

**FAO-DFID Programme:**

**Information Systems in  
Agricultural Science and Technology**

**Project  
GCP/INT/997/UK**

**Final Report  
2005-2010**

**December 2010**

## ***Executive Summary***

The strategic problem addressed by the FAO-DFID programme on **Information Systems in Agricultural Science and Technology** was the enhancement of the accessibility of the outputs of research, primarily in agriculture but also in health and the environment, at the level of enabling policy and validated good practices. The context of accessibility is focused primarily on digital full text of document-like objects, with a secondary emphasis on practicable pathways for re-purposing those outputs to make them more applicable to producers in rural communities.

In terms of target groups, the programme primarily focused on three groups in agriculture, namely (a) information and communication professionals in research organizations, (b) scientists and academics conducting research, and (c) their managers. The programme did not address intermediaries in research uptake pathways or rural producers themselves.

The first target group participated across 70 countries in the formulation of the policy and practice framework developed under Component 3, and a global team of information and communication specialists with representation from all regions has been engaged on development of coherent tools and services. All three target groups participated in the national pilots undertaken in Ghana and Kenya under Component 2 in the development of sound policy and practice. Members of all three target groups, in agriculture health and the environment, have benefited directly from increased access to the content provided by the Research4Life programmes.

### Key outcomes achieved:

Component 1: A range of interventions designed to address constraints identified by the users of the international literature available through the AGORA programme ([www.aginternetwork.org](http://www.aginternetwork.org)) and its sister Research4Life programmes in health and the environment, achieved continuing increases in the amount of uptake and use of the R4L programmes. More publisher partners are contributing content, many more institutions are now registered, and usage of the resources has increased by more than 400% in the five years of the programme. A study of the world's literature conducted in 2010 has shown that researchers in R4L countries now publisher more than they used to in 2005 and that they are citing journals available in R4L programmes.

Component 2: Two pilot national networks of publicly accessible institutional repositories of agricultural research outputs in Ghana and Kenya have been established, with enabling institutional policies formulated through participatory approaches and significant quantities of full text content now accessible in digital format through those repositories ([www.gains.org.gh](http://www.gains.org.gh) and [www.kainet.or.ke](http://www.kainet.or.ke)). Lessons learned through these pilots have been captured in partnership with GFAR, FARA, and other relevant bodies, and shared for the benefit of other countries through the CIARD initiative's tools and through other mechanisms.

Component 3: The "Coherence in Information for Agricultural Research and Development" (CIARD) ([www.ciard.net](http://www.ciard.net)) initiative has been established as a unique global partnership in support of research communication in agriculture, comprising the 20 most important international and regional agricultural research agencies and organizations. Following its inception in 2008, the initiative was consolidated and strengthened through the participatory development of the detailed framework for policy (Manifesto) and practice (Checklist and Pathways), and shared through global and regional research policy-setting events to be held in 2010. The CIARD community platform was launched, and a set of

training resources developed through the IMARK initiative ([www.imarkgroup.org](http://www.imarkgroup.org)) to support capacity building. Significant advances were made in open technical standards and public domain tools for interoperability in agricultural information systems, with the outcomes reflected through the global community of practice facilitated by FAO (<http://aims.fao.org>), and a global registry (CIARD-RING) of open repositories and services for research outputs was launched and the significant amounts of content registered. A series of essential elements have combined to provide a positive image for the sustainability of the CIARD initiative.

Value of the programme: FAO provided significant resources from its own budget and it was able to secure co-funding from partners for many of the activities throughout the Programme, leveraging the resources provided by DFID and securing better value for money. Examples of this include the co-financing of the regional CIARD consultations provided by other partners in the initiative including the Global Forum on Agricultural Research (GFAR) and the regional research forums for Africa, Asia-Pacific, Near East North Africa, and the Consultative Group on International Agricultural Research (CGIAR), which between them paid for around 70% of participants' costs. For the Task Force meetings and activities, partners covered all of their own staff costs and in many case the costs of their participation. In the national pilots in Component 2, all local salary costs were covered by the national partners, and in Ghana financial contributions from other international organizations were leveraged. In component 1, the R4L partners contributed significant resources themselves, including especially large in-kind contributions from Microsoft, in addition to the resources applied from the FAO-DFID Programme.

## TABLE OF CONTENTS

A.	INTRODUCTION.....	7
B.	COMPONENT 1: Access to International Sources of Scientific Information .....	9
B.1.	Introduction to the Initiatives .....	9
B.2	Challenges faced by the R4L initiative .....	10
B.3	DFID-FAO Interventions to enhance Research4Life .....	11
B.4	The difference the FAO-DFID Programme made for R4L .....	15
C.	COMPONENT 2: Disseminating the Outputs of Agricultural Research in Africa .....	20
C.1	The Problem: Limited access to research information.....	20
C.2	Access to the outputs of public research in agriculture: Kenya .....	21
C.3	Access to the outputs of public research in agriculture: Ghana .....	24
C.4	Lessons learned and sharing to inform other interventions .....	28
D.	COMPONENT 3: Coherence in Agricultural Information Management .....	31
D.1	Introduction .....	31
D.2	Building a Global Platform for Coherence.....	31
D.3	Collaborative approaches to defining policy and practice .....	33
D.4	Capacity Building Activities .....	39
D.5	Content Management.....	41
D.6	Lessons Learned and Sustainability of the CIARD initiative .....	42
E.	Logical Framework Outputs and Status of Objectively Verifiable Indicators.....	44

**TABLE OF ACRONYMS**

AGORA	Access to Global Online Research in Agriculture
AGRIS	International System for Agricultural Science and Technology
ARD	Agricultural Research for Development
ARI	Animal Research Institute
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
CABI	CAB International
CAGRIC	College of Agriculture Education, Mampong-Ashanti
CBTF	Capacity Building Task Force
CGIAR	Consultative Group on International Agricultural Research
CIARD	Coherence in Information for Agricultural Research for Development
RING	CIARD Routemap to Information Nodes and Gateways
CMS	Content Management System
CMTF	Content Management Task Force
CORAF	Conference des Responsables de Recherche Agronomique Africains
CRIG	Cocoa Research Institution of Ghana
CRM	Customer Relationship Management
CTA	Technical Centre for Agricultural and Rural Cooperation (ACP-EU)
DFID	United Kingdom Department for International Development
DLRD	Digital Libraries, Repositories and Documents
FAO	Food and Agriculture Organisation of the United Nations
FARA	Forum for Agricultural Research in Africa
FORIG	Forestry Research Institute of Ghana
FRI	Food Research Institute, Ghana
GAINS	Ghana Agricultural Information Network System
GAPP	Ghana AGRIS Pilot Project
GCARD	Global Conference on Agricultural Research for Development
GCP	Government Cooperative Programme
GFAR	Global Forum on Agricultural Research
GNI	Gross National Income Gross National Income
HINARI	Programme for Access to Health Research
IAALD	International Association of Agricultural Information Specialists
IAG	Intelligent Application Gateway
ICM	Information and Communication Management
ICT/M	Information and Communications Technology and Management
ICT	Information and Communication Technologies
IICD	International Institute for Communication and Development
IISAST	International Information Systems for Agricultural Science and Technology
IKM	Information and Knowledge Management
IMARK	Information Management Resource Kit
INASP	International Network for Availability of Scientific Publications
INSTI	Institute of Scientific & Technical Information
IPR	Intellectual Property Rights
ITOCA	Information and Training Outreach Centre for Africa
JKUAT	Jomo Kenya University of Agriculture and Forestry
KAINet	Kenya Agricultural Information Network
KARI	Kenya Agricultural Research Institute
KARI-NARL	Kenya National Agricultural Research Laboratories
KEFRI	Kenya Forestry Research Institute
MDG	Millennium Development Goals
OARE	Online Access to Research in the Environment

---

OEK	Office of Knowledge Exchange Research and Extension, FAO
PMC	Project Management Committee
R4L	Research4Life
RAILS	Regional Agricultural Information and Learning Systems
SRA	Strategy for Revitalising Agriculture
STM	Scientific, Technical & Medical Publishers
UNEP	United Nations Environment Programme
UNICC	United Nations International Computer Centre
UPCH	Universidad Peruana Cayetano Heredia,
USA	United States of America
WHO	World Health Organization

## Information Systems in Agricultural Science and Technology

### A. INTRODUCTION

The agriculture sector in many developing countries is facing great challenges if it is to attain the food security and development targets set in the World Food Summit Plan of Action. Science and technology underpin agricultural development, yet funding for national level research and development in many countries is inadequate. At the same time, mechanisms for the documentation and dissemination of the technology outputs of science are weak. As a result, the outputs of research are often inadequately recorded, and are not communicated to farmers, policymakers and others who need to adapt and apply them. The traditional national mechanisms in science and technology are being supplemented, and sometimes even replaced, by regional/sub regional networks that cut across organizational structures and political boundaries, and in fact national efforts in this area need to be fostered and strengthened. These different mechanisms have diverse approaches to capturing and disseminating research outputs. In fact, agricultural knowledge and information systems are in a state of change in the way that research is funded and that the outputs are disseminated, and the type of information that farmers require is also changing.

#### Relationship of programme to FAO Strategic Framework.

The FAO-DFID programme was undertaken in the framework of particular aspect of FAO's new Strategic Framework and Medium-Term Plan defined in 2009 and implemented in 2010. FAO has three interrelated global goals that the Organization is specifically dedicated to helping Members achieve, and eleven Strategic Objectives have been agreed by the member countries for achieving those goals. The FAO-DFID programme falls under Strategic Objective F (SO-F) on *"Sustainable management of land, water and genetic resources and improved responses to global environmental challenges affecting food and agriculture"*. Within SO-F, the Office of Knowledge Exchange Research and Extension (OEK) is responsible for Organizational Result F6 on *"Improved access to and sharing of knowledge for natural resource management"*.

A specific Unit Result 13 has been developed by OEK for the biennium 2010-11 with the title: *"Enhancement of member countries' access to scientific and technical information on innovation in agricultural development and sustainable natural resources management."* This Unit Result two major areas of activity including: a) Coordination of the AGORA (Access to Global Online Research on Agriculture) programme on access to scientific literature on agriculture and natural resources management as part of the Research4Life partnership. b) Coordination of the AGRIS initiative and database for country-based programmes to facilitate access to national scientific and technical information linked to facilitation of the global initiative on Coherence in Information for Agricultural Research for Development (CIARD). This Unit Result encompass to the work of the FAO-DFID programme.

Over five years, 2005-2010, this collaborative programme between FAO and DFID addressed constraints in three key component areas of the international information systems in support of agricultural science and technology as follows:

- Access to International Sources of Scientific Information - enhancing access in developing countries to the world's scientific and technical literature related to agriculture and food security;

- Disseminating the Outputs of Agricultural Research in Africa – validating effective institutional approaches for dissemination of the outputs of agricultural research in developing countries, with a particular focus on Africa;
- Coherence in Information for Agricultural Research for Development - development of a coherent approaches information dissemination and exchange between institutions and individual scientists and academics based on an international common set of information management standards and guidelines

These three development tracks were coordinated closely given the close inter-relationships. The outcomes for the five-year duration of the programme period are addressed in the respective sections. The report also contains the logical framework and the status of objectively verifiable indicators.



## **B. COMPONENT 1: ACCESS TO INTERNATIONAL SOURCES OF SCIENTIFIC INFORMATION**

### **B.1. Introduction to the Initiatives**

Researchers, policy makers, clinicians, students and teachers working in developing countries have historically suffered from a lack of access to essential up-to-date scientific literature, essential for furthering studies, discovering evidence, sharing findings, and informing teaching, practice and public policy.

Research4Life (R4L) comprises three programmes operating online portals that provide low-income countries with free or low-cost access to around 7,000 subscription-based and free scientific journals in agriculture, health and the environment. Each of the three portals enables users from institutions that are subscribed to R4L programmes to search publishers' index databases, view abstracts of publications, and download the full text of these publications. Through these programmes, researchers in participating institutions have access to the same information as their peers in developed countries. The three portals, described below, are sustained by public-private partnerships involving more than 150 commercial and academic publishers, scholarly societies and scientific associations (including most of the major scientific presses), three United Nations agencies, two universities in the United States of America (USA), and Microsoft Inc. as a technology provider. The partners are represented in the various R4L governance bodies and operational management teams.

The first R4L programme to be established, HINARI (Access to Health Research - [www.who.int/hinari](http://www.who.int/hinari)) was launched in 2002 and is led by the World Health Organization in collaboration with Yale University. The HINARI online library makes available over 6,200 scientific publications in one of the world's largest collections of biomedical literature. With over 4,100 registered institutions in 109 countries. Launched in 2003, the second programme AGORA (Access to Global Online Research in Agriculture - [www.aginternetwork.org](http://www.aginternetwork.org)) is led by Food and Agriculture Organization (FAO). AGORA provides over 2,200 subscribing institutions with access to almost 2,000 scientific journals in agriculture and related biological, environmental and social sciences. The third programme, Online Access to Research in the Environment (OARE - [www.oaresciences.org](http://www.oaresciences.org)) was established in 2006 and is led by the United Nations Environment Programme (UNEP<sup>1</sup>) in collaboration with Yale University. OARE enables individuals in approximately 1,900 registered institutions to use more than 1,800 scientific journal titles from the world's environmental science literature.

