

# FAO's Capacity-Building Initiatives in Accessing, Documenting, Communicating and Managing Agricultural Information

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**Abstract:** The new information and communication technologies (ICT) and the growing wealth of digital information have the potential to improve access to and benefits from development activities for the rural poor, as well as facilitate policy-making. In this regard, the Food and Agriculture Organization of the United Nations (FAO) is involved in various initiatives aimed at building human and institutional capacities in documenting and communicating agricultural information. The paper presents a brief overview of three initiatives, which together form the basis of a coordinated effort by FAO with a wide range of partners to improve access to information on agricultural science and technology. The initiatives are: Access to Global Online Research in Agriculture (AGORA); and Mobilizing Agricultural Science and Technology Information. The paper also highlights some of the capacity-building activities involving the above three initiatives that have taken place in Africa.

**Resumé:** Les nouvelles technologies d'information et de communication (TIC) et la richesse croissante d'information numérique ont le potentiel d'améliorer l'accès aux activités de développement pour les pauvres ruraux, d'en tirer de meilleurs bénéfices, et même de faciliter les décisions. Dans cet égard, l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO) est impliquée

dans diverses initiatives visant à renforcer les capacités institutionnelles et humaines dans la documentation et la communication de l'information agricole. L'article présente un bref aperçu général de trois initiatives, qui forment ensemble la base d'un effort coordonné par la FAO avec une grande palette de partenaires pour améliorer l'accès à l'information sur la science et la technologie agricole. Ces initiatives s'appellent : Accès en ligne à la recherche mondiale sur l'agriculture (AGORA), Mobiliser la science agricole et l'information technologique, et l'Initiative globale de renforcement des capacités. Cet article souligne aussi certaines des activités de renforcement des capacités impliquant les trois initiatives ci-dessus, qui ont eu lieu en Afrique.

**Resumen:** Las nuevas tecnologías de información y comunicación (TIC) y el creciente acervo de información digital tienen potencial para mejorar el acceso de la población de escasos recursos en zonas rurales a las actividades de desarrollo y los beneficios que ésta pueda obtener, así como facilitar la formulación de políticas. A este respecto, la Organización de las Naciones Unidas para la Agricultura y la Alimentación (FAO) participa en diversas iniciativas encaminadas a fortalecer las capacidades humanas e institucionales en documentación y comunicación de la información agrícola. El artículo presenta un revisión breve de tres iniciativas, que juntas forman la base de una gestión coordinada por la FAO con una amplia gama de socios para mejorar el acceso a la información sobre ciencia y tecnología agrícolas. Estas iniciativas son: Acceso a la Investigación Mundial en Línea en el Sector Agrícola (AGORA), Movilización de la

Información en Ciencia y Tecnología Agrícolas y una iniciativa mundial de fortalecimiento de capacidades. El documento también destaca algunas de las actividades de fortalecimiento de capacidades que comprenden las tres iniciativas anteriores que han tenido lugar en África.

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## Introduction

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It is clear that effective information exchange and communication are multifaceted processes dependent on human resources, institutional capacity, and technology infrastructure. The new information and communication technologies (ICT) and the growing wealth of digital information have the potential to improve access to and benefits from development activities for the rural poor, as well as facilitate policymaking. A crucial agent of change is the mobilization and harnessing in digital form of previously inaccessible knowledge and information, coming from local sources or adapted to the local context.

The Food and Agriculture Organization of the United Nations (FAO) recognizes three key components in its strategic approach to using information and communication to reduce hunger and fight poverty. These are:

- information content relevant to agricultural and rural development and food security, mobilized by governments, rural service providers and communities.

- innovative mechanisms and processes for information exchange among rural policy-makers, service providers, communities and households.
- networks of formal and informal associations of stakeholders that give them a way to exchange information and communicate about these new mechanisms and processes.

Normative guidelines and tools for information and communication facilitate common approaches to policy and technical issues. The development of a normative framework has to address the range of demands and capabilities of different stakeholders, based on active partnerships and collaborative lesson learning. The framework comprises a set of principles and tools for mobilizing the global knowledge base, which enhances its accessibility.

