



AARINENA-RAIS Workshop
Preparatory Workshop Document
(1st DRAFT, as of mid January 2003)

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1. REGIONAL AGRICULTURAL INFORMATION SYSTEM (RAIS) FOR WANA REGION, KEY MILESTONES

The paramount importance of information and communication management activities for agricultural research for a sustainable development within the WANA Region has been recognized, both clearly and early. In 2000, AARINENA Secretariat searched the support of FAO and GFAR (NARS Secretariat) to launch an information strategy for the Region. This study led to a well-endorsed global framework for action, from which a following workshop designed a plan of work. Once more FAO and GFAR supported this workshop. Following highlights are based on the three key milestones endorsed by AARINENA Stakeholders. In 2001, the AARINENA Secretariat launched a project proposal of US \$ 1M. to support the development of the Regional Agricultural Information System (RAIS), for the WANA Region. As of today this project has not been funded. The documents related to these three milestones are:

- ❑ “Information Strategy for the West Asia and North Africa (WANA) Region” by Ahmed Rafea, Computer Science Department of the American University in Cairo. NARS Secretariat & FAO/SDRR, 2000.
- ❑ “Workshop report on a regional information System for the West Asia and North Africa (WANA) Region”. October 2-4,2000. Dr. Ashmed Rafea (CLAES) and Dr. Stephen Rudgard (FAO/WAICENT).
- ❑ “Proposal for a regional information system in the West Asia and North Africa (WANA) Region”. AARINENA, April 2001.

1.1. Importance of Information and Communication Technology in WANA Region

The stakeholders of Agricultural Research and production in the WANA region experience great problems in getting accurate and timely information. The traditional way of transferring information from research to extension through extension documents and training is not currently adequate because the information generated every day cannot be conveyed efficiently using this method. The same argument can be posed for researchers who want to get up-to-date information concerning their areas of interest. It will be a waste of very valuable resources if research is conducted for something which has already been done some where else, in a neighbour country or even a neighbour institution. Policy makers need to be aware of research plans, capacities, agricultural production, and other information to plan for needed research and production. This type of information is also needed by development agents to orient funding to the proper direction. Farmers and agro-industries need to have up to date information related to product prices in different markets and these markets capacities.

The launching of a regional Agricultural Information System (RAIS) as a portal to access to NARS’ web information resources can help in satisfying these needs.

1.2. State of Agricultural Information and Communication Management in WANA Region

The current status of Agricultural ICM in the region is presented through three components: a) the leading institutions and the key initiatives in the region to date, b) the Internet connectivity status c) the human resources available in the region.

a) The key players and initiatives

Some efforts have been made to develop information and knowledge systems in the region.