**Eligibility :** R4L participation is open to not-for-profit, national academic, research or government institutions, and is free of charge in 67 "Band 1" countries with per-capita Gross National Income (GNI) of less than US \$1,250, with institutions in a further 42 "Band 2" countries with a GNI between \$1250-\$3500 are required to pay an annual fee of \$1,000. Organizations in eligible countries request subscriptions from the three R4L programme offices; and each then receives an organizational username and password. Conditions of eligibility in terms of countries and types of institution are determined by the publisher partners who offer the information content accessible through R4L. Individual users include researchers, university faculty, students, librarians, and practitioners delivering services at community level.

**The structure of Research4Life:** AGORA, HINARI and OARE are public-private partnerships under Research4Life (R4L) bringing together more than 100 publishers, three UN

---

<sup>1</sup> United Nations Environment Programme

organizations, two major universities and other partners, with the single partner of improving access to and training on essential information for life where it is more needed and least affordable.

Their collective catalogues of more than 7000 journals titles, with an estimated annual value of US\$3 million includes approximately 75% of the world's most influential and widely cited scientific publications, representing the intellectual foundation of the health, agricultural and environmental science communities.

Through R4L, researchers in participating institutions have access to the same high quality information as their peers in developed countries. The three portals are sustained by public-private partnerships involving more than 150 commercial and academic publishers, scholarly societies and scientific associations (including most of the major scientific presses), three United Nations agencies, two universities in the USA, and Microsoft Inc. as a first technology provider. The International Association of Scientific, Technical & Medical Publishers (STM) coordinates the input from the publishing partners. All the partners are represented in the various R4L governance bodies and operational management teams.

#### **R4L Technology Partner**

Microsoft first became involved in the R4L initiative in 2006 to replace the technology used for user authentication, and the new Microsoft-built system was introduced in 2007. The company currently has four substantial areas of involvement with R4L in providing support to the development of: (a) a new user authentication system; (b) a customer relationship management (CRM) system; (c) a web portal for the R4L initiative; and (d) a cross-programme search facility. Microsoft also provides considerable support to the partnership's efforts to promote R4L. In fact, R4L is seen as a flagship project for Microsoft's "Citizenship" CSR programme as a principal area of collaboration with the UN system, given that education is a priority area that is core to the company's mission.

In 2006, all R4L partners committed to continuing the initiative at least until 2015, to tie with the timeline of the United Nations Millennium Development Goals (MDGs). In 2010, the partners have committed to support the initiative until at least 2020.

An estimate of the total annual value of the resources employed by the various R4L partners on the core activities of programme was found to be around \$2.7million per annum in 2006. The resources applied to Research4Life through the FAO-DFID Programme contributed to enhancing the user experience over and beyond the commitments of the partners.

## **B.2 Challenges faced by the R4L initiative**

### **B.2.1 Users perspectives of R4L programmes**

In 2006, Aptivate, a UK-based not-for-profit company, was contracted under the FAO-DFID Programme to conduct a review of the AGORA website. The evaluators identified potential problems based on accepted usability conventions and best practice. The following problems were identified:

- The performance and usability of the AGORA search interface.
- The unconventional workflow and navigational structure of the AGORA and HINARI systems.
- The disparity between expected and actual journal article availability.

- The reliability of the logon and authentication system
- The reliability of downloading documents in Portable Document Format (PDF) on poor network connections.

The activity dramatically illustrated the need for a more appropriate user interface and allowed Aptivate to offer informed, "on the ground" feedback to the development team at FAO and elsewhere who then designed and built the new systems.

### **B.2.2 Independent Review of R4L and the Strategic Plan – Path to 2015**

The three R4L programmes developed in separate tracks but in close cooperation since the earliest days of the HINARI programme in 2000. In 2006, reviews were commissioned to identify successes, impacts, and challenges for their future funded by DFID through a grant to Centre for Agricultural Bioscience International, International (CABI). At the R4L Programme Partners' meeting in mid-2006, the stakeholders committed to continue the R4L initiative at least until 2015, and agreed to a strategic planning process to identify the desired roadmap for the next 9 years. The strategic plan was informed by a desire to build on the successes so far, to continue to expand the programmes' positive impacts, to establish a secure base to carry the partnership through to 2015, and to identify an organizational structure to enable R4L to operate more efficiently while retaining the informality and altruistic enthusiasm that has carried the programmes so far so quickly.

A User Experience Review coordinated by CABI examined how the programmes were being used, and identified problems that might be limiting the value of the R4L programmes to users. The 2006 Reviews identified the key challenges and barriers to use, including (a) authentication problems, (b) bandwidth and connectivity limitations, (c) low awareness, and (d) need for training. Increased demand for access to the internet, both in number of people and frequency of use, is putting pressure on the already weak telecommunications infrastructure in the programmes' eligible countries. In addition, new generations of web tools have increasingly heavy bandwidth requirements. So, poorer countries' efforts to improve infrastructure are likely to keep pace with the increasing demand, and connectivity remains the biggest constraint to access to the programmes.

The main problems facing users that were addressed through the FAO-DFID programme were: (a) the need to enhance the quality/facility of training in the use of R4L programmes; and (b) the authentication system and other user support services that facilitate continuing users' access to the programmes.

## **B.3 FAO-DFID Interventions to enhance Research4Life**

The goal for this component of the FAO-DFID programme was to improve the efficiency of document discovery and retrieval for R4L users (AGORA, HINARI and OARE programmes) with poor Internet connectivity. The activities under this component focused on two areas (a) enhancing the training services and outreach to users and (b) improving the user experience in relation to all the constraints identified by the Reviews. The output-level indicators were the overall number of organizations registered for the three programmes, the frequency of use by registered institutions, and enhanced perceptions of users in the quality of services provided by R4L programmes.

### **B.3.1 Support to Training**

An extranet site was developed in collaboration between FAO, WHO, Cornell and Yale Universities to provide access to a range of information on training materials, resources for

promotion of the programmes as well as registered subscribers, and usage statistics of the R4L programmes. Most areas of the site were made accessible to users. The work was undertaken by staff consultants working at FAO-Rome, and the new website and Extranet were launched in March 2008. The main Components of the Extranet are as follows

- Resources for Partners and Users:
  - Promotion/Outreach materials: Publicity Materials and Presentations (Leaflets, PowerPoint files etc); Stories (provided by users)
  - Training Materials - in multiple languages
- Partners resources: Meeting Documents/Reports; Usage Statistics; Technical Documentation (e.g. country IP addresses)

The FAO-DFID programme contributed to expanding outreach by supporting the production of three editions of a R4L Training Resource CD covering the three programmes (AGORA, HINARI, and OARE). The CD contained resources to support face-to-face training (presentations, guides etc) in three languages, and e-learning materials for independent self-paced learning. This training resource CD was distributed to registered institutions, supplied to institutional partners delivering training-of-trainers activities in countries (see 1) delivered by the R4L partners. The development of the three editions of the R4L Training Resource CD was lead by the Information and Training Outreach Centre for Africa (ITOCA), which is the official R4L training partner with offices in South Africa (see box below). Some of the e-learning materials were developed at FAO.

In addition to the development of the Training Resource CD, DFID also funded two training-of-training courses in Cameroon and Madagascar managed by ITOCA, for a total of 49 participants from eligible institutions.

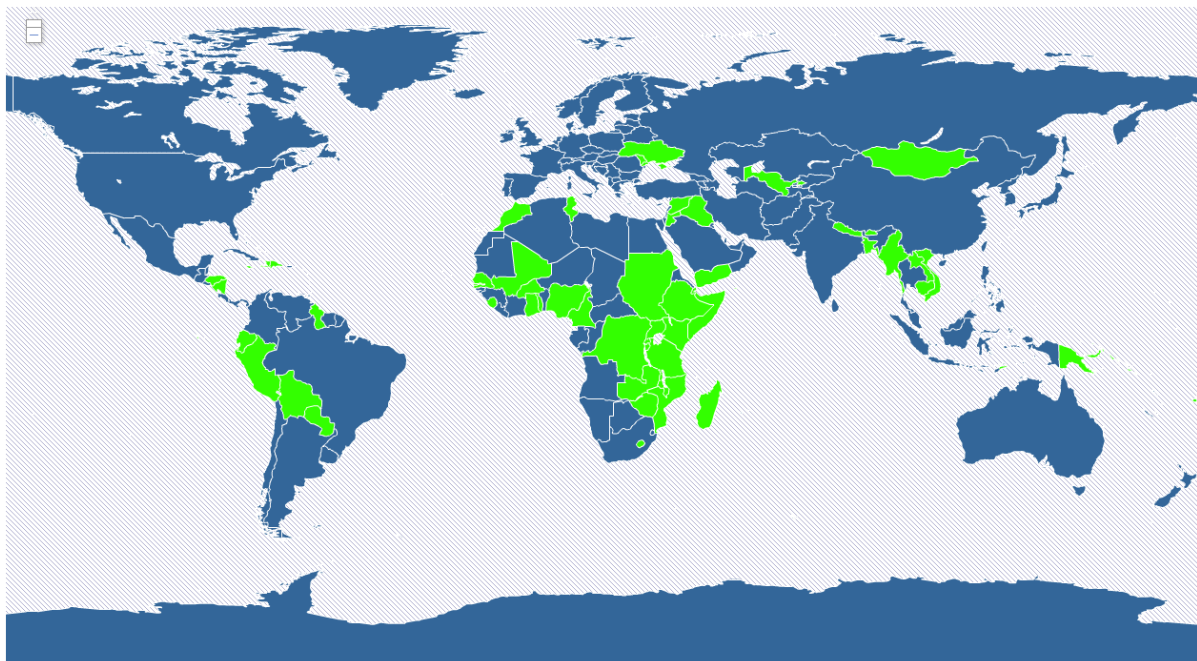


Figure 1: Countries where training was conducted from 2006-2010

### **Key Partnership to support Outreach**

The Information Training and Outreach Center for Africa (ITOCA) which is mandated to carry out training and outreach work for R4L Programmes by the UN agencies (FAO, WHO, and UNEP) respectively has reached out to over 300 institutions in Africa through outreach and training. Capacity building is -a critical component of the R4L initiatives in ensuring that the programs are fully utilized and ITOCA looks after this component in the Sub-Saharan Africa region with backstopping from the UN agencies and Cornell University. ITOCA has delivered training of trainers workshop in Sub-Sahara Africa under training programmes funded by DFID, the Rockefeller Foundation and CTA.

#### **B.3.2 Facilitating access to the programmes**

Overcoming Bandwidth Limitations: AGORA offline search: FAO recognized the potential of being able to offer users in AGORA-eligible countries a facility to search an index of articles offline using a locally available resource distributed on CD. Of the three R4L programmes, this could only be made available for AGORA on the basis that CAB International was prepared to agree to allow its CAB Abstracts data that constituted the index file for AGORA could be distributed on a CD, outside the protection normally offered by the authentication system. The owners of the index files for HINARI and OARE were not amenable to such a development. However, considerable work was required to develop a search interface for the CAB Abstracts data. FAO had to customize its own non-proprietary search interface used for to the AGORA website in order to be able to distribute it on the offline edition of the database on CD. Work was also required to ensure interoperability of the FAO search engine with the new authentication software donated by Microsoft, which encountered a series of minor technical problems and was launched on the AGORA production website in December 2007. For the offline version, a decision was taken at an early stage in the work not to proceed with a DVD format, given that feedback had confirmed that few registered institutions had the appropriate hardware. The number of records in the database meant that it was initially too large to fit onto one CD, and some complex re-engineering of the file was required to enable it to be accommodated. The interface also had to be re-designed to reflect the new website interface to ensure that the users' experience with the offline version would be as close as possible to the online version. All the above work was undertaken by consultants working at FAO.

In the 2007, the first of three agreements was signed with CABI for the provision of monthly updates of new data, and for a first annual revision of the database profile was conducted to reflect addition of new titles and removal of existing ones according to decisions taken by the publisher partners. Two editions of the AGORA-CABI CD developed and disseminated to Band I countries aimed to assist low-bandwidth users with offline search. FAO continued to receive monthly updates of CAB Abstracts data from CABI, and publish these updates in the AGORA portal on the same day they were received from CABI.

#### **Comments received from institutions receiving the AGORA-CABI CD**

Thank you so much for sending us the AGORA-CABI CD. I got it today and have already tried it. I really appreciate it as it allows to check things without having to be at a point with internet access. Again, thank you!

*Ronald Jaudas (ing. hort.), Director, Riverside Farm Institute, Kafue, Zambia*

Thank you very much for sending us a copy of the abovementioned CD for the use of our library. We think that the information available on the CD will be highly useful for our teachers and the students of the university.

*M.A. Matin, Librarian, Asian University of Bangladesh, Dhaka*

I acknowledge with thanks a receipt of AGORA-CABI CD. It is a handy Database which can be deployed even if there is no Internet connection. Once again thank you for focusing on our basic need in this regard.

*S.J. Ngadaya, The Librarian, Hubert Kairuki Memorial University, Tanzania*

Renewal of the R4L authentication system: The above review showed that the authentication system for the R4L programmes was causing significant frustration and dissatisfaction for users due to (a) inability to log-on because the system was down, and/or (b) incorrect requests for payment from publishers websites arising from false/incomplete authentications; (c) extremely slow user sessions caused by the particular software technology employed. R4L users were generally only able to access the Internet using slow connections in any case, so these effects were even less tolerable. In addition, the proprietary technology (Safeweb) for the authentication system was aging and liable to frequent service interruptions, and replacement was impossible as the manufacturer had ceased trading. In 2006, Aptivate was contracted under the FAO-DFID Programme to investigate possible options for a new authentication system that would replace the existing technology and improve the user experience. Three options were investigated and Aptivate concluded that Microsoft IAG<sup>2</sup> was the choice. The IAG authentication system was deployed in Geneva in 2007/8 more or less as the existing Safeweb technology ceased to function, and it has continued to work well to date.