FAO has initiated a strategic program entitled Bridging the Rural Digital Divide (BRDD), through which it is seeking to enhance the role and impact of information and communication for development in support of rural livelihoods in disadvantaged countries and communities. As part of this initiative, FAO is developing, applying, and evaluating working models of information exchange and communication with partners in different contexts worldwide. These models are either derived from documenting and sharing lessons from existing initiatives, or they developed from first principles. Wherever possible, approaches are innovative but profit from lessons learned in past experience in a wide range of environments. Such approaches use a mix of media based on traditional and new technologies.

### **Access to information on agricultural science and technology**

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There is a range of conceptual models and networks under which stakeholders are aiming to mobilize

and provide access to the world's information on agricultural science and technology. These fall into two broad categories, firstly those that are facilitating access to the world's scientific literature in agriculture in peer-reviewed learned journals that are often published commercially and sold at prices which are unaffordable in developing countries. The second category includes those initiatives that are trying to help organizations active in agricultural science to publish and disseminate the outputs of their own work.

### **Access to the world's scientific literature in agriculture**

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Within the first category are two major initiatives to illustrate the general model. Firstly, Access to Global Online Research in Agriculture (AGORA) is a global partnership to provide free online access to full-text scholarly journals in agriculture to developing countries that was launched in October 2003. AGORA is an initiative of FAO in collaboration with partners, including over 20 of the world's leading agricultural publishers,<sup>1</sup> Cornell University, Rockefeller Foundation, WHO, Department for International Development (DFID), and the United States Agency for International Development (USAID). The goal of the AGORA initiative is to increase the quality and effectiveness of agricultural research and education by providing to the poorest countries in the world access over the Web to around 800 key journals in agriculture and related disciplines. It offers researchers, policymakers, educators, students, technical workers and extension specialists a collection of literature comparable to that available to their counterparts in the developed world. AGORA is accessible for free in 38 African countries; for seven African countries access is available at a fee of \$1000 per year per organization.

Another initiative through which literature on a wide range of sub-

jects including agriculture is made accessible to scientists in Africa is the Programme for Enhancement of Research Information (PERI), coordinated by the International Network for the Availability of Scientific Publications. Among other services, access is provided to developing countries to over 17,000 full-text journals from 42 commercial publishers at much reduced prices. PERI also supports scientific publishing through the African Journals Online (AJOL) initiative.

### **Mobilizing agricultural science and technology information**

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In the second category, is the International Information System for the Agricultural Sciences and Technology (AGRIS) initiative. AGRIS was established in 1975, and now at its 30th anniversary consists of a network of over 200 organizations worldwide collaborating on the shared objective of improving access and exchange of information on agricultural science and technology. The new AGRIS strategy developed in 2002 has the following principles: a decentralized approach enabling the member countries to have the capacity to capture and disseminate their research outputs; a greater diversity of participating organizations; a strengthened role in capacity building; empowering the information managers with knowledge on new methods of information management; a focus on full text documents, where initiatives such as the Open Access model of publishing is promoted; greater availability of associated information about activities, organizations and people and a set of Web-enabled standards and tools. As opposed to the old arrangements where one organization (national AGRIS input centre) in a country coordinated inputs into AGRIS, the new strategy allows for individual research organizations to directly contribute and share their information and knowledge resources with the international AGRIS community.

This arrangement also makes it possible for institutions to collaborate, share their information resources and work towards a distributed national and regional AGRIS network. Further the new AGRIS strategy supports and promotes the concept of establishing open-access repositories (open archives).

### **Absence of skills and institutional capacity**

In most African countries, agricultural information and knowledge resources are still produced in limited copies (i.e. in some cases only one copy is produced), stored in drawers, cabinets and sometimes in poorly equipped libraries. At the same time, information and communications technologies (ICTs) have changed the way researchers are generating and sharing agricultural information and knowledge. Agricultural research scientists are increasingly using computers in their work and generating information and knowledge resources in digital format, including research reports, databases, data sets and research project documents. These resources need to be collected, processed and disseminated, but unfortunately this is not being done in most agricultural research organizations in Africa. There is a general absence of skills to manage digital information resources among information managers. In addition, most agricultural research institutions do not have in place strategies and policies to support information and knowledge management and sharing activities. The three initiatives mentioned above, namely AGORA, PERI and AGRIS, all have a strong emphasis on capacity building both for information specialists who manage the systems and for scientists who use the content.