- ❑ In Egypt, a UNDP and government project was initiated in 1989 to develop the capacity for building agricultural expert systems in the Egyptian Ministry of Agriculture and to develop two expert systems for cultivating cucumbers under plastic tunnels and citrus in the open field. Since then CLAES has developed many expert systems either through collaborative projects or through local funds (<http://www.claes.sci.eg/projects.htm>).
- ❑ ICARDA has an ICT strategy that is based on (a) a common electronic communications network, (b) networked information systems and databases, (c) building information partnerships, (d) common technical standards for information products, (e) joint acquisition of inputs and production of outputs, and (f) appropriate human and financial resources. A program of three steps is being implemented according to this strategy. These three steps are: (a) Improved speed and efficiency in accessing and exchanging information, (b) Improved Public Awareness about ICARDA's Work and (c) fostering technology transfer efforts of ICARDA, through training, networking and resource sharing and developing appropriate print and multimedia products, including Expert Systems, to foster the transfer of technology.
- ❑ In order to transfer this expertise to the region, FAO has supported four missions to other countries in the region through TCDC program. In these mission scientists from CLAES travelled to Iran, Syria, United Arab Emirates, and Oman. There are efforts between FAO/SDDR and CLAES to implement a Virtual Extension and Research Communication Network (VERCON¹: http://www.vercon.sci.eg/Vercon_en/vercon.asp). VERCON aims to strengthen existing linkages, as well as enable new linkages between the various components of agricultural knowledge and information system in Egypt. The ultimate goal is to improve the agricultural information and services provided to Egyptian farmers and in particular resource-poor small holder farmers. The VERCON will involve pilot sites in Egypt, which will use the Internet to communicate and exchange information.
- ❑ The Electronic Global Forum on Agricultural Research (EGFAR, <http://www.egfar.org>) is preparing sub-regional web sites that facilitate access to the agricultural research institutions and the information facilities in each sub-region of the WANA region. This will be accessed through the Gateway Function backed with a Node XML achieved in close relationship with EARD/INFOSYS+.
- ❑ There is also a current project in the Arab Organisation for Agricultural Development (AOAD) for building a Database for Agricultural Current Research in Arab Countries (ongoing research projects). AOAD plans to collect information from different Arab countries this year.
- ❑ CIHEAM also has a program for ICT capacity-building in the region that will be based on four key items: (a) Install in each Regional Action Programme (RAP) leader partner institution a web server, (b) Supply partners with internet utilities, PC's and modems and where applicable also support infrastructure works (cabling), (c) Develop at CIHEAM level, through a proper software the framework for an intranet and (d) implement training activities to support this capacity building programme, at level of both users and webmasters.
- ❑ ACSAD has a set of databases for: arid plants (ADAP, it contains 1300 plants in 14000 locations in Arab countries), Egypt database for fruits and forest trees (EDBFFT), database for soil/land (SOTER), water resources database in Arab countries, ground water database, and ACSAD publications database.
- ❑ In Cyprus, there was a study that identified 21 information systems of strategic importance to be implemented in a 5 years plan at an estimated cost of \$8M. Examples of the 21 information systems are Integrated Administration and Control System based on a unified farm approach, Geographical Information System, Groundwater System, and Animal Identification and Registration System.

b) Internet Connectivity

¹ For further details see Annex 3: "FAO Regional Workshop on Institutional Needs Assessment for Agricultural Research, Technology Development and Extension in the Near East Region", 29 – 31 May 2002, Amman, Jordan
By Dr. Ahmed Rafea

As of 2000 the situation could be described as follows:

- ❑ There is a discrepancy in the cost of installing and running leased lines in the region. The highest cost is in the Nile Valley (especially in Egypt).
- ❑ ISDN is only available in the Maghreb sub-region.
- ❑ VSAT and Radio Links are only available in three sub-regions.
- ❑ Dials up prices are almost the same in three sub-regions. Differences in monthly rates and telephone calls prices can be found in the area.
- ❑ The number of Institutions permanently connected to the Internet in West Asia and Nile Valley sub-regions is comparable followed by Maghreb sub-region.
- ❑ The best international Internet connectivity exists in the West Asia sub-region followed by Maghreb sub-region and then Nile Valley sub-region.
- ❑ The highest number of users and ISP's existed in the Maghreb sub-Region followed by, West Asia, and then Nile Valley. It should be noted that the estimated number of users is not limited to the agriculture sector.

c) Human resources

There are three players in ICT namely developers, information providers, and end users. There is a need to develop the skills of these three categories.

In most agricultural institutions in the region, there are no professional information systems developers. Therefore, non-professionals are responsible of the information system in the organisation, which leads to developing unreliable systems. In Egypt, there is a presidential decree that urges any organisation to maintain an information centre. Employees in these centres are not up to the professional level because the low salaries in the government do not attract ITC professionals to work in these centres. The successful systems were developed through projects funded by international organisations that hired professional to carry out the work. This problem exists in all the regional countries.

The information providers are trained on using developed systems. However, the problem is that in most of the countries, each organisation is reluctant to share information. There is a need to change this attitude in the regional countries. The current tools that help avail information on the web can enable each institution to use this technology in disseminating its information. It is therefore necessary to train information providers like researchers, economists, and other stakeholders, in using these tools. Currently, this capacity does not exist.

End users in most of the regional countries are computer illiterate and have barriers in using the computer. Hence, they cannot access information on the Internet or even packages on CDs and other media.