Streamlined websites and systems for the three R4L programmes: Following the analysis conducted by Aptivate, a major overhaul of the AGORA website was undertaken in 2007-08, in terms of bringing the graphical design in line with the HINARI and OARE web sites and to save time in administering the AGORA website. This meant development of a new "look-and-feel", and transfer of existing content into a "Content Management System" (CMS). This occurred at exactly the same time as the development of the new authentication system, and careful work was required to ensure interoperability with that and with the FAO search engine for the CAB Abstracts database. In 2007, it was also decided to develop a shared portal architecture for the three programmes to enhance the user experience and streamline administration systems/workflows. Two principal tools were developed, namely a single journals database covering the three Programmes with a table for country exclusions, and a single user registration and help desk system.

Journals Management System: This system was designed to provide a common facility for all three R4L programmes. It comprises a database of journal titles available through each programme, and the country exclusions determined by the publisher partners. This database supplies the lists of publishers and journals to the three R4L programme websites. A major consideration was the selection of the technology components most suitable for the system, to ensure interoperability with the existing AGORA, HINARI and OARE operational software and technology infrastructure. This work was undertaken by Aptivate, and was completed in March 2008. The purpose-built software application was installed in WHO-Geneva, and can be accessed remotely by staff at FAO-Rome and UNEP-Nairobi.

User Registration System and Help Desk Facilities: Work on this area began in 2008, and focused on streamlining of administration systems for the three R4L programmes to enhance support and outreach to users. These aspects had been identified as key constraints by R4L users in eligible countries during the 2006 Review. The phases of this

---

<sup>2</sup> Microsoft Intelligent Application Gateway

work are documented below to show the evolution of the system and the close collaboration between the partners:

- Phase 1 - 2008: A Functional Specification for these system(s), including an analysis of Process and Work Flows, was completed by Aptivate in close consultation with the Help Desk teams of all three R4L programmes.
- Phase 2 - 2008: A Technical Specification was completed by Aptivate, describing how the Functional Specification as above could be implemented and delivered as an Open Source software application to be installed at WHO in Geneva. However, analysis of the technical options proposed revealed that the total cost at more than \$350,000 was significantly beyond the available budget.
- Phase 3- 2009: The Functional Specification was submitted to Microsoft, and an analysis of options was completed in two stages:
  - a "gap analysis" study coordinated by the UN International Computer Centre (UNICC) assessed whether the required software application could be developed using Microsoft "Sharepoint" software, with the assistance and co-financing of Microsoft Inc. The study found that considerable work would be required to customize Sharepoint to the specification required, and that the total cost in excess of \$500,000 would be beyond the available budget.
  - an assessment of a Microsoft software product for Customer Relationship Management (CRM), called "Dynamics", showed that an application could be delivered relatively easily. It was decided to proceed with that product.
- Phase 4 - 2010: The necessary licenses for MS Dynamics were purchased, and Microsoft Consulting Services were contracted in March 2010 to assist with the relatively small amount of customization required. The company agreed to co-finance the inputs from their team in the context of their strategic partnership with R4L, and to host and provide technical support for the application at their main European Data Centre at negligible cost. The system will be completed by the end of 2010.

#### **B.4 The difference the FAO-DFID Programme made for R4L**

R4L usage grew steadily throughout the duration of the FAO-DFID Programme, both from the point of view of the numbers of institutions registered and the number logins to the systems by users. A combined total 1,952 registrations across all three programmes were recorded in 2005, which increased over the 5 years of the FAO-DFID programme to 8,100 in 2010, representing a growth of 415% (Figure 2).

A total 152,896 user logins have been recorded for 2010 (January – October), which had increased by 384% from 39,775 registrations in 2005 (Figure 3).

Evidence that researchers in developing countries are now better able to participate in the advancement of the global scientific community through the services offered by the programmes was found by a Literature Review was commissioned in 2010 by the R4L Review Board, and conducted by the Evidence Division of Thomson Reuters.

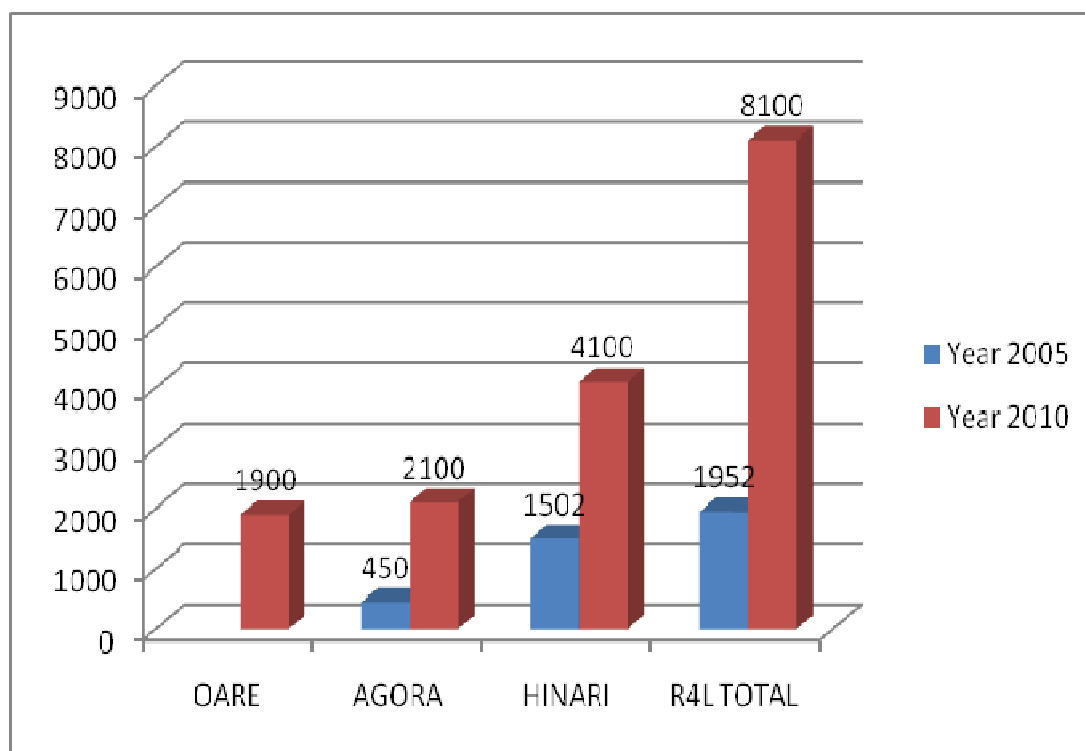


Figure 2: Comparative numbers of registered institutions in each R4L programmes.

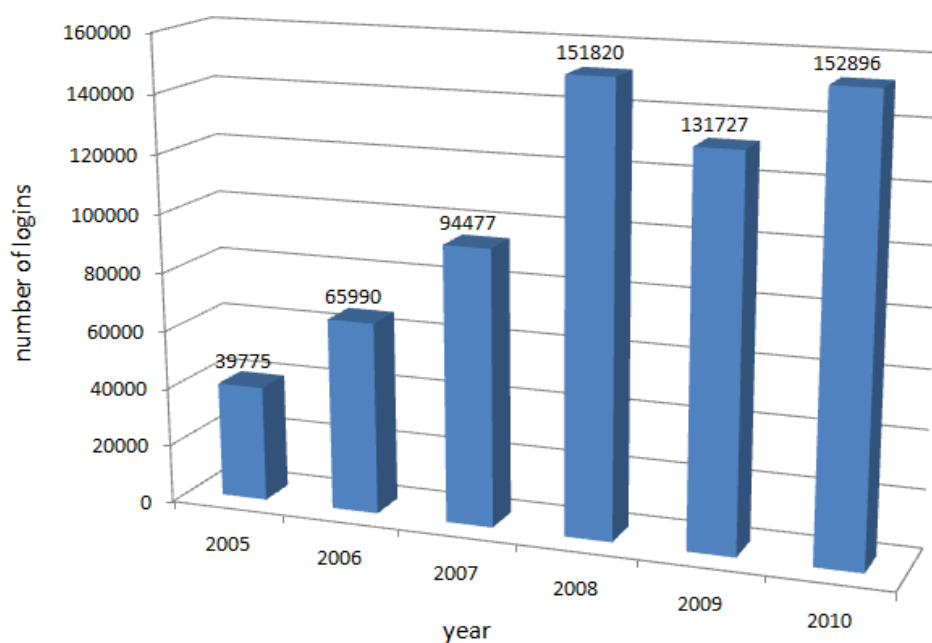


Figure 3: Number of user logins in AGORA from 2005 - 2010 (Jan-Oct)



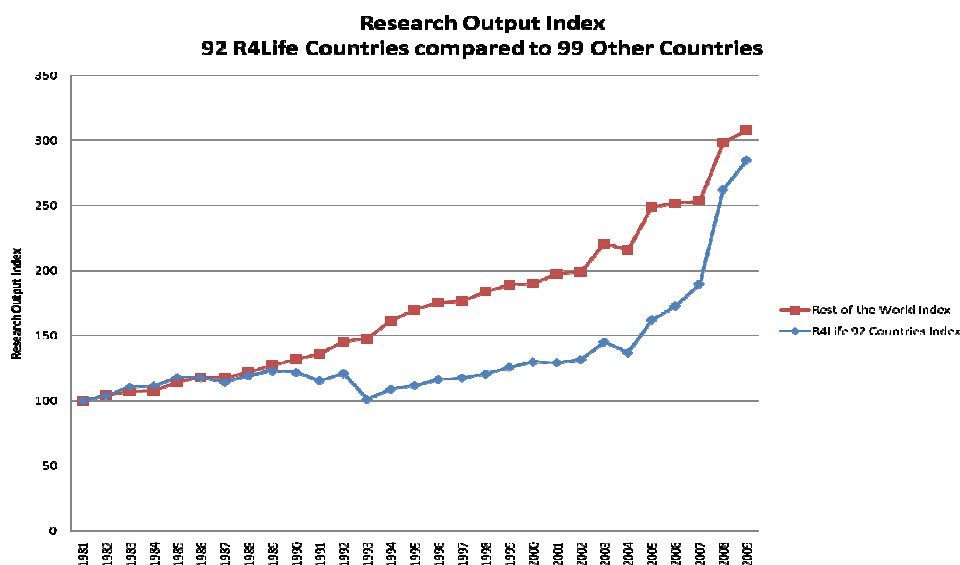


Figure 4: Research output index from 1981-2009

Their analysis showed that the number of articles being published in international journals by scientists in 92 R4L-eligible countries increased significantly in the period 2004-2009. This increase narrowed the deficit in publication rates as compared with 99 non-R4L countries, using 1981 as a baseline (Figure 4). The Literature Review also showed that the average annual rate of change in citations of articles from R4L journals by researchers in eligible countries has increased in the period following the launch of the programmes. Data are shown below are for HINARI, showing how the rates of citation of HINARI journals increased for all R4L regions except the Americas (Figure 5).

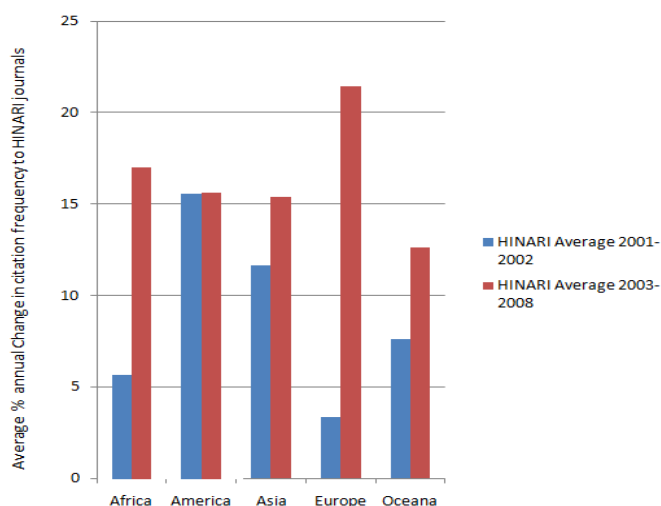


Figure 5: Increases in rates of citation of HINARI journals from eligible countries

**Enhanced User Perceptions:** A second User Experience Review was commissioned in 2010 by the R4L Review Board from an appropriate independent researcher, Ed Gaible of Natoma Inc. The overall assessment of the R4L initiative emerging from the Review was that:

- R4L is an effective and highly valued provider of access to research publications in subscribing institutions, and R4L can reliably be characterized as the primary means of access to research publications in developing countries today.
- Lack of awareness within subscribing institutions and generally — compounded by limited means of interaction among users, institutional points-of-contact and R4L personnel — impedes realization of R4L's full potential impact.
- Problematic access to the full text of research articles is the single most critical challenge cited by users of all three R4L programmes.
- Band 2, in which institutions in higher-GNI (Gross National Income) countries are required to pay subscription fees, places a burden on some participating institutions and on R4L programmes. Some institutions in these countries receive unequivocally improved access to research information; others cannot afford even the minimal fee required.