Under the new AGRIS strategy, FAO is also giving consideration to building capacities among policy-makers in agricultural institutions so that they can invest in agricultural information management, and appreci-

ate the importance of having in place effective information management strategies, structures and procedures in their institutions.

### **Resource materials for capacity building**

There is a widely recognized need for high-quality resource materials to support capacity building, for use by trainers without access to reference materials. A wide range of organizations including FAO are collaborating on developing such materials for trainers and for learners to support capacity-building programs and activities related to participating in and accessing scientific and technical information through initiatives and networks such as AGRIS, AGORA and PERI.

Several international organizations worldwide recognized that great economies of scale can be achieved in the task of capacity building if a distance-learning approach is adopted based on standardized learning materials. A group of seven organizations have formed a Steering Group that supports and guides a partnership-based e-learning initiative known as the Information Management Resource Kit (IMARK), which trains individuals in effective management of agricultural information (<http://www.imarkgroup.org>).

The goal of IMARK is to mobilize and build upon existing resources to create a comprehensive suite of distance-learning resources for information management and exchange, which will support agencies, institutions and networks worldwide, and allow them to work together and share information more effectively within a virtual community of practice. IMARK covers major subject areas in information management. The modules introduce the latest concepts, approaches and tools for information management, using interactive tutorials specifically designed for individual self-paced learning. The learning materials are being developed as a series of mod-

ules on CD-ROM, supplemented by an Internet-based online community providing a virtual discussion forum for contributors and learners to exchange views, share information and request help from each other.

IMARK modules are being developed using the latest methods in e-learning, providing an interactive environment for self-paced learning.<sup>3</sup> The modules that have been developed so far have direct applications in developing human and institutional capacities in digital information management, and these are:

*Management of Electronic Documents* (available also in French, copublished with CIRAD) – offers a series of lessons on electronic document management, which introduce basic concepts and describe specific workflows and topics. The lessons include relevant resources and additional reading. Learners can also consult a glossary specific to the module and search within the course materials for specific terms.

*Digitization and Digital Libraries* (copublished by FAO and UNESCO) – is concerned with creating digital libraries and preserving materials in digital format. Also included are lessons covering copyright issues, electronic formats for text and images, metadata and subject indexing, as well as a comprehensive overview of creating and managing digital documents.

*Investing in Information for Development* (copublished by FAO, CTA<sup>4</sup> and GTZ) – addresses the needs of managers and decisionmakers for new awareness and skills related to development and implementation of strategies, policies, structures, and procedures for effective management of agricultural information. The module reviews current trends in access to and dissemination of information, and how new ICTs affect and enhance information activities in an institutional environment.

*Building Electronic Communities and Networks*—will document and teach users about the approaches, methods and tools that help to build groups and communities, enhance communication and stimulate active participation using electronic ICTs. The module will allow learners to develop the advocacy skills needed to make the case for electronic networking with their managers and funding agencies. The module will also help sensitize policymakers about how electronic networking can benefit groups and communities.

## Capacity-building activities in Africa

**AGRIS—new strategy into action:** In Africa, FAO and partner organizations focused on developing the capacity-building element of the new

AGRIS strategy, while also addressing advocacy for adoption of the new approach. IMARK was developed for this purpose, and its teaching modules are being used to support the roll-out of the new AGRIS strategy in the context of a blended learning approach, which uses the IMARK curriculum and materials to support face-to-face workshops with self-paced distance learning. Given that IMARK modules were initially produced in English only, capacity-building activities were concentrated in anglophone Africa.

