were designed for.

Both surveys and usability testing have contributed to increasing understanding FAO's Web site users information preferences and needs. The survey in progress is contributing to the development of profiles of information needs and preferences of major user groups as well as measuring the satisfaction with FAO search tools. A methodology for conducting further qualitative research through observability tests has also been developed. Future work will include continuing with this approach as well as developing a more sophisticated log analysis.

4. AGRICULTURAL INFORMATION SYSTEMS AND COMMON EXCHANGE STANDARDS

FAO has a normative role to play in the creation and promotion of standards in agricultural information management. It understands itself as an organization responsible for knowledge brokering. Knowledge and information can be brokered on vertical or horizontal lines only when common exchange standards exist. Before the explosion of the Web this problem had been mainly handled by the international Library community and its Z39.50 protocol [12] for information exchange.

In 1995, the Online Computer Library Center [13] organized the first workshop of the Dublin Core community with the aim of reaching a consensus on a core set of metadata elements to describe networked resources. This

discussion was taken up in a meeting on agricultural standards, organised by Oneworld Europe [14] in collaboration with FAO in Brussels, during autumn of 2000 [15]. The meeting raised awareness amongst information providers of the new opportunities for sharing information through use of metadata standards and platform-independent formats such as XML. The participants agreed that a standard methodology was necessary and showed particular interest in the Dublin Core model.

Since the Brussels meeting in 2000, FAO has undertaken a number of initiatives to facilitate the standard setting process. More recently, in June 2003, the United Kingdom Department for International Development [16] organized the "Fertile Ground" meeting, where policy makers and information service managers discussed the implications of the dispersed developments in exchange standards, tools and methodologies, thus introducing the notion of - and the need for - "coherence". This coherence can be achieved by: facilitating collaboration, partnership and networking among partners by promoting information exchange and knowledge sharing; and by harmonizing the decentralized efforts currently taking place in the development of methodologies, standards and applications for management of agricultural information systems; consequently, providing a 'one-stop' access to system designers and implementers.

4.1 The Agricultural Metadata Element Set

The Agricultural Metadata Standards Initiative (AgMES), launched in November 2000, is an attempt to promote the use of metadata through use of standardized agricultural metadata terms for the purpose of facilitating resource discovery and interoperability between richly described agricultural resources. It defines elements, qualifiers, encoding schemes and controlled lists that are necessary for the description of agricultural information resources. The use of such a standard makes it easier to integrate data from different sources allowing for creation of value-added services such as simple aggregated subject-based views, automatic news feed services etc.

Much of the activity has taken place in collaboration with internal and external partners. The AgMES Web site has been continuously updated with useful information for the users. It is now furnished with official documentation, metadata schemas, metadata creation tool, glossary and FAQs. A mailing list [17] provides a forum for discussions and exchange of ideas. The AgMES initiative has received encouraging feedback internationally with a number of citations on well-known sites. Additionally, conference presentations and journal articles have been written on the topic [18, 19, 20]. Several applications, both within and outside FAO, have fully or partially implemented metadata schemas using AgMES elements (e.g. Open Knowledge Network [21], Consultative Group on International Agricultural Research [9], FAO Fisheries Global Information System [22], International Portal on Food Safety, Animal and Plant Health [23], and Global Forest Information Service [24]).

4.2 The AGRIS Application Profile

One of the first AGMES applications was the AGRIS application profile [25]. AGRIS is the international information system for the agricultural sciences and technology. It was created by FAO in 1974, to facilitate information exchange and to bring together world literature dealing with all aspects of agriculture [26]. The AGRIS Application Profile is a format that allows sharing of information across dispersed bibliographic systems. Most information systems, including AGRIS, are faced with the chronic problems of exchanging and aggregating information, starting from the differences in applications to those concerning varying database structures and cataloguing rules. The AGRIS Application Profile is a major step towards exchanging high-quality and medium-complexity metadata in an application independent format and provides possibilities to offer value-added services, irrespective of how the information was stored locally.