Institutions subscribing to R4L have a high demand for access to research information, with uses of that information clustering around research and around practical activities. In a General Survey not targeted specifically to R4L users, 78% of scientists etc stated that access to research information is "extremely important" to their work, and almost all (91.4%) of these respondents publish nationally or internationally. The Review furthermore found that the value of R4L was reliably demonstrated by the evidence that respondents who have used R4L once generally become regular users. In addition, R4L programmes were found to be the most frequently used sources of online research publications among respondents. A total of 32% of respondents cite HINARI as their most frequently used resource in comparison with other online life-science and biomedical publications services; 27% percent and 14% of respondents cite AGORA and OARE, respectively, as their most frequently used resource in comparison with other agricultural and environmental publications services.

#### Examples of R4L users interviewed during the User Experience Review

##### Vietnam

- Agricultural researcher in Hanoi, providing training to livestock farmers in Haiphong -- training relies on AGORA-derived information with regard to disease prevention and treatment, and to breeding
- Ophthalmological pathologist at Hanoi Ophthalmological Clinic uses HINARI to assist with interpretation of biopsied ocular tumors
- Genetic researcher at Hue Medical Center uses HINARI to inform DNA analysis in relation to diagnosing likelihood of birth defects for newly married parents

##### Peru

- Agricultural researcher in Lima uses AGORA to seek information to support the advisory services he offers to two 'green' social enterprises for reintroducing a traditional crop with new market possibilities and harvesting reusable/recyclable items from rubbish
- Faculty and students at the Universidad Peruana Cayetano Heredia (UPCH) in Lima use HINARI to support an intensive research programme and the operations of a clinic.

Remaining Challenges for R4L programmes: The User Experience Review also documented the two most important principal challenges to the R4L initiative identified by R4L users, which are poor Internet connectivity and the difficulties with access to the full text of relevant resources once they are found. In addition, lack of awareness on the part of potential users and lack of means of communication with actual and potential users remain two key barriers to increased impact of the programmes. The Review made recommendations for action to address these barriers.

Financial contributions and sustainability: An Infrastructure Review conducted in 2010 confirmed that the principal partners make in-kind contributions of approximately \$2.64 million in 2009 to assure the delivery of the three R4L programmes, which had increased from \$2.22 million in 2006. In addition, the three UN agencies programmes have collected \$250,000-300,000 in revenues from subscriptions from institutions in Band 2 countries that is used towards "expanding the programmes' reach and overcoming barriers to use. On that basis, over the five years of the FAO-DFID programme, the R4L partners have contributed around \$15 million, against the DFID contribution of around \$1.1 million over the same period. This means that the DFID contribution represented significantly less than 10% of the resources used to run the three R4L programmes, which underlines the value for money that DFID gained through the leveraging of its investment and the sustainability of the whole initiative assured by the other partners' contributions. Two specific examples of the leverage of DFID contribution to R4L resource contributions for specific activities are provided below, noting that the partners made significant contributions even in cases where DFID funds covered the majority of the costs:

(i) Authentication system:

- DFID: \$ 80,000 (technical advice and systems development from Aptivate)
- R4L Partners: \$800,000 (all salaries etc of programme teams, hardware, software, and systems development)

(ii) User Registration System and Help Desk Facilities:

- DFID: \$ 130,000
- R4L Partners: \$75,000

## C. COMPONENT 2: DISSEMINATING THE OUTPUTS OF AGRICULTURAL RESEARCH IN AFRICA

### C.1 The Problem: Limited access to research information

Effective access to public domain scientific knowledge is critical to a broad range of stakeholders and communities across Africa to develop and apply solutions for rural development and to improved rural livelihoods. The graph below reveals that there is very limited access to digital information in Africa in terms of the amount of web-based content available and accessible as compared with other regions.

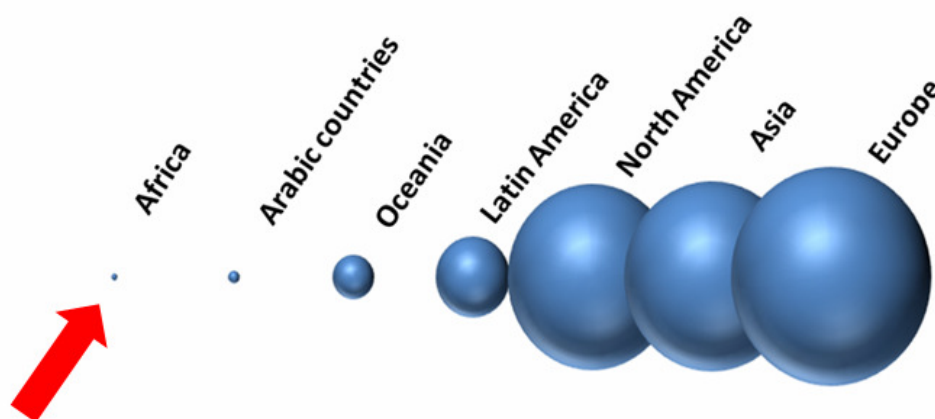


Figure 6: Accessibility through Google of digital content from universities  
(data from [www.webometrics.info](http://www.webometrics.info) - January, 2009)

This component of the FAO-DFID programme developed pilot implementations in two African countries to facilitate open access to public domain scientific and technical information on agriculture through interlinked full-text repositories at the institutional level as part of a national agricultural science and technology system, in order to foster improved archiving, dissemination and sharing between researchers and other stakeholder groups.

The pilots were developed over three years with the aim for the experience gained by the institutions to serve as the basis firstly to test approaches and secondly expand such pilots to national level. The work on the national network in Kenya started in 2005/06 and was completed in early 2009. The work in Ghana started in 2007/08, and was completed in 2010. The pilot implementations drew on the resources, tools, and technologies available from FAO and through the AGRIS network and other sources as appropriate.

Each of the pilot initiatives established and strengthened a national coordinating centre and up to six selected partner institutions to develop open access, public domain scientific and technical information services on agriculture through interlinked full-text repositories at institutional level. This involved the development of strategies and policies for all participating institutions, while also building institutional capacity and strengthening human resources to manage the systems and resources.

## **C.2 Access to the outputs of public research in agriculture: Kenya**

### **C.2.1 The Actors**

This sub-component has focused on the pilot implementation of an electronic repository as part of a Kenyan national agricultural science and technology information system, in relation to the Strategy for Revitalizing Agriculture. The lead institutional partner was the Kenya Agricultural Research Institute (KARI); technical backstopping was provided by local consultants, FAO, CAB Africa, and ASARECA. The Project was supported by a US\$ 250,000 grant provided from the FAO-DFID Programme. A case study that was presented to DFID in March 2010 is provided below, summarizing the work in Kenya and describing the progress in achieving the planned outputs.

Five principal institutional actors in Kenya have created a shared open repository of the outputs of agricultural research through a collaborative partnership named the Kenya Agricultural Information Network (KAINet). The creation of the shared resource has been enabled by the participatory development of supportive institutional policies in each national centre, and by extensive training and roll-out of technologies that ensure coherence nationally and with international information-sharing systems. KAINet was to promote the philosophy of the open access to information approach espoused by the CIARD initiative (see Component 3).

Initiated in April 2006, the Kenya Agricultural Information Network (KAINet) was developed in response to demand from the national and international community to promote information exchange and access among stakeholders in the agricultural sector to support decision-making, to promote innovation in agriculture, and to improve livelihoods. KAINet addresses the national policy to build a Kenyan national agricultural science and technology information system, enshrined in the national Strategy for Revitalising Agriculture (SRA). The SRA prioritised knowledge-sharing links between the national research system and extension and other rural service providers in Kenya, as well as international information systems. At the international level, KAINet is a response from Kenya to the call to join the global movement on Coherence in Information for Agricultural Research and Development (CIARD) aimed at making public domain agricultural research information and knowledge truly accessible to all.

The main stakeholders in the first phase of KAINet were five leading national institutions: the Kenya Agricultural Research Institute (KARI), the Kenya National Agricultural Research Laboratories (KARI-NARL), the Kenya Forestry Research Institute (KEFRI), the Ministry of Agriculture (MoA) and Jomo Kenya University of Agriculture and Forestry (JKUAT), although other key players in agricultural research and extension sector in Kenya were consulted at various stages. At the international level, FAO, CABI Africa and the Association for Strengthening Agricultural Research in East and Central Africa (ASARECA) provided inputs at the policy and technical level, as well as providing training.

### **C.2.2 The Activities**

KAINet development occurred in four phases:

1. creating awareness, ensuring commitment, and assessing needs for capacity development.
2. strategy development.
3. strengthening institutional capacities through training in ICM and provision of equipment.

4. completion of work from Phases 1 to 3, building of institutional repositories and development of the national repository of Agricultural Science and Technology, plus development of a marketing strategy and initiation of promotion to a wider stakeholder group.

KAINet was officially launched in May 2009 at a ceremony presided over by the Minister of Agriculture, Hon. William Ruto.

Planning and Advocacy: Initial activities focused on consultations between national and international stakeholders in agricultural research, education, and extension to establish the basis for the network community and its activities for the first phase of three years. Participatory consensus-building workshops were held to raise awareness of the initiative and gain commitment at all levels throughout the five institutions including management, researchers, and information and communication specialists. Capacity assessments were also completed.

*This KAINet partnership is creating the synergy that will foster the free flow of information from its generation, harvesting, proper storage, and sharing, to make sure the information is used to better the quality of our agriculture and the livelihoods that are derived from agriculture. This network will be a tool to enhance the quality of our policy decisions and our policy initiatives.* Hon. William Ruto, Minister of Agriculture, speaking at the official launch of KAINet

Capacity Development: Capacity development activities addressed three dimensions, namely the enabling policy level, organizations, and individuals. Firstly, an overall KAINet strategy and implementation plan was finalized with inputs from a broader stakeholder community and was formally presented during the official launch of KAINet in May 2009. In the organizational dimension, the lack of functional institutional strategies and policies in research information sharing and communication led to their development through write-shops with institutional teams followed by peer review sessions with partners from other institutions. Individual training to imbue awareness, understanding and technical skills in institutional planning, information management and communication was provided to 55 staff from the KAINet member institutions. Training was delivered in a variety of formats in areas ranging from policy, planning and management, marketing of information products and services, through to technical aspects of information systems management.

The training was also valuable for professional development and staff recognition from management of their institutions, who had included KAINet project activities in staff performance contracts. Other benefits included a network of professional colleagues with whom they were able to share experiences and challenges related to their work, a positive change in the perceived negative attitude of the users of the information services towards library information services, and improved visibility of scientists who were gradually coming to appreciate the benefits of sharing their outputs.

KARI's IT Systems Administrator was trained by FAO in trouble-shooting software tools and methodologies, and provided technical advice across the network to address technological problems experienced at the different institutions. In consultation with project partners, he led the development of guidelines for validating information for input into the repositories, establishing the central KAINet repository and the KAINet website, and served as a link between the developers of the technologies in FAO. Crucial IT equipment was also provided to some of the participating institutions, to upgrade facilities to a more or less common standard.

Development of repositories: Existing databases and repositories were reviewed and upgraded into the institutional repositories, and where necessary content was harvested from global databases where it was no longer available locally. In all the five participating institutions, targets for content development were surpassed, with enhancements made to workflows, information management tools and methodologies, which enable systematic capture of full text documents and metadata including historical digitized documents and digitally-born ones.

Promotion of KAINet: Promotion of the network started immediately after its inception to create awareness through various internal events in the member institutions, articles written in institutional publications and presentations at conferences and workshops. A more formal marketing strategy was developed for KAINet, focusing in particular on its flagship product the KAINet e-repository.



Figure 7: Hon. William Ruto, Minister of Agriculture of Kenya at the KAINet launch

### C.2.3 Progress and Achievements

- Establishment of KAINet: The Kenya Agricultural Information Network (KAINet) has been formally established with the endorsement of the Minister of Agriculture, together with its strategy and implementation plan. KAINet is registered at national and sub-regional levels as a non-profit making Trust to provide a forum for participation by all stakeholders, with a national stakeholders' forum, a board of trustees and a network management committee.
- Enabling Policies and Stenghtened Capacities: KAINet is integrated into the national and institutional policies and strategies and its outputs and resources such as the institutional and national repositories of agricultural information will complement on-going, national and global initiatives aimed at promoting sharing of information. and support development of human capacity in ICM through training programmes
- Repositories of research outputs: The national repository of Agricultural Science and Technology Information is accessible through the KAINet website: [www.kainet.or.ke](http://www.kainet.or.ke). In addition, the five KAINet member institutions have their own institutional repositories accessible on institutional LANs and some of them are published on the Internet (e.g. KARI). The repositories include over 35,000 metadata records generated by the institutions that conform to international coherence standards to facilitate access and sharing, and about 1,500 full-text documents. In addition, three of the five centres are

successfully exporting content to FAO's global public domain AGRIS database, thereby further increasing the international accessibility of Kenyan research outputs.