Activity in eastern and central Africa was led by the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), through its Regional Agricultural Information Network (RAIN). A regional training-of-trainers workshop on Electronic Produc-

tion of Agricultural Documents and Bibliographic Database/Management was held in Kenya in 2004 for 22 participants from nine countries (Burundi, Democratic Republic of Congo (DRC), Ethiopia, Kenya, Madagascar, Rwanda, Sudan, Tanzania and Uganda). Since that time, national AGRIS training workshops have been held in Kenya (in collaboration with the Kenya Agricultural Research Institute – KARI), Tanzania (in collaboration with the Department of Research and Training of the Ministry of Agriculture and Food Security) and in Sudan, in collaboration with the Agricultural Research Corporation.

Activity in West Africa was led by the Ghana Agricultural Information Networks Systems (GAINS) based at the Institute for Scientific and Technical Information (INSTI).

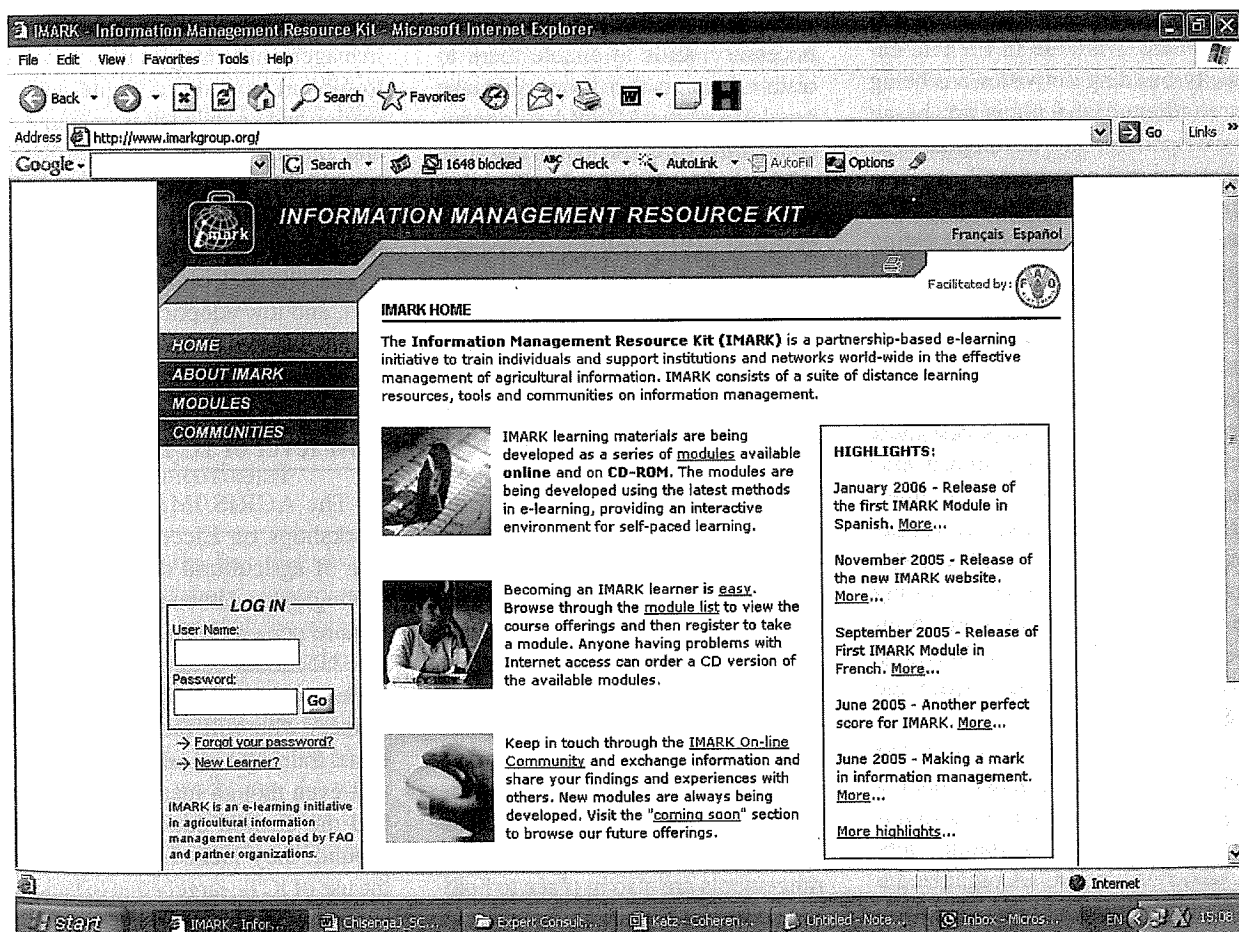


Figure 1. IMARK portal.