The following figure shows how the use of an Application Profile as a common exchange layer helps to resolve the problem of heterogeneity of data models among information systems with similar types of resources (i.e. Database 1, Database 2, ...), and can be used as a basis for the development of further value-added services (i.e. Thematic Portals, News feed Services, ...).

| Aggregated database views | Subject specific portals | News feed service | ... | Information system (n) | Value-added Information Services |

| Common exchange layer (using Application Profile structure, XML format) | Shared layer of Interoperability |

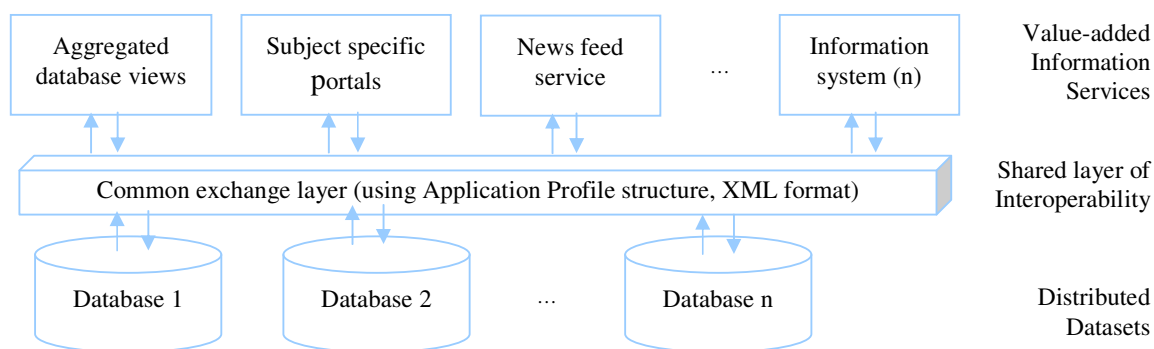| Database 1 | Database 2 | ... | Database n | Distributed Datasets |

Figure 2. Interoperability, using common exchange standards, between distributed datasets allow for creation of value-added services

The result of introducing this standard can be measured quantitatively. This year, so far in the first nine periodical updates, 44105 records have been added; a significant increase from last year's total of 38532 records that were uploaded. One third of these records were submitted using the AGRIS Application Profile XML format and WebAGRIS (as it is now available with the automatic XML-based export functionality). The most remarkable achievement of the new format is resuming of records submission by some of the countries that had stopped sending in their inputs to the AGRIS database, such as Finland and Norway.

4.3 AGROVOC and the development of domain ontologies

The multilingual AGROVOC thesaurus [27] is available in the five FAO official languages which are English, French, Spanish, Chinese and Arabic. It is also available in Czech and Portuguese and Thai. Other languages such as Italian, Korean, Japanese, Hungarian and Slovak, are currently under translation and revision. The main role of AGROVOC is to standardize the indexing process in order to make searching simpler and more efficient, and to provide the user with the most relevant resources. Currently, it is downloaded regularly, an increase possibly attributed to its ease of applicability in multilingual web applications.

AGROVOC is the foundation that underpins the development of the Agricultural Ontology Service (AOS) project. By making use of knowledge contained in vocabulary systems and thesauri such as AGROVOC, AOS is committed to developing specialized domain-specific terminologies and concepts that will better support information management for the web environment.

Since Tim Berners-Lee has launched the debate about a future "Semantic Web" [28], there is a growing interest in vocabularies and especially in structured controlled vocabularies among the community of Web Information Specialists. FAO has taken up the challenge by re-launching the AGROVOC thesaurus as a starting point for a basis for using ontologies in Agricultural knowledge applications. The first AOS Workshop [29], which was held in 2001 in Rome, was aimed at transforming the AGROVOC Thesaurus into an Ontology server. Since then the approach has become much more phased and is directed at developing a collection of semantic tools which will serve as building blocks of the AOS project. Since 2001, five Agricultural Ontology workshops have taken place, allowing experts to exchange knowledge about the semantic tools and trends and to raise awareness of its importance for the Agricultural community.