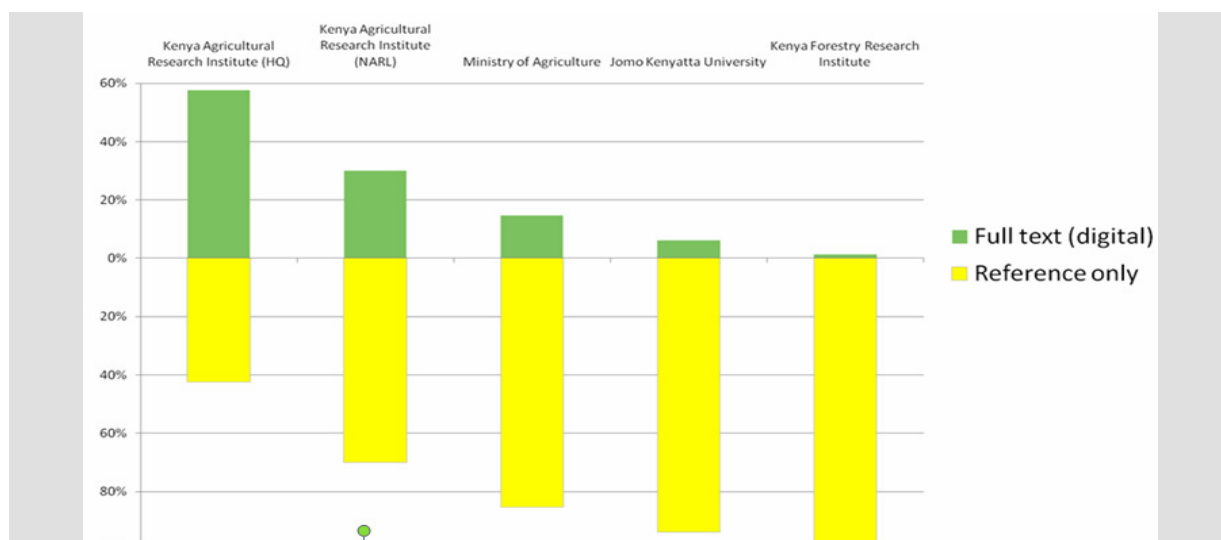


Figure 8: Full text documents and Metadata (Reference only) content of institutional repositories in KAINet centres in May, 2010.

Financial sustainability of KAINet is a priority. To ensure this, KAINet activities have been included in institutional budgets of pilot centres and in performance contracts of ICM staff.

**What's next:** Following the success of the first phase of KAINet development, the principal institutional actors that founded the network will need to address the following areas:

- develop incentives for researchers and academics to place more of their research outputs in the institutional repositories;
- build an evidence base of the benefits of the institutional repositories in increasing the accessibility of research outputs by analysing their use over time;
- enhance communication activities and advocacy materials aimed at increasing awareness of the KAINet resources and attracting contributions;
- consolidate membership by attracting wider participation from agricultural-sector stakeholders in research, education, and extension sector in Kenya.

### C.3 Access to the outputs of public research in agriculture: Ghana

#### C.3.1 The Actors

This sub-component focused on the pilot implementation of an electronic repository as part of the Ghana Agricultural Information Network System (GAINS) and technical backstopping was provided by local consultants, FAO, and CORAF<sup>3</sup>. The Project was supported by a US\$ 250,000 grant provided from the FAO-DFID Programme, and operated from October 2007 to March 2010.

The Ghana AGRIS Pilot Project (GAPP) was established in 2007 to support the efforts and activities of the Ghana Agricultural Information Network System (GAINS) which has been in existence since 1992. GAPP was to promote the philosophy of the open access to information approach espoused by the CIARD initiative. The main goal of GAPP was to

<sup>3</sup> Conference des Responsables de Recherche Agronomique Africains



develop open access to public domain scientific and technical information on agriculture (see Section D).

Agricultural research and development are influenced by unimpeded flow of information among the sector's stakeholders including lecturers, researchers, students, policy makers and farmers, to name a few. In the past, however, provision of agricultural information support services in Ghana remained largely uncoordinated and several useful documents were scattered in various agricultural institutions and among researchers and generally had limited distribution. Besides, useful international and local journal articles were also generally not accessible to Ghanaian lecturers and researchers. This situation was partly remedied in 1991 when the Ghana Agricultural Information Network System (GAINS), a network of 18 Ghanaian agricultural and academic libraries, was established to revive the library and information system in the agriculture sector to support agricultural research and development. GAINS, therefore, plays a frontal coordinating role in the harnessing and sharing of agricultural information (both locally and internationally generated) in Ghana. Though GAINS has performed well over the years and has considerably increased and facilitated the flow of information among stakeholders, it faces some operational challenges not the least of which are inadequate capacity to harness and share generated agricultural information especially in digital forms to be readily accessed by potential end users. It is against this background that the GAPP was established in 2007.

The GAPP was a partnership involving seven national pilot institutions (PIs) *viz.* the Cocoa Research Institution of Ghana (CRIG), the College of Agriculture Education, Mampong-Ashanti (CAGRIC), the Animal Research Institute (ARI), the Food Research Institute (FRI), the Forestry Research Institute of Ghana (FORIG), the Institute of Scientific & Technical Information (INSTI) and the Ministry of Food and Agriculture (MoFA). The Project was managed by a Project Management Committee (PMC) consisting of the Director of INSTI and a member each from the seven PIs. INSTI coordinated the Project and also housed its secretariat. These institutions were the Pilot Institutions of the GAPP and each was represented by one member on the Project Management Committee (PMC) which directs the project. It was therefore the responsibility of each Pilot Institution to nurture and actively prosecute GAPP's agenda at the institutional level and also see to the project's overall success at the national level. Periodic consultations (official and unofficial), PMC and IMC meetings ensured a sustained sense of joint ownership of the project

Three main categories of stakeholders stood to benefit from the GAPP. The first category consists of the staff at the Pilot Institutions. The institutional benefit is largely from the higher national and international visibility to be gained for becoming a participant of the Project and the material and human resource development support it would attract from the Project. The second beneficiaries of the GAPP are the staff of the PIs who stand to benefit greatly from the easy and rapid access to scientific literature which otherwise would be beyond their reach. In addition, the staff would be able to put their research in the public domain for easy access. The attendant benefits of this are many, not the least of which is the potential for interaction and collaboration with counterpart researchers elsewhere. The third category of beneficiaries is made up of students whose research would be much facilitated by the easy access to pertinent literature. With proper and sustained national awareness creation on the GAPP, other categories of stakeholders such as non-governmental organizations, farmer-based organizations, agro-based companies, individual farmers etc. would become beneficiaries of the project

### C.3.2 The Activities

The project was managed in three phases, with work plans agreed by the PMC derived from

a master work plan from the GAPP proposal document to address the six specific objectives.

Phase One (October 2007 to March 2008): The GAPP was designed to have institutional ownership, and 15 institutions of the GAINS with potential to become partner institutions of the GAPP were visited by a team from the INSTI to discuss the GAPP document, instill a sense of ownership of the project among the institutional management and information professionals and select some of the institutions to participate in the project. Six of these institutions were finally selected to participate in the Project based on potential capacity to deliver, and MoFA was added because of its pivotal position as a key governmental stakeholder. Project Management and Institutional Management Committees were established to lead the Project at national and institutional levels respectively. Awareness creation, consensus and confidence building workshops activities were aimed key actors in the project. Subsequently, Members of the PMC were trained by the Pan African Institute for Leadership and Governance Studies, Accra, on project planning, execution, monitoring, and evaluation.

Phase 2 (April 2008 to March 2009): There were six areas of activity: i) Establishment of electronic repositories on public domain scientific and technological information on agricultural science and technology at partner institutions ii) Finalization of the information management policies and workflows iii) Knowledge sharing within the GAINS network iv) Enhancing capacity (human and material); improving collaboration among network institutions.

Phase 3 (April 2009 to March 2010): This phase was devoted to the establishment of the national portal, establishment of e-repositories centrally and at the separate institutions with full texts and metadata on agricultural sciences and technology information, knowledge sharing of and sensitization on agricultural and technology information at the national level.

### C.3.3 Progress and Achievements

- Awareness of GAINS/GAPP: Considerable awareness was created among the staff and Management of the Pilot Institutions, on some of who initially found the project a novelty and difficult to fathom. Issues such as: copyright, institutional repositories and open access to public domain agricultural scientific and technical information are now fairly well understood. With awareness created, many of the staff became participants of the project, which enhanced sustainability of the project. A report entitled: "*Promotional Strategies and Materials for GAPP Activities*" was published.
- Information Management Policies and Workflows: The pilot institutions developed their ICM policy and strategy documents. Further, all CSIR research institutes benefited from this activity in the sense that the CSIR decided that the ICM policy and strategy document which was being developed for ARI, FORIG, FRI and INSTI should be extended to all CSIR research institutes. A policy document for the GAINS was also launched. The workflows for various information documents generated within the Pilot Institutions were also revised. They incorporated the capture of documents for the institutional repositories.
- Knowledge Sharing Framework: A GAINS Knowledge Sharing Framework was developed and validated for sharing agricultural information in the GAINS network on information management strategies and policies. This framework will greatly facilitate the exchange of agricultural, scientific and technological information and knowledge among the GAINS member institutions and as a result strengthen GAINS
- Institutional ICT Capacity: Some basic ICT equipment including PCs, scanners, uninterruptible power suppliers, printers and external hard drives were supplied to Pilot institutions. A server was also purchased for the GAINS coordinating Centre. Key staff of the PIs had training on marketing of agricultural information services, management of electronic documents and AGRIS tools and methodologies, website development and

management, and on copyright and institutional repositories. Capacities of the PIs were therefore greatly enhanced for GAPP's work.

- **Institutional Repositories:** Institutional e-repositories were established at almost all the Pilot Institutions, albeit at varying degrees of scale. Metadata and associated full-text documents are being available to their staff on institutional intranets and later will be accessible on the Internet to the public. Contents of the various institutional repositories in March 2010 are presented in Figure 9.

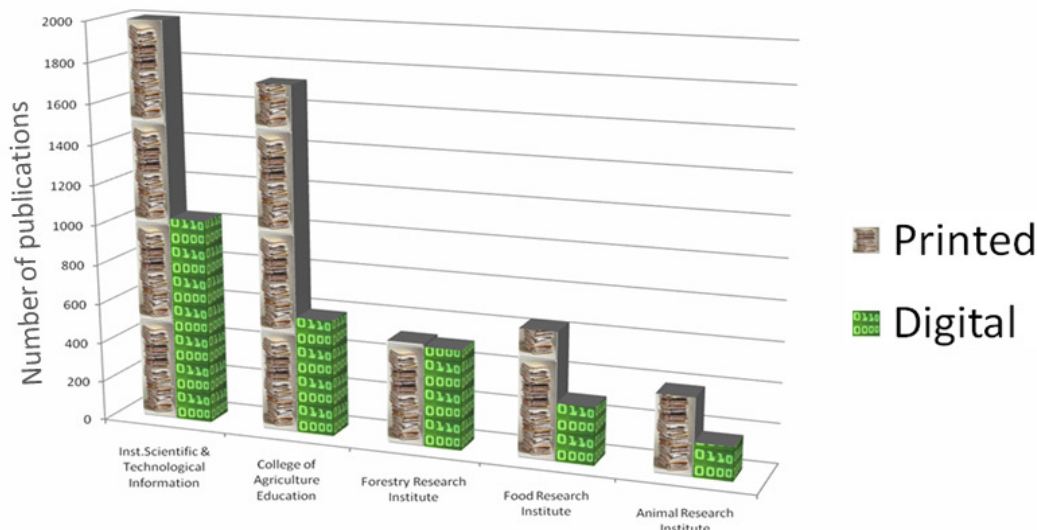


Figure 9: Status of document holdings in GAINS centres in March 2010

- **National Portal:** Although not launched by the end of the project, specifications for the national portal for agricultural sciences and technology information had been agreed upon by the GAINS stakeholders and work had begun on developing the portal. The portal will be key in facilitating access of the GAINS' central e-repository into which metadata from the Pilot Institutions can be placed.

**What's Next:** The GAPP was established in 2007 with the main objective of establishing electronic repositories at selected Pilot Institutions. The achievements are substantially in line with the objectives. Given the success of the GAPP, the principal institutional actors now need to address the following areas:

- **Facilities:** Pilot institutions should provide adequate equipment for ICM activities in the institutions to cope with the volume of work anticipated in the future. Institutions should also invest in the security and protection of the ICT facilities from computer viruses.
- **Incentives:** The institutions will need to develop policies and/or schemes to ensure that for researchers and academics place their research outputs in institutional repositories.
- **Involvement of more institutions:** GAINS should extend the activities initiated by the Pilot Project to all its member institutions involved in the generation, management and dissemination of agricultural technological and scientific information in Ghana. For example, a number of agricultural faculties and institutions exist in Ghana with staff and students generating much-needed information.
- **Financial Sustainability:** the Pilot Institution's Management will need to sustain the financial allocations for development of information management and the necessary infrastructure acquisition and maintenance to supplement technology provided by the project.

## C.4 Lessons learned and sharing to inform other interventions

### C.4.1 Lessons learned

Strong progress was made in the pilot national networks of institutional repositories of agricultural research outputs in Ghana and Kenya, with enabling institutional policies formulated through participatory approaches and significant quantities of full text content now accessible in digital format through organizational repositories ([www.gains.org.gh](http://www.gains.org.gh) and [www.kainet.or.ke](http://www.kainet.or.ke)). The experiences in Kenya and Ghana were carefully documented in the form of case studies summarized above, completed in collaboration with the relevant sub-regional organizations (ASARECA<sup>4</sup> and CORAF/WECARD<sup>5</sup>). Some key lessons learned and enabling factors were captured as below.