In March 2004, GAINS hosted a regional training-of-trainers workshop on Electronic Production of Agricultural Documents and Bibliographic Database/Management for 20 participants from the Gambia, Ghana and Nigeria, in May 2004.

The objectives of the training workshops were to introduce participants to modern trends and initiatives in agricultural information management, to introduce participants to the new AGRIS vision, and to equip participants with skills to enable them to manage outputs of agricultural research (electronic documents) using WebAGRIS tools and methods. Leading on from these training initiatives, pilot national AGRIS networks in the new vision are now being established in Ghana and Kenya, with participation of multiple resource centres and wider uptake and use of methodologies and tools.

Now that the first IMARK materials are available in French, capacity-building activities are being strengthened and plans are being developed for the development of pilot national networks.

Following the launch of the new IMARK module on Investing in Information for Development, RAIN and FAO have pioneered a new format of a face-to-face workshop aimed at assisting managers and decisionmakers to develop an information strategy for their organizations and to establish new structures and procedures for effective information management. The workshop was held in May 2006, for managers and directors working in national agricultural research institutions, including those in charge of information services from the ASARECA countries.

Likewise, associated with the launch of the new IMARK module on Building Electronic Communities and Networks in March 2006, RAIN, FAO, and CTA organized a pioneering online training workshop on Facilitating Online Interaction spread over 5 weeks in February–March 2006. Coordinators of subregional thematic knowledge

networks actively participated in this workshop and focused on enhancing virtual interaction and knowledge exchange among and within the ASARECA networks. As members and contributors to these networks are often geographically dispersed, the workshop provided the network coordinators the opportunity to learn how communications and information exchange can be facilitated and enhanced through electronic networking.

### **Capacity building to support AGORA**

The success of the AGORA initiative depends on how effectively potential users can make use of the resources. In this regard, FAO and collaborating partners are conducting various training-of-trainers workshops aimed at equipping participants with the necessary skills to enable them to train others so that they can make good use of the AGORA resources. A leading role has been taken in Africa by the Information Training and Outreach Centre for Africa (ITOCA) (<http://www.itoca.org>), a capacity-building organization based in Harare, Zimbabwe, aimed at enhancing ICT skills for African librarians, information specialists, scientists, researchers and students. A set of resource materials has been developed to support trainers in face-to-face environments, together with some self-instructional materials for users.

So far AGORA training workshops have been held in Ethiopia, Ghana, Kenya, Malawi, Mali (for participants from Burkina Faso and Mali), Mozambique, Nigeria, Rwanda, Senegal (for participants from Côte d'Ivoire, the Gambia, Guinea-Conakry and Senegal), Tanzania, Uganda and Zimbabwe. Arrangements are also in place to hold an additional training workshop in Kenya (May 2006) and Zambia (June 2006). The objective of the workshops is to increase the quality and effectiveness of research

and education in agriculture and related biological, environmental and social sciences, to contribute towards improving food security in the participating countries. Participants at the workshops have included library and information management specialists, researchers, lecturers and policymakers.

### **Challenges and constraints**

Capacity-building activities under the new AGRIS strategy and AGORA initiative have been going on for almost two years and FAO is monitoring the situation to see the impact of these activities on agricultural information management and access in Africa. However, several challenges have been observed, including the absence of skills to manage digital information resources among information managers, and absence of information management strategies and policies to support agricultural digital information and knowledge management and sharing activities, which have been highlighted above. Other challenges are the low level of ICT skills, inadequate ICT facilities for training workshops, lack of institutional support, and low adoption levels of the methodologies and tools introduced to the participants.