Using AGROVOC, Domain Ontologies [30] have been developed and are currently being used in some of FAO's applications [31]. Further funds and collaborations are needed to extend the work in this area. A number of conference presentations and journal articles have been written on the topic [32, 33, 34, 35, 36, 37, 38, 39]. A recent publication also outlines the steps that will be taken towards removing inconsistencies from the thesaurus and enforcing on it a more ontological structure.

4.4 Towards a Clearinghouse for information management standards

Although much has already been done in the development of information management standards, the outreach within the sector is still limited. A more solid framework needs to be adopted to raise awareness and promote 'reuse' of such standards in the development of new information services. The aim is to establish an Information

Management Clearinghouse (IM Clearinghouse) to bring together information on methodologies, standards and tools. Its specific goals would be to:

- establish a network of partners who adhere and agree to the primary goal of the initiative "to provide unified and free access to information management approaches and tools";
- bring together information about currently available standards (such as thesauri, classification schemes, metadata sets, ontologies, controlled vocabularies) used in management of Agricultural Information;
- encourage the re-use of these standards to facilitate interoperability between information systems;
- increase awareness of these freely available resources and promote sharing of good practice examples; and
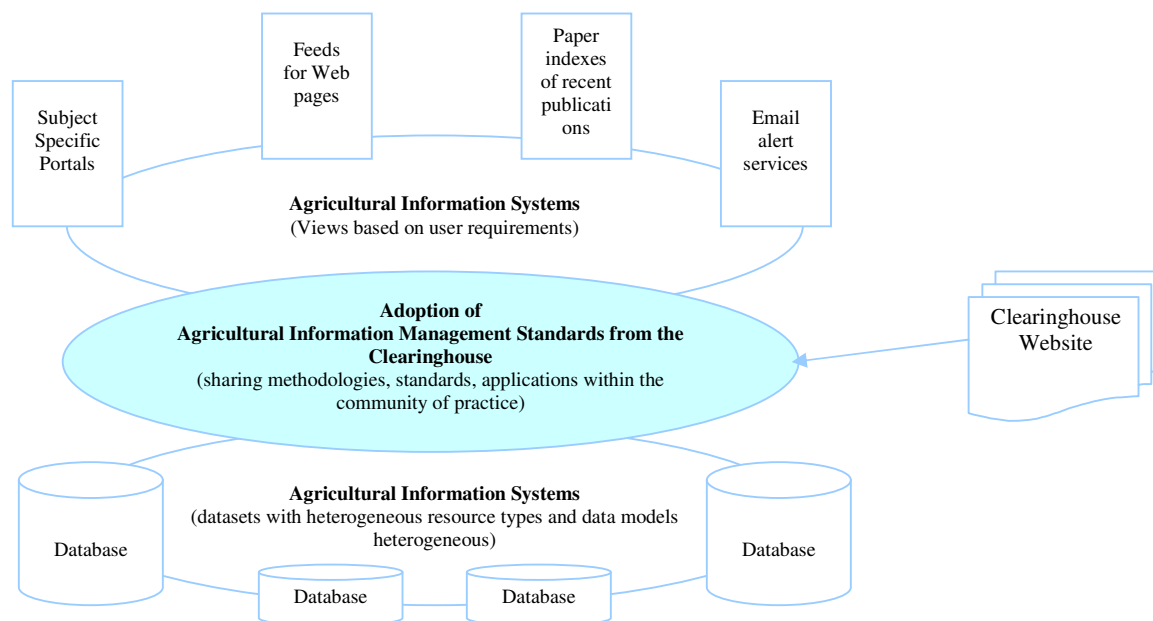- provide channels for communication between different actors in the community.