#### KEY ENABLING FACTORS AND LESSONS LEARNED FOR SIMILAR INITIATIVES:

- Basing the project on national **policies and strategies** in both the agricultural and information and communication sectors was critical for the project's success and is expected to contribute to its sustainability.
- Working in **partnerships**, both national and international, helped to deliver joint planning, rationalizing of resources, sharing of skills and experiences, and cross fertilization of ideas.
- **Piloting** the network with a limited number of national institutions allowed the partners to learn and devise workable solutions before expanding the network.
- The management/steering committees played important roles in involving the **management** of institutions, promoting the network and guiding project activities.
- Linking the project to **institutional priorities/plans** added credibility, ensuring that it would enhance existing work, rather than leaving it as a stand-alone initiative.
- **Phasing** of activities provided a systematic approach. In particular, the initial phase of planning and building partnerships was critical for the success of the project as it provided an understanding of the institutions' ICM needs and the basis for collaboration.
- **Networking** contacts provided the basis of project operations. Telephone and email groups were essential for constant communication among partners and facilitated sharing of experiences.
- The use of **participatory approaches** such as "write-shops" in developing ICM strategies, and stakeholder consultations in the institutions, was very effective in ensuring broad representation of stakeholders in strategy development and in imparting strategic planning skills.
- Development of adequate **ICM capacities** (including equipment) was essential for development of open repositories, and these capacities should preferably be built in the early phases of the project.

Although the two case studies were initiated before the conceptualization of the CIARD framework, first conceived in 2008, these lessons learned from Kenya and Ghana were fed into the consultation process for the CIARD initiative (section D) in 2009, in terms of the formulation of the Checklist of Good Practices and the detail of the Pathways.

Apart from the successful outcomes, these two interventions faced and continue to face a range of challenges, some of which were outside the scope of the FAO-DFID programme, and which remain to be dealt with. Those somewhat outside the scope of the FAO-DFID programme include shortage of skilled human resources, inadequate technology resources,

<sup>4</sup> Association for Strengthening Agricultural Research in Eastern and Central Africa

<sup>5</sup> West and Central African Council for Agricultural Research and Development

poor internet connections, and unreliable electrical power supplies, and these barriers have to be contended with for the foreseeable future. The most serious barrier to further development of the open archives in Kenya and Ghana is the reluctance of scientists to archive the outputs of their research in institutional repositories, and this barrier is known to be a worldwide issue that by no means is confined to developing countries. The FAO-DFID programme did begin to probe the underlying reasons for this reluctance in 2010, which are reported in Section D, and this remains a serious challenge that has to be addressed.

#### C.4.2 Financial contributions and sustainability

FAO provided significant resources from its own budget and it was able to secure co-funding from partners for some of the activities in Kenya and Ghana, which leveraged the resources provided by DFID and secured better value for money. Examples of this include the financing in the national pilots in Kenya and Ghana of all local salary costs by the national partners, and in Ghana financial contributions from CTA and IICD were leveraged to support activities under the GAINS development. In terms of sustainability, the two networks are now firmly embedded in the policy and budgetary frameworks of the sponsoring institutions in Kenya and Ghana, and as such their continuing existence is assured.

#### C.4.3 Sharing the lessons

In addition to serving as national pilots, the case studies provided the basis for sharing experiences with other countries in the region, in partnership with the major regional body in agricultural research, FARA<sup>6</sup> and other bodies including the Africa Chapter of the IAALD<sup>7</sup>. The major events in which staff from the KAINet and GAINS pilot networks presented the lessons learned to almost 700 agricultural professionals are summarized in the table below.

Event and Dates	Participants Information	Presentation from KAINet/GAINS
FARA-RAILS Implementation Workshop, Ghana, January 2007	31 participants from 13 African countries	KAINet
EuroAfrica-ICT Awareness Workshops in Kenya, July, 2007	81 participants from 5 African countries	KAINet
Session on <i>Investing in Agricultural Science and Technology Information in Africa</i> at IAALD World Congress, Japan, August 2008	20 participants from different countries including 15 African countries	KAINet and GAINS
FARA-FAO-GFAR CIARD Africa Regional Consultation, Ghana, July 2009	40 individuals from 24 African countries	KAINet and GAINS
IAALD Africa Chapter Conference on: <i>Towards Opening Access to Information &amp; Knowledge in the Agricultural Sciences and Technology in Africa</i> , Ghana, July 2009	103 individuals from 35 countries – agricultural information professionals, researchers, policy makers, and development organizations	KAINet and GAINS
Knowledge Sharing in the Agriculture and Rural Development Sector in Ghana, February 2010	70 participants from Ghana – research institutes, universities, NGOs, Ministry, and research organizations	GAINS
IAALD World Congress, Montpellier, France, 26 – 29 April 2010	250 participants from more than 50 countries	KAINet and GAINS
FARA General Assembly - Side event on: <i>Enhancing the accessibility of research outputs through more</i>	50 participants from 15 African countries – including information professionals, farmers, researchers,	GAINS

<sup>6</sup> Forum for Agricultural Research in Africa

<sup>7</sup> International Association of Agricultural Information Specialists

<i>coherent knowledge centres and networks"</i> , Burkina Faso, July 2010	extension agents, policy-decision makers	
Workshop to establish National RAILS in Kenya, Nairobi, 1 - 2 September 2010	32 participants – from Kenya from universities, research institutes, NGOs, ministries, media, and farmers' organizations	KAINet

## **D. COMPONENT 3: Coherence in Agricultural Information Management**

### **D.1 Introduction**

Researchers and research systems everywhere are witnessing major changes in the ways in which the results of research, and the ensuing applications and impacts, are being made accessible and communicated. The processes by which knowledge, information and data are generated and shared are being transformed and reinvented by the application of information and communication technologies (ICT). These changes are providing opportunities for agricultural researchers worldwide to interact and participate together in the development and usage of their research. Further, the whole information chain, from researcher to extension worker to farmer and back again, is being transformed by the use of ICT.

The last decade has seen rapid growth in the open availability on the internet of research information. The Open Access (OA) movement in developed countries has primarily focused upon making the formal outputs of research (research papers) freely and openly available on the Internet, either through open access publishers or by deposit into institutional or subject-based repositories. The technologies required to build and operate open access repositories have developed at low cost. Aided by this factor the great potential for developing country institutions and networks to participate in the digital knowledge economy has become apparent. Open repositories in particular bring into focus the opportunities to capture and share a range of types of research content, including theses, data, images, researcher profiles, and so on. In addition, the more recent rapid spread of Web 2.0 tools and related communication activities, has opened up low cost routes to the capture and dissemination of research outputs in more informal ways. In this new environment it has become increasingly clear that research outputs that are not captured, disseminated and communicated in an effective way are largely invisible. Invisibility means that the investment in that research has been lost.

Because of low investment, in both technical infrastructure and agricultural research, some developing countries have been slow to benefit from this new, digital, open environment. Further, the development of digital information systems needs to conform to international standards and methodologies. A lack of technical “coherence” undermines efforts to combine and share information and knowledge between countries and continents. The other dimension of coherence lies in the arena of effective actions taken by organizations that can align their efforts to develop information collections and services that are interconnected and more accessible, avoiding competition between systems and initiatives. Although each has its own priorities and constraints, all subscribe to common approaches.

### **D.2 Building a Global Platform for Coherence**

It was within the rapidly changing landscape of research communication that a group of major international organizations, all with a long-standing role in enhancing the sharing of information and knowledge arising from agricultural research, came together to combine their experience and to address the issues of coherence and capacity in developing country research systems. With some financial support from the FAO-DFID Programme, FAO, GFAR<sup>8</sup>, Cirad, and the CGIAR<sup>9</sup>, organized two expert consultations on “International Information Systems for Agricultural Science and Technology” (IISAST) in 2005 and 2007. These events

---

<sup>8</sup> Global Forum on Agricultural Research

<sup>9</sup> Consultative Group on International Agricultural Research

brought together representatives of the key regional institutions and other major actors, who produced a series of key recommendations to enhance various aspects of coherence.

However, the organizations were unable to develop the basis of a profile for the initiative that all parties could buy into. The principal partners met again in a small landmark meeting in January 2008 at the French Ministry of Foreign Affairs to devise a shared identity, and they settled on the name CIARD (Coherence in Information for Agricultural Research for Development) for the initiative, and the following vision: "To make public domain agricultural research information and knowledge truly accessible to all", with the aim of enabling organisations and individuals that create or possess public agricultural knowledge to disseminate it more effectively. The principal elements of the CIARD initiative were finalised with the wider group of organizations in 2008.

CIARD was sustained in great part through the commitment of the principal organizations that decided to found and support it. These comprised the major players in agricultural research at international and regional level, and two major governmental (donor) organizations, including the following:

- International: CGIAR, Cirad, CTA, FAO, GFAR, IAALD, IICA,
- Regional: AARINENA, APAARI, CACAARI, FARA, FORAGRO
- Sub-regional: ASARECA, Coraf, SADC
- Governmental: DFID (UK), MAE (France)

The formation of this partnership was a pre-requisite to the initiation and sustainability of CIARD.

Public knowledge and research has a limited impact on agricultural and rural development and natural resources management, because most of these outputs are not easily or widely accessible. CIARD aims to change this situation with the message that the new ICTs provide many opportunities for information to be handled and presented differently and economically. The CIARD Partners coordinate their efforts, promote common formats for information sharing and exchange, and adopt open information systems approaches. However, CIARD is not just about technology. It actually addresses the ways that technologies are used. This includes building and improving information systems, empowering the institutions and people using them with a framework and a set of tools that open access to their resources. So, while every institution or individual exists in their own environment, CIARD encourages them to interconnect and work together in ways that complement each other. In this way, CIARD addresses the fundamental issues involved in making local, national, regional and global information systems available and accessible.

In order to collaboratively develop common standards, share knowledge, and contribute to effective and coherent institutional and individual approaches in agricultural science and technology information, the CIARD partners have focused their activities in three priority areas:

- i) Make content accessible: with open content, open systems and common international standards;
- ii) Develop capacities: by empowering individuals with awareness and skills and encouraging institutions to be self-sufficient through ownership of their information;
- iii) Advocate better investments: with policies that enable easier access to information, coordinated approaches, and using evidence of benefits.



### **D.3 Collaborative approaches to defining policy and practice**

#### **D.3.1 Operational Mechanisms**

The CIARD initiative has been developed in several different ways.

Task Forces: CIARD has worked to achieve its' aims through three strategic strands in the form of Task Forces, on which the major partner organizations and other key actors are represented. The Content Management Task Force addresses the development and promotion of: methodologies and tools for Open Access repositories; common standards and protocols for agricultural information exchange; and common services to access partners' distributed information. The Capacity Building Task Force addressed issues related to capacity development of institutions and individuals that wish to align with the CIARD Manifesto, including training for individuals and development of training resources. The Advocacy Task Force developed a sustained effort to increase awareness of and support for the CIARD Manifesto amongst key stakeholders at policy and institutional level. These Task Forces used virtual collaboration facilities, and they meet as necessary at international events to progress policy and implementation initiatives, and to promote the CIARD concepts.

Consultations: A series of regional expert consultations<sup>10</sup> driven by the Advocacy Task Force were organized to gather inputs from more than 150 experts from almost 70 countries and a range of regional and international organizations, who are directly involved with the communication of research outputs. These consultations allowed real experiences to influence and guide the nature of the concepts being developed in the CIARD Manifesto, the Checklist of Good Practices (which illustrates to institutional and individual users the key areas of activity which, if followed, will enable them to participate in the international digital information economy), and the Pathways (see below). The consultations led to a strong endorsement of the CIARD agenda, with the contributions resulting in a major revision of the CIARD Manifesto, and the Checklist of Good Practices was reformulated into its' current shortened form (see below). As a result of this, the CIARD website was entirely reconsidered and the layout enhanced with appropriate alterations to the main elements of text. This process of consultation also provided the momentum to promote further the CIARD programme by:

- organization of CIARD events within major international/regional meetings in Europe (April 2010) and North America (May 2010), areas not covered in the 2009 consultations, to introduce the CIARD Manifesto and Values to research communication specialists;
- development and dissemination of the CIARD advocacy tools in as many languages as possible;
- increase in efforts to gather evidence of development outcomes from national and local levels from institutions following the CIARD approach;
- continuing enrolment of institutions into the CIARD community.

---

<sup>10</sup> The regions were: Africa (Accra), Asia and the Pacific (Hyderabad), Latin America and the Caribbean (Lima), Middle East (Cairo), and the Russian Confederation (Moscow)

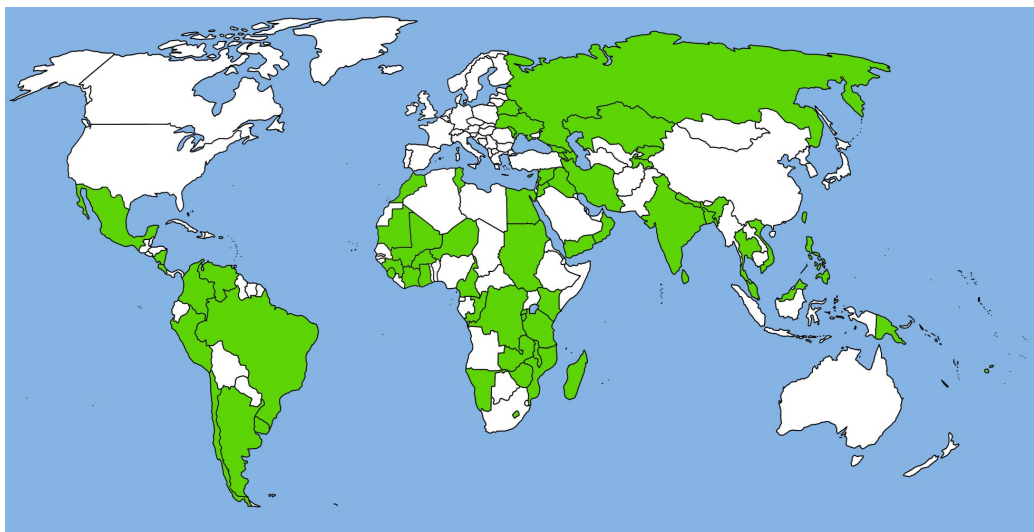


Figure 10: Country representation at CIARD regional Consultations

**Website:** The explanation, and the routes for implementation, of the CIARD agenda as a whole are delivered through the CIARD website (<http://www.ciard.net/>) and associated print materials. These show the CIARD Manifesto and the Checklist of Good Practices. Then, a collection of Pathways is available (currently 16), each one explaining how the user can address a specific area of activity (such as creating a policy framework to enable an institution to develop a repository) necessary for the support of the CIARD agenda. The Pathways cover the development of institutional readiness, the collection and preservation of information and data (including building a repository), and making content accessible on the web. All Pathways address the CIARD agenda of making information available, accessible and applicable in the digital environment.