1.3. A shared vision on the objectives of the Regional Agricultural Information System for AARINENA

The general objective of the Regional Agricultural Information System for the WANA region is to increase the effectiveness of the agricultural research in the region through interrelating information facilities in the region, strengthening them, developing synergism among them, and increasing their capacities to reach the end-user with relevant data. This general objective can also be expressed in terms of increasing the access to information by the various end users, or in terms of developing an information management capacity in the region, as a tool for increasing the capacity of research to achieve its objectives of food security, poverty alleviation and sustainable development.

The more specific objectives of the RAIS/WANA are:

1. Facilitating access to publications and to research results that are generated by research centres and scientific institutions
2. Integrating local knowledge into information systems. The issue here is that of combining universal knowledge (science) with local wisdom, which can play a very important role in assuring sustainable development

3. Providing interaction between researchers and extension services. If close interaction is assured between these two actors, extension services can play a major role in the process of knowledge brokerage
4. Facilitating access by local end-users to global information facilities (i.e. FAO/WAICENT, EGFAR, CABI, CGIAR databases)
5. Encouraging regional research networks to increase their connectivity (evolving towards electronic networks), and to systemise their databases and information management capacity (evolving towards specialised information systems)
6. Promoting the use of web-enabled technologies in the information facilities in the region, in order to take full advantage of the internet

1.4. Structure of the Regional Agricultural Information System of AARINENA

In order to respond to these objectives, RAIS/WANA should consist of the following two main components: a Management Information System (MIS) and a Regional Reference System (RRS) to access to specialised Regional Information and Knowledge Systems in Agricultural Research and Development, to the National Agricultural Information Systems (NAIS), to Global Databases and Information Systems, and to the Regional Information Systems of other regions.

The following subsections will describe each of the above-identified systems.

a) Management Information System (MIS)

The Management Information System (MIS) of RAIS/WANA should consist of five databases with the objective of monitoring agricultural research and development (R&D) in the region, and of facilitating regional co-operation in this area. The following web-enabled databases should be developed:

1. Database for all the NRI's in the region: This database should contain the information related to each NRI including its name, its mission, director, address, email, web site (if any). The study prepared by FAO, ICARDA, CIHEAM, AARINENA for the National Agricultural Research Systems in the region could be the basis for building such database
2. Database on Regional/Sub-regional Research Networks: This database should contain information on the research networks that exist at both the region-wide level, as well as at the sub-regional level. Access to these networks will be facilitated, either through the web pages of the network, if it exists, or through e-mail contact with the co-ordinator of the network. ICARDA web site has information about some research networks in the region, therefore a link to ICARDA site could be established <http://www.cgiar.org/icarda/Research/Research2/network.htm>. However the information in the ICARDA site is not complete. For example it does not contain the name of Network co-ordinate and email address
3. Databases on Research Projects: : The Current Agricultural Research Information System (CARIS) is an international cooperative network for the collection, organization and dissemination of information on current agricultural research. CARIS operates worldwide on a decentralized basis, using a standardized methodology for data gathering and initial data recording . National and regional CARIS Centres process and disseminate information concerning agricultural research undertaken within their areas of responsibility. In the case of the RAIS/WANA, this information could be conveyed from the countries in the region to build a database on the regional level that links the national local focal points. FAO experience in managing this process can help in this regard. The regional database inter-relating these national databases is to be complemented by a regional (centralised) database that will concentrate only on covering research projects that are carried out through regional/sub-regional networks and/or regional/sub-regional research projects. It should be pointed out that if the project of the Arab Organisation for Agricultural Development (AOAD) is implemented, this project should constitute the starting point for this database.
4. Databases on Research papers: AGRIS is the international information system for the agricultural sciences and technology, aiming to facilitate information exchange and to bring together literature

dealing with all aspects of agriculture, including research papers. As in the case of CARIS, FAO has developed tools and methodologies which can be used at national, regional and international levels.