Figure 3: Adoption of standards from the Clearinghouse will facilitate interoperability between systems and allow for creation of value-added systems.

In Figure 3, the lower layer depicts the different collections of data (ranging from numerical datasets to collections of full text documents). These collections are compiled by agricultural information providers, but not necessarily by the same services that provide the final views to the community. The top layer is made of different Agricultural Information services, such as multi-host database searches, e-mail alert services about new outputs, portals, or paper-based journals. The proposed intervention of the Information Management Clearinghouse, to facilitate interoperability, would take place in the middle layer, where developers of information services will be able to obtain information on methodologies that have been applied, the standards that have been used and the way they have been applied. This framework of sharing common standards and tools would not only influence both the data-providers and service-providers.

The increasing uptake of common standards will provide the possibility not only to enhance interoperability but also to decrease the cost of the resources necessary to create information systems from scratch and the reuse metadata. This is clearly exemplified in the case of bibliographic agricultural information systems such as AGRIS. Although existing systems have started to share information using standardized data-models and XML technologies, this is not the most efficient solution for systems that are being newly created. An acceptable level of homogeneity within the domain can be achieved by sharing not only 'transformed and compliant' metadata but also by sharing the backbone technologies and tools used to create those information systems.

The scope and eventual sustainability of the Information Management Clearinghouse will be determined by the level of cooperation received from the participating network of partners.

4.5   Institutional bodies to facilitate Organization-wide adoption of standards

Article 1.1 of FAO's constitution states the "the organization shall collect, analyze, interpret and disseminate information relating to nutrition, food and agriculture". Moreover, as mentioned in section one, of the key strategies of FAO is to improve decision-making through the provision of information and assessments and fostering of knowledge management for food and agriculture. In support of these critical functions, FAO established the World Agricultural Information Centre (WAICENT) [4] as a corporate framework for agricultural information management and dissemination.

One of the fundamental principles of WAICENT is that is based on a participatory and decentralized approach. Each technical unit is responsible for collecting, analyzing, interpreting and disseminating the information for which it is responsible. The amount of information and knowledge acquired, managed and published under this approach is enormous as manifested by the half-million HTML pages available on the corporate web-site. However, at the same time, FAO strives to provide an "integrated information resource base, with current, relevant and reliable statistics, information and knowledge made accessible to all FAO clients" [2]. Without the guidelines and standards offered by the WAICENT framework, it would be virtually impossible to obtain integrated access to FAO's information under a decentralized approach and it would be very difficult to cover the many interdisciplinary and cross-cutting themes that FAO is mandated to address.

The vast amount of information generated by a large organization such as FAO, together with the apparent dichotomy between decentralized production on one hand, and a desire for integrated and interdisciplinary information access on the other, makes the WAICENT Framework a rather complex institutional arrangement. For WAICENT to work efficiently and effectively, all FAO technical departments are involved in the policy-making, approval and implementation process through two corporate WAICENT bodies: the Committee and the Advisory Group. Adoption of standards would not be possible in a decentralised environment like FAO if broad participation of information originators were not ensured. Within the Organization, the WAICENT Framework acts as a sounding board and policy-making mechanism for the discussion, adoption and implementation of standards.

The WAICENT Committee works to enhance the sense of ownership of WAICENT by all organizational units concerned and bring about a shared understanding of how WAICENT can better serve the needs of FAO target audiences. It also recommends policy decisions which are then passed to the FAO Director General for final approval.

The WAICENT Advisory Group (WAG) supports the WAICENT Committee by proposing items for the latter's agenda, gathering and preparing necessary background information for agenda items, tracking and reporting on the implementation of the Director-General's policy decisions. The WAG also resolves many technical issues and ensures that standards and policies for development of interoperable systems are based on common standards, tools and methodologies.