The website also provides the CIARD-RING (Routemap to Information Nodes and Gateways), a global registry of web-based services that will give access to any kind of information sources pertaining to agricultural research for development (ARD). The CIARD-RING is the principal tool created through the CIARD initiative to allow information providers to register their services in various categories and so facilitate the discovery of sources of agriculture-related information across the world. The CIARD-RING aims to provide an infrastructure to improve the accessibility of the outputs of agricultural research and of information relevant to ARD management.

### D.3.2 The CIARD Toolset

The 'Manifesto' and 'Checklist of Good Practices': The CIARD Manifesto<sup>11</sup> presents a context which explains the issues that the initiative aims to address, and a set of values which the initiative embraces. The Checklist of Good Practices<sup>12</sup> takes these issues a step further.

A conceptual model (Figure 11), which emerged originally from the first IISAST Expert Consultation, categorizes the complex “reality” experienced by institutions and national networks which had already embarked upon major digital information projects. The model maps the major elements that are required for successful development of agricultural information systems in institutions and networks.

<sup>11</sup> <http://www.ciard.net/ciard-manifesto>

<sup>12</sup> <http://www.ciard.net/checklist>

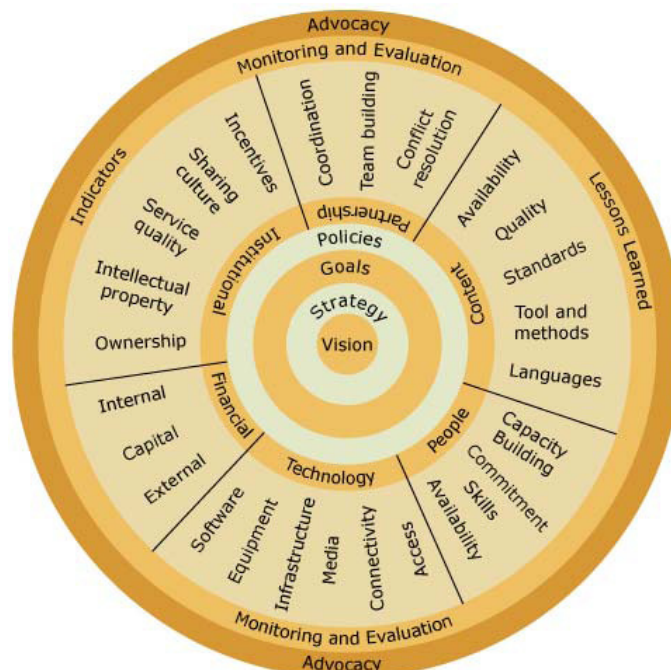


Figure 11: Components of sound information systems

The CIARD Checklist represents a set of items covering the elements of the above model through which organisations, research systems and individuals can work towards achievement of the CIARD Manifesto. It is not a set of requirements. There are many different ways in which the Checklist agenda can be achieved, according to the specific scope of an organisation's work. So everyone will be able to develop their own route through the Checklist. An organisation or system can assess itself against the Checklist to reveal its status, and then can prioritise and stage actions over time to achieve as many of the Checklist items as are appropriate to local needs. Organizations are encouraged to follow this process on the CIARD website. Implementation of many of the Checklist items will depend on capacity building in important techniques for key actors. The Checklist actions address a range of stakeholders, setting out approaches that will ensure that research outcomes are more likely to be sustainable.

The current status of the Checklist of Good Practices is shown in the Box below. As is shown, it presents two areas of activity – Developing Institutional Readiness (critical to the effective development of necessary change within an organization), and Increasing the Availability, Accessibility and Applicability of Research Outputs (referred to as the 3 As).

The current status of the Checklist has been achieved over a period of almost two years. This process began by using the increasing body of knowledge available on best practice in digital information management, which was refined by, and put into context by, the breadth and depth of experience of the CIARD Partners. Most importantly, the list has been further refined by key inputs from the regional expert consultations referred to above. This evolution will continue, wherever necessary, in response to input from users providing insights into the real issues they face in their local organizations and networks.

The CIARD Pathways: In addition to the Checklist of Good Practices, a range of targeted CIARD Pathways have been developed showing the ways in which the Checklist actions can be achieved.

The Pathways (currently 16 in number) provide detailed practical guidance in specific areas of activity. It is unlikely that any single network or organization or individual would need to follow all Pathways. The list of current Pathways are shown in the Box below. Both collectively and individually the Pathways have been developed through a process of bringing together best practice information from the current corpus of knowledge on digital information management. This body of best practice is steadily being established by the activities of researchers and information management specialists worldwide. They have then been further refined through a process of input from workshops and consultation with experts with broad experience in the fields covered.

All CIARD Pathways, individually and as a list, are completely open to further development responding to input from the real experiences of users in all regions. Further, the Pathways will be produced in several languages to extend their dissemination and usage.

In their current state of development the Pathways have been organized into three Groups, as shown in the Box below, which relate to the organization of the Checklist of Good Practices. Group 1 concerns 'Institutional Readiness'. Groups 2 and 3, cover 'Collection and Preservation' and 'Making Content Widely Accessible on the Web'. As a whole they aim to deliver the three 'A's of information and knowledge sharing (Availability, Accessibility and Applicability).

To help to put the Pathways into context for potential users each Group is described by an introduction which explains the intended audience for those Pathways and what the user will learn from them.

Each individual Pathway is presented in a standard form, starting with a brief introduction to the context in which the Pathway has been developed, what the user needs to know in terms of background, and what they will need to do to if they wish to follow the Pathway into further detail. References and links to more detailed information resources are provided. The purpose of each Pathway is to introduce the user to that particular area of knowledge, explain its' relevance, and then to enable the user to pursue the subject in further depth if that is required.

### D.3.3 Applying the CIARD Toolset in practice

The regional expert consultations referred to in Section D.3.2 above, apart from producing detailed input into the formulation of the CIARD Manifesto, Checklist of Good Practices, Pathways, and their presentation in the CIARD website, also identified a number of common concerns and challenges, such as:

- How to identify the resources, both technical and in other skills, needed to make the changes necessary to achieve the Checklist.
- How to persuade and mobilise the three key groups of stakeholders in institutions, namely researchers, policy-makers and information managers, into communicating their research outputs.
- The need for CIARD to harmonize with the agendas of national and sub-regional organizations (and vice versa) attempting to address the same issues.
- The richness of the CIARD agenda provides a context within which institutional and national developments can take place. But how can the best alignments be created?
- The challenges of turning the Checklist and Pathways into action.

In April 2010, a CIARD "**Marketplace**" was organized for the IAALD Congress in Montpellier France, to allow 200 participants involved in the documentation, management and

communication of research outputs to explore questions about how research can be communicated digitally. The Marketplace showed how to work effectively so that research can become more available and accessible to others around the world using the CIARD framework. Essentially the Marketplace was designed to allow around 20 organizations to present the products and services that enable achievement of the CIARD Pathways, with a Guide provided to participants that explained how the 'Pathway enabler' exhibitors contributed to the Pathways. The Guide also showed how the IMARK e-Learning modules provided learning materials that offered training in how to achieve the Pathways. The FAO-DFID programme only financed the international travel of some of the exhibitors and of ten Congress participants, so considerable leverage was achieved by the programme. The Marketplace was considered very successful, and a virtual form of the event has been constructed for the CIARD website.

An additional important area of action was taken forward by the CGIAR using support from the FAO-DFID programme, exploring what makes researchers and managers of research programmes share and communicate the outputs of research. A series of events, workshops, and focus group discussions were held in 2010, including in particular one held during the 5th African Agriculture Science Week and FARA General Assembly, held in Burkina Faso in July 2010. The first two days of the Week were designed as an open space of side events on three sub-themes, and FARA and FAO together with the CGIAR jointly organised a side-session during this open space to look at "enhancing the accessibility of research outputs through more coherent knowledge centres and networks". The event was attended by more than 50 research communication specialists and research managers, who identified the benefits and incentives that could be foreseen for researchers and institutions that communicate their outputs effectively. These benefits/incentives are summarized below.

#### **Benefits to be gained directly by individual researchers:**

1. Greater personal recognition (renown, reputation, status, popularity) from peers, policymakers, and users of research – in terms of professional performance, role in the community, and contribution to society
  - increased "visibility"/profile awareness of their research results (through citation index) in the scientific domain
  - exposure to the greater information society on the web
2. Greater recognition of their institution (renown, reputation, status, popularity) from peers, policymakers, and users of research
3. Increased access to resources for their research in terms of funding and material support
4. Opportunities to increase their peer networks with other researchers in terms of:
  - invitations to join research programmes/networks/initiatives
  - development of collaborative partnerships
  - invitations to present their research findings at conferences/meetings
5. Practical and sustainable appropriation and use of their research outputs to resolve challenges faced by the variety of rural actors to the benefit of rural communities
6. Moral duty/satisfaction of making the outputs of research accessible and contributing directly to the advancement of science and to rural development
  - Contribution to development of their country, to alleviating poverty, to enhancing food security, agricultural development/production/productivity, to the needs of the population
  - Contribution to state of research/science and the knowledge commons, through collaboration and knowledge exchange/sharing

**Incentives that could be offered by institutions:**

1. Greater practical support in research communication from their institutions, combined with enhanced access to ICT, and sound institutional policies for protection of ownership of intellectual property
2. Provision of enhanced opportunities for career and personal (training) development for researchers who communicate their outputs, with possibility of promotion and financial reward (a) salaries increases, (b) national/institutional prize/awards, (c) payment of proportion of royalty to individual scientists for Intellectual Property Rights (IPR) bought by companies
3. Insistence on fulfillment of obligatory requirements for reporting and communication of research outputs of the institution, national government/stakeholder, and/or foreign donors

This work is still continuing, and the outputs now include promotional/motivational videos that highlight the need to share/communicate research findings, and a set of Pathways specifically aimed at researchers and research managers.

**D.3.4 Principles and guidelines for designing and implementing interventions**

The development so far of CIARD interventions (ranging from workshops assessing content management tools, to establishing documentation to be used in advocacy campaigns) has been critically dependent on three elements:

1. The use of best practice, openly available, guidance on approaches to creating change in information and knowledge management for individuals and organizations.
2. The breadth and depth of experience of the CIARD Partners.
3. An ongoing, iterative process of gaining feedback at all levels of the programme (from Manifesto and Values to the specifics of a particular Pathway).

The outcome of this process can be seen in the Checklist of Good Practices and the development of the Pathways both described above. In both cases international best practice across a number of different areas of technical and organizational study has been brought together, adapted and redefined so as to be meaningful to the constituencies which are to be the chief beneficiaries of the CIARD programme.

On the CIARD website all concepts and documentation are open to detailed comment and feedback by anyone registered on the site. In this way the CIARD initiative is open to constant development based on the real experiences of users, whether contributed through meetings and events or through comments on the website.

**D.3.5 Promotion of the Initiative**

In 2010, the CIARD agenda has been featured/highlighted in two key events with senior government officials, research managers and policy makers.

1. 1<sup>st</sup> Global Conference on Agricultural Research for Development (GCARD), France - with more than 700 experts, scientists, policy makers as well as media and development partners.

The GCARD recommended that stakeholders to "use the potential of multi-partner initiatives such as CIARD to facilitate availability and access to information and knowledge in innovative ways".

2. 5<sup>th</sup> African Agricultural Science Week and General Assembly of the Forum for Agricultural Research in Africa (FARA), Burkina Faso – with more than 400 experts, scientists, policy makers as well as media and development partners.

The FARA Assembly recognized that the key challenge for agricultural research in Africa is that too few of its outputs are truly accessible and applicable. Participants called on the two principal initiatives in Africa facilitating greater accessibility of agricultural research outputs – namely the RAILS<sup>13</sup> and the CIARD:

- to advocate with all national actors in agricultural research the need for more coherent approaches to knowledge sharing and communication of the outputs of agricultural research in support of innovation
- to support development of national capacities by sharing sound institutional strategies and policies, providing tools and practices, and offering learning resources and events for all types of individual stakeholders

#### D.3.6 Resourcing of Advocacy Activities

FAO provided significant resources from its own budget and it was able to secure co-funding from partners for many of the activities during the programme, leveraging the resources provided by DFID and securing better value for money. Examples of this include the co-financing of the regional CIARD regional consultations provided by other partners in the initiative including the Global Forum on Agricultural Research and the regional research forums in Africa, Asia-Pacific, Near East and North Africa, and the CGIAR, which between them meant that the FAO-DFID programme only paid for around 30% of participants' costs.