5. Economic and statistical Database: FAOSTAT is a global statistical database available from FAO. The data are collected from governmental focal points in countries all over the world, and can be accessed by the research community. These data and their collection go beyond an agricultural information system. In a similar way as for CARIS and AGRIS, a regional database could be established.

b) A Regional Reference System (RRS)

In the case of this component RAIS/WANA only plays the function of a “regional reference centre”(RRC) to access specialised Regional Information and Knowledge Systems in Agricultural Research and Development, the National Agricultural Information Systems (NAIS), Global Databases and Information Systems, and the Regional Information Systems of other regions. This serves as a gateway function, which facilitates access to the following information systems:

1. Specialised regional and sub-regional information systems that exist on topics related to agricultural research and technological development. The Regional Knowledge based systems for Faba bean and wheat, currently being developed by CLAES and ICARDA, are examples of these specialised systems to be accessed by the RRC.
2. Sub-regional Information Systems and Databases: The Electronic Global Forum on Agricultural Research (EGFAR) is preparing sub-regional web sites that facilitate access to the agricultural research institutions and the information facilities in each of the five sub-region of the WANA region. This can be accessed through the Gateway Function of the NARS Master Web site of EGFAR, at <http://www.egfar.org/action/stakeholders/rubric-7.shtml>. Through the Gateway Function access is available to the web sites of the Maghreb sub-region, the Nile Valley and Red Sea sub-region, the Mashreq sub-region, the Arabian Peninsula sub-region, and the Western Asia Sub-Region. Through this function, access will be facilitated to the agricultural research institutions and the information facilities or systems that exist in each country of the sub-region.
3. National information systems that have been responding to different information needs of farmers and other end-users in these countries. The institutions that provide information services at the local level can be integrated into National Agricultural Information Systems (NAIS), in order to improve the complementarity between them and to seek to develop common services or integrated services for the end-user that may increase their effectiveness. These national information centres play a very important role, since they are the closest information agents to farmers and other end-users. Thus they play a critical function in the whole regional information system, both in terms of facilitating access to agricultural information by end-users, and in strengthening the input the various countries of the region make into regional and global information databases and systems. A few of them are now establishing homepages in the web in order to use Internet to co-ordinate their activities. In Egypt, for example, the following national information facilities are already web-enabled: Central Laboratory for Agricultural Climate <http://clac.claes.sci.eg/>; Agricultural Technology Transfer and Utilisation Project <http://www.atut.gov.eg/>; Egyptian Agricultural Library <http://nile.enal.claes.sci.eg/>; Central Laboratory for Agricultural Expert System <http://claes.sci.eg/>. This laboratory will avail its expert systems soon on the Internet. These information services could be integrated into a National Agricultural Information System (NAIS), aimed at increasing the effectiveness of these various services in terms of reaching the end-users. This would also facilitate interaction with the WANA-RAIS.
4. Global databases and information systems (i.e. EGFAR, AGRIS, WAICENT, other CGIAR centres, Global Research Networks, etc.), as well as to the Regional Agricultural Information Systems of other regions (i.e. Asia/Pacific-APAARI, Sub-Sahara Africa-FARA, Latin America and Caribbean, Europe-EIARD/InfoSys). Through this function, RAIS/WANA will be integrated with the emerging Global Knowledge System on Agricultural Research for Development (GKSARD).

1.5. A Strategical approach for Agricultural Information in the WANA has been defined

The general objective a Regional Information Strategy is to provide a general framework for action, as well as specific guidelines for the establishment of a regional system (i.e. adoption of common protocols and policies, development of e-mail connectivity, strengthening Internet access in the rural sector, etc.).

More specifically, the goal of the proposed information strategy is to provide guidelines on three subjects.

- a) **Development:** Who will be responsible for the development of each sub-system? What are the needed resources? And when should efforts start?
- b) **Management:** How can AARINENA best host, maintain and deploy RAIS/WANA? What kind of training is needed? And how can it be implemented?
- c) **Technology:** What mix of delivery/access media in the range of printed, CD-ROMs, Internet, and Wide-Area-Networks (WANs) will be most appropriate in terms of both uses/users and costs/benefits?

1.6. A Project has been designed, but not yet funded

AARINENA designed a project proposal in April 2001, its executive summary is as follows.