### **Low level of ICT skills**

The AGRIS/IMARK training workshops on Electronic production of agricultural documents and bibliographic database management require persons with a certain level of educational background and experience. The workshops also train trainers who will then conduct national training. Our analyses indicate that even though many participants had the desired educational background, they lacked experience in the use of ICTs, largely due to lack of exposure and limited use of AGRIS tools and methodologies. For example, participants need basic experience with CDS/ISIS, HTML, XML and metadata standards concepts.

Unfortunately, many participants, found it difficult to follow up on the training activities such as installing and configuring WebAGRIS tools, and understanding XML. As a result it is difficult for them to later easily adopt these methodologies or hold local or national training workshops.

### **Inadequate ICT facilities for training workshops**

To conduct training workshops, access to computers, scanners, a local area network, and preferably the Internet, is important. However, for most workshop participants, their institutions do not have these resources that can be made available for the training seminars. For many, the only ICT facilities that they have direct access to are those located in their offices. This makes it difficult for the trainers to train other information managers and this directly has a negative impact on the level of skilled personnel in most of the research libraries.

In the case of AGORA for example, lack of access to training facilities equipped with adequate computers, and to reliable and faster Internet facilities has made it difficult to conduct effective training workshops.

### **Lack of institutional support**

In spite of the fact that participants at the workshops are nominated and sent to the workshops with the support of their directors and managers, it is apparent that when they return, they do not receive any support to put into practice the skills learned at the workshop. As result very few participants from both AGRIS/IMARK and AGORA training-of-trainers workshops have successfully organized in-house, or local or national training workshops.

In most institutions the lack of support for capacity-building activities is a result of lack of fund-

ing. Most institutions do not have a budget for capacity-building activities and therefore it is difficult to get internal funds for in-house or national training workshops, or even support information managers to train elsewhere.

### **Low adoption levels of methodologies and tools**

Though more than two AGRIS/IMARK workshops have been conducted in some regions, there is no concrete evidence of their impact on the local management of information resources in the trainees' institutes. Expectations such as contributions to the AGRIS central database, use of Dgroups electronic forum to channel experiences and technical issues are still to be met even after the AGRIS tools have been successfully implemented.

The AGRIS/IMARK workshop program is very comprehensive, touching most of the new trends in information management. General indication is that the program is too heavy for the 8 days allocated for the training. Most participants are not able to grasp all the concepts adequately to put them into practice.

In spite of the above challenges, it is worth noting that national training workshops held in Kenya and Tanzania have sensitized many information managers on current trends in management of agricultural information. Many information managers are now aware and have a growing need to acquire more skills on how to manage and disseminate their agricultural information resources effectively.

An important point is that the national training workshops in Kenya and Tanzania were largely local initiatives by some of the participants at the regional training workshops who also served as resource persons at their workshops. Collaboration with RAIN has also borne fruit as it appears that interest in AGRIS from the ASARECA region is slowly growing and RAIN continues to support the trainers in their countries.

Information managers with support of the AGRIS Secretariat and the regional associations should push for strong information management policies by institutions. This will facilitate more capacity-building activities, accelerate the adoption of AGRIS methodologies and tools and eventually facilitate a greater visibility of research output from this region.

The AGRIS/IMARK workshops should be conducted often to update the skills of the agricultural information managers. In addition they should also take advantage of the IMARK modules available online to update their skills. This over time will also phase out the problem of the need for crash programs within a short period and ultimately raise the level of skilled information management personnel from Africa.

### **Conclusion**

The challenge is how to improve accessibility of information about agricultural development and food security. This challenge is multidimensional, covering language issues as well as those of intellectual property and physical accessibility. AGRIS, AGORA and IMARK are playing roles in diminishing the knowledge divide not only between developing and developed countries but especially in the developing countries with agriculture as a central part of their society. This effort is based on the awareness and goodwill of the international community. AGRIS and IMARK are focused on building capacity and improving electronic publishing of documentation in agricultural science and technology, linking information about institutions, scientists and researchers, and activities, without imposing too rigid a collaborative framework. One key aspect of the approach establishing better collaboration with international initiatives to support and coordinate agricultural research for development.

FAO has already initiated in some regions a strategic approach