### D.4 **Capacity Building Activities**

#### D.4.1 Capacity Building Task Force (CBTF)

The inaugural meeting of the Task Force was convened in mid-2009 in Wageningen in association with the meeting of the Steering Group of the IMARK (Information Management Resource Kit) initiative<sup>14</sup>. IMARK is a partnership-based initiative that has developed a series of resources for self-paced e-learning related to aspects of information and knowledge management. The meeting was held at CTA, Wageningen in June 2009 to discuss the nature and scope of Task Force with members from CIARD partnership, with the participation of representatives of CIARD partners and stakeholders, namely CGIAR, CTA, Cirad, FAO, GFAR, IAALD, IICA, and INASP.

- Role of CBTF: Participants agreed that the CBTF should be a convening body of CIARD partners with the following primary objective of the Task Force: *"to facilitate the compilation and dissemination of training and learning resources that would support global activities in building individual and institutional capacities in information and communication management (ICM) matters related to CIARD"*. Specific activities and tasks for the CBTF were agreed to be: (a) selective inventory and related gap analysis

<sup>13</sup> Regional Agricultural Information and Learning System

<sup>14</sup> <http://www.imarkgroup.org/>

of non-IMARK learning resources related to skills etc required to implement the Pathways; and (b) compilation of case studies illustrating appropriation and implementation of CIARD Checklist and Pathways, an activity which is being lead by the Advocacy Task Force.

- Formation of CBTF: It was agreed that the Task Force could not be expected to coordinate and/or monitor planning and delivery of CIARD-related CB activities worldwide, as this task was simply too complex. Furthermore it was agreed that the IMARK Steering Group could be not asked to assume the duties of the CBTF, given that IMARK did not have a specific orientation to agriculture. It was agreed that formation of the CBTF was a little premature given that the Pathways were still in preparation, and that cataloguing and compilation of learning resources could not begin until they were in hand. Participants from the founding partners noted that they were currently fully stretched on developing the principal CIARD tools, and they would prefer to delay the formal inception of the CBTF until 2010.
- IMARK Learning Resources for CIARD: Participants agreed that the IMARK learning materials would provide an excellent coverage of the CIARD Pathways once the latter were complete. FAO was asked to ensure that the relevant IMARK lesson(s) are highlighted in each CIARD Pathway in a special section on "*Learn about how to implement this Pathway*".

#### D.4.2 Capacity building resource materials

With guidance and involvement of members of the CIARD founding partners, a revised/updated IMARK module of self-paced learning materials addressing the CIARD agenda based on two existing modules<sup>15</sup> was finalized. The main learning objectives of the new module on "Digital Libraries, Repositories and Documents" (DLRD) were: (a) to advocate good information and knowledge management (IKM) practices at the organizational level; and (b) to enhance understanding of how to use tools and standards for the creation and management of digital libraries/repositories, such as digital file formats, metadata management, database management and preservation of digital information objects.

The content for nine new lessons was provided by the International Network for Availability of Scientific Publications (INASP) and all the revised existing lessons were transformed into new storyboards and then converted into the lesson mark-up format (XML). The self-paced learning materials were adapted into resources that can be used for face-to-face training, especially "training-of-trainers", and they can if necessary be customized to the local context. All the associated resources were compiled, and the English version of the DLRD module was completed in March 2010.

A variety of training workshops and seminars (face-to-face and virtual) were organized for information managers on (a) creation of digital content; (b) strategy formulation and enhancement of investment in Information and Knowledge Management (IKM) using IMARK materials directly or indirectly. These were supported by resources other than the FAO-DFID programme.

#### D.4.3 Resourcing of Capacity Building Activities

---

<sup>15</sup> Existing IMARK Modules – "*Management of Electronic Documents*" and "*Digitization and Digital Libraries*".



The resources applied from the FAO-DFID programme were supplemented by significant resources from FAO and other sources. For example, the DFID funding (\$60,000) for the revision and production of the DLRD module was leveraged by the resources put into the development of the two original modules, which amounted to more than \$250,000. In addition, FAO has provided funding from its regular programme to finance adaptation of the module into Spanish and French at more than \$80,000.

## **D.5 Content Management**

The component of the programme supported the development of the international initiative for coherence in agricultural information management standards. The objectives were:

- to develop element sets, vocabularies, and protocols for information exchange; and
- to advocate for their use.

The activities in this area were coordinated and implemented by the international Content Management Task Force (CMTF), first created to follow up on the Expert Consultation on *International Information Systems for Agricultural Science and Technology* (IISAST) held in Rome in October 2005. A virtual platform for CMTF was implemented in collaboration between FAO and GFAR to categorize, describe and evaluate standards and tools, and the outputs of the CMTF were brought to the online global community of practice on agricultural information management standards facilitated by FAO (<http://aims.fao.org>).

Significant advances were made in open technical standards and public domain tools for interoperability in agricultural information systems. The essential standard on which the others were based was the Agricultural Metadata Element Set (AgMES), developed by FAO before the FAO-DFID programme, and the related AGRIS Application Profile used by the international information system for agricultural research documents. Under the FAO-DFID programme, standards for collecting and disseminating information related to various types of information object were developed by the CMTF as follows:

- AgriFeeds - news and events
- AgriOrg - organizations
- AgriProject - projects
- AgriJobs - employment opportunities
- AgriLOM - learning objects

Apart from the AIMS website/community, the standards were deployed in the global Routemap of Information Nodes and Gateways (CIARD-RING) of open sources and services for research outputs developed in 2009 to facilitate discovery and access to sources of agriculture-related information across the world, which was launched in 2010. The CIARD-RING is a global registry of web-based information sources and services that provides access to any type of information pertaining to agricultural research for development that has been registered. The CIARD-RING was developed as the principal practical tool for the CIARD initiative to allow information providers to register their services in various categories and so facilitate the discovery of sources of agriculture-related information across the world. The RING aims to provide an infrastructure to improve the accessibility of the outputs of agricultural research and of information relevant to ARD management. By the end of 2010, around 100 such services had been registered covering millions of research outputs, and CIARD partners continue actively encouraging institutions to register content sources and services in the CIARD-RING.

Many of the standards and tools for data exchange were developed and applied by networks in the pilot national networks of the DFID-FAO project as well as several other countries (e.g. Egypt, Peru, Thailand).

In addition, the CMTF formulated many of the CIARD Pathways, and developed a guide to choice of approach in relation to local circumstances, requirements, resources and skills for CIARD Marketplace (Section D.3.2). The CMTF has also produced a good practices guide on selection and use of different information management software tools, and has developed two case studies to demonstrate the use of Free Open Source Software (FOSS) using toolsets such as DSpace and Drupal.

#### **D.5.2 Resourcing of Content Management Activities**

FAO provided significant resources from its own budget and it was able to secure co-funding from partners for many of the activities during the project, leveraging the resources provided by DFID and securing better value for money. Examples of this included the CMTF meetings and activities, partners covered all of their own staff costs and in most cases the costs of their participation in face-to-face meetings, and the extensive work on information standards financed from FAO's regular budget.

### **D.6 Lessons Learned and Sustainability of the CIARD initiative**

The new environment of research communication in the digital age is having impacts now on everyone involved with agricultural research, and the potential benefits for developing countries by involvement in these systems are very great. The open exchange of research information, and the collaborative involvement with research problems across national and regional boundaries, has never been so enabled - in theory. The technology infrastructure is available to all at relatively low cost. But the FAO-DFID programme has shown that the active involvement of individuals and institutions is too often hampered by the lack of understanding of the potential to be tapped and the lack of skills to do so.

There are no simple solutions to these challenges. They are experienced in much the same way in developed countries as in developing countries, but the difficulties are more acute, perhaps harder to solve, in the developing world. It has become clear that a number of features of the CIARD programme, as it has evolved so far, are central to its' success to date, and will help to sustain its further development.

1. CIARD is a partnership and not an organization or a legal entity. It is a partnership of like-minded organizations working toward a common end. The "Coherence" refers not only to the technical reality but collaboration in an effective partnership. The founding Partners have committed their own resources to enable their continuing support for and participation in the initiative. Further, any organization can now become a CIARD Partner by registering its' interest and capabilities on the website, and can contribute to moving the initiative forward.
2. CIARD's openness to new thoughts and new thinking and the interactivity with users through its' website. CIARD is committed to maintaining this flexibility to enable it to evolve further.
3. The commitment to capacity-building, which is so central to long term success. FAO, as one of the CIARD founding partners, is also the leader in a partnership developing IMARK. The many areas of synergy between the two initiatives mean that IMARK, which is also freely available, provides a powerful platform of support for the capacity-building efforts required by CIARD.

The sustainability of the CIARD initiative rests to a great extent on the continuing support of the major international organizations that founded it, namely FAO, GFAR and the CGIAR. Other organizations have been prepared to follow the lead of these major players, as many of them do not have an international mandate that would allow them to facilitate a global

initiative. However, some significant lessons have been learned about the establishment of such an initiative, with many of them learned in the period 2005-8 while the major partners struggled to develop the global platform for coherence that all parties could buy into. The major lessons learned can be summarized as follows:

- Any such global initiative should be founded on a neutral identity with which all partners can identify and engage.
- No single partner should have prior ownership of the global identity or take too dominant a role.
- The initiative should be managed on a visibly neutral platform – especially in the context of the website.
- A clear and striking visual identity (branding) for the initiative should be developed in consultation with the partners. Consultative mechanisms should also be used to develop the main elements of policy and practice being advocated.
- The partners should work to align their efforts, avoiding competition between systems and initiatives. Although they may have their own priorities and constraints, all should subscribe to common approaches.
- The international partners should respect the roles and profiles of the regional partners, ensuring that activities in the regions are lead by the appropriate actors at those levels.
- The partners should develop approaches whereby their inputs and deliverables for the initiative are aligned to their regular programmes of work, because the individual members are heavily engaged with their duties and responsibilities for their own institutions, and they have an ongoing challenge to find and dedicate time to the initiative's activities.
- The leading international partners should take specific roles in the CIARD initiative in which they have leadership, which fit with their existing priorities and which draws attention to their involvement and contribution, for example in CIARD:
  - FAO leads on the information standards and training materials development
  - GFAR leads on the global advocacy and the CIARD-RING
  - CGIAR leads on the development of many of the Pathways
- Sources of extra-budgetary financial resources (e.g. the FAO-DFID programme) are essential in complementing partners' in-kind investments to support collaborative activities, especially in the early stages of establishment of the initiative.

**E. Logical Framework Outputs and Status of Objectively Verifiable Indicators**

<b>Outputs</b>	<b>Objectively Verifiable Indicators</b>	<b>Status of Indicators</b>
Component 1. <u>Access to international scientific information</u> : increased levels of document discovery and retrieval for eligible institutions in low-income countries registered for the three Web-based Research4Life (R4L) literature access programmes, namely HINARI, AGORA and OARE	<ul style="list-style-type: none"> <li>- enhanced cross-programme systems for Research4Life that increase usability (2009)</li> <li>- sustained increases (2005-2010) institutional registrations in Research4Life</li> <li>- sustained increases (2005-2010) in use of the Research4Life web sites</li> <li>- enhanced perceptions (2010) of Research4Life users on quality of services provided and ease of access of journal content</li> </ul>	<ul style="list-style-type: none"> <li>- enhancements of R4L websites and enhancements of administrative systems completed</li> <li>- number of institutional registrations in 2010: HINARI 4100 (1502 in 2005) AGORA 2100 (450 in 2005) OARE 1900 (n/a in 2005)</li> <li>- number of AGORA log-ins: March 2005: 3228 March 2010: 11243</li> <li>- reviews of usage of HAO in eligible institutions completed</li> </ul>
Component 2. <u>Dissemination of African research results</u> : pilot implementations in Africa of national agricultural information networks focused on Web-based repositories, improving archiving and dissemination for publicly funded agricultural research outputs between researchers and with other stakeholder groups	<ul style="list-style-type: none"> <li>- pilot network of institutional open access repositories established in Kenya (by mid 2009) and in Ghana (by mid-2010)</li> <li>- by mid 2010, stakeholders in Kenya, Ghana and in other countries in Africa aware of lessons learned in pilot networks</li> </ul>	<ul style="list-style-type: none"> <li>- Kenya: KAINet central repository established and accessible online with content from all participating institutions; marketing of KAINet through meetings, promotion materials</li> <li>- Ghana: repositories established in all pilot institutions; national portal being developed</li> <li>- increased awareness of stakeholders in Kenya about KAINet through meetings, promotion materials, and widely publicized launching event.</li> </ul>
Component 3. <u>Coherence</u> : international institutional partnerships for enhancing access to digital information on publicly funded agricultural science and technology	<ul style="list-style-type: none"> <li>- by 2009, international partnership initiative established including principal international and regional actors supporting access to research information</li> <li>- by 2009, functioning international Community of Practice, with virtual platform and an identity established for the initiative</li> <li>- by 2009, establishment of three multi-stakeholder international Task Forces in Advocacy, Capacity Building and Content Management</li> </ul>	<ul style="list-style-type: none"> <li>- CIARD initiative defined and established as partnership with international and regional institutions, with endorsement from 150 information and communication professionals from 70 countries.</li> <li>- CIARD website relaunched, with CIARD-RING, and linked to collaboration spaces for the CIARD Community of Practice comprising the Task Forces and Core Group</li> <li>- two Task Forces established and functional (Advocacy and Content Management)</li> </ul>