5.   CAPACITY BUILDING IN INFORMATION MANAGEMET

With respect to the wider interest in Information Management, many organizations from Member Nations are approaching FAO with requests for appropriate methods and tools for agricultural information management, and to assist them in developing and improving their capacity to manage agricultural information effectively. FAO has responded to these requests in the past by providing technical assistance in the form of information management tools and applications, normally in association with advice and training. However, FAO's human resources available to respond directly to Members requests are insufficient to address all of the Members' demands, and there is a pressing need to facilitate the wide dissemination and adoption of its key normative resources, including provision of adequate training in their application and use. In response to this need, FAO has initiated a partnership-based distance learning programme in agricultural information management called the "Information Management Resource Kit" (IMARK) to bring together the necessary resources from its own programme, as well as from international, regional and specialized agencies that are facing the same challenges in capacity building in information management and development of standards.

The objectives of IMARK are to build institutional capacity at national and local levels to manage and share agricultural information more effectively, through increased awareness, understanding and skills of individuals responsible for information management in agricultural agencies, institutions and networks. IMARK is being delivered as a computer-based distance learning resource made up of a series of discrete modules published on CD-ROM and over the Web, with each module containing one or more inter-related topics. The modules are being

developed using the latest methods in interactive e-learning which are highly suitable for self-paced learning, and software applications and tools developed by FAO and partner organizations are also being provided with each module. The IMARK concept also has modules and the Web site [40] supplemented by an Internet-based online community, which is co-ordinated and supported by FAO and its partners. The community is aimed at assisting and supporting IMARK learners by providing a forum and collaborative workspaces for learners and subject matter experts in which to initiate discussions, upload and download documents, and to point to other web resources. The online community was developed and integrated with the IMARK website using the "DGroups" community networking tools [41] coordinated by Bellanet International and customized for IMARK.

It is too early to assess in detail the impact of the initiative, given that only the English version of one module ("Management of Electronic Documents") has so far been released, but some trends have already become clear. In general, the reaction of learners to the module has been very positive, given the ability to create their own personal curriculum and the added value of the well-structured learning materials. FAO has also been using the distance learning module to support its face-to-face training courses, and a strong demand has developed for IMARK lessons and resources for use in face-to-face training. This so-called "blended" approach to training has been greatly appreciated by learners and trainers alike, and it has now been decided that all IMARK materials will also be made available in face-to-face format. A nascent online community has been developed in 2004 around the first module, consisting primarily of the migration of existing FAO-facilitated discussion lists on relevant subject areas, and a significant effort will be made in 2005 into expanding and enhancing the community as new modules emerge and engagement increases. Early informal assessments indicate that the acquisition of knowledge and skills on the key tools and standards associated with the area of the first module have been significantly enhanced by the IMARK initiative. The programme for 2005 comprises publication of other language versions of the first module and three further modules in up to three languages, including a module entitled "Digitization and Digital Libraries", so the initiative will reach a wider audience with a richer set of resources. In addition, a formal evaluation will be made of the uptake and impact of the first module in 2005. Finally, FAO is exploring mechanisms for broadening the involvement of partner organizations in the oversight and direction of the IMARK initiative.

6. CONCLUSION

This paper has tried to present an assortment of some of the many activities taking place to support the goals put forward by the World Food Summit and the Millennium Declaration. The WAICENT framework is aimed at facilitating the search for and access to FAO's collection of information and to establish and implement more effective policies and programmes aimed at food security and sustainable agricultural production. It aims to benefit the Member Nations by providing timely access to vast multilingual repositories of information on food and agriculture. FAO's work on development of standards and guidelines for agricultural information management is aimed at improving the efficiency of FAO's own information management systems as well as those in use in the international community. The development of the Information Management Clearinghouse is meant to ensure wide-scale participation in the development and adoption of those standards. In FAO, participation can be ensured by involving the key stakeholders represented in the WAICENT Committee and Advisory Group, respectively the policy-making and technical advice bodies of the WAICENT Framework.

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