“Agricultural development in the West Asia and North Africa (WANA) region is sustained in part by the effective and efficient exchange of knowledge and information. Stakeholders in agricultural research for development in the region have major problems in obtaining accurate and timely information. Modern Information and Communication Technologies (ICTs) have introduced a new dimension and, if properly applied, can help in promoting knowledge and information exchange. AARINENA, in co-operation with the Global Forum for Agricultural Research (GFAR) and the countries of the region, intends to establish and develop a Regional Agricultural Information System (RAIS) for the WANA Region. This would aim to increase the effectiveness of the agricultural research in the region and to increase their abilities to reach the end-user. External financial support is being sought for the programme of work.

The RAIS would serve as an information repository and exchange mechanism at the regional level, aiming to strengthen, co-ordinate, and add value to initiatives by national programmes and those co-ordinated by regional and international organisations. The two principal components would be a gateway or portal function and a reference centre.

The gateway would facilitate access to the knowledge systems for agricultural research for development (ARD) in the region, and the global system knowledge system for ARD (GKSARD), and would be designed to help users resolve their development problems through the sharing of knowledge and information resources from various sources. The Regional Reference Centre would provide a document repository for regional projects and networks and include data from National Agricultural Information Systems (NAIS), including agricultural research institutions and other stakeholders, focusing particularly on scientific and technical publications, projects, and human resources.

The RAIS would aim to present the key resources in two principal languages, English and Arabic, with some resources in French. Standards, methodologies, and common software systems would be agreed and adopted, supported by training materials at the national level. Existing national resources would be adapted to improve consistency and accessibility. Given the unavailability or unreliability of connectivity in some parts of the region, offline versions of the system or parts of the resource would be made available on CD-ROM.

The project would be implemented in a phased approach, involving an initial phase at the regional level and five national systems, before proceeding to the remaining countries.

The project would be managed by AARINENA at an operational level through a secretariat located in a host institution, which would include a RAIS Co-ordinator, and through national focal points in member organisations. The project would be supervised by a Project Steering Committee.

A total requirement of \$1,000,000 of external financial support is foreseen.”

2. AS A PILOT/PRELIMINARY PHASE: ESTABLISHMENT OF AARINENA WEB SITE (MANAGED BY AREO, IRAN)

The establishment of the AARINENA was carried out by the AARINENA-RAIS Secretary, Tanareh Ebrahimi, who just worked on it for a period of eight months.

The most important scope of AARINENA-RAIS is to facilitate the access to scientific and technological information on agricultural and rural topics by end-users, as well as the exchange of knowledge and information among all the regional stakeholders of agricultural research and development.

Regarding the previously mentioned objectives (1.3. A shared vision on the objectives of the Regional Agricultural Information System), and considering the mission of RAIS, the AARINENA web page content was designed with the intention to be a gateway to enable access to all useful information of the Region and sub-Regions. The design was also based on previous experiences from EGFAR and other Regional Fora/Organizations such as APAARI, ICARDA, and FORAGRO.

2.1. Web page Design

The most important challenge was to design a user-friendly set of web pages, which everyone could access it easily. Preliminary contacts were established with the webmaster of the GFAR Secretariat.

a) Home Page

The page is structured with the AARINENA logo on the top-left of the page and GFAR logo on the top-right in order to demonstrate the close relation between AARINENA and GFAR.

Around AARINENA logo there are five colored circles symbolizing the five sub-Regions of the Near East and North Africa and through them one can easily access the sub-Regional sections.

The page is also composed of a top menu through which data like news, events, AARENINA links, GFAR links, databases and e-mail are accessible. The left menu contains general information, consisting of About AARENINA Vision and Mission, Constitution, Executive Committee, and Cosponsors of AARINENA are available.

The right menu contains links to spotlights, for example new events like conferences, meetings and workshops, and the central part of the page contains a short introduction to AARINENA.

b) AARINENA Regional and sub-Regional Data Access

Access to Sub-Regional data is possible through a page containing a sensitive map (the same as EGFAR, but adapted to AARINENA site). Data was taken both forms the “Directory of Agricultural Research Organizations in the Near East & North Africa” published by FAO & AARINENA and from GFAR-NARS database.

By clicking single countries it is possible to access national information both in general terms and in terms of classified institutions/organizations of the individual country. The classification of these is based on EGFAR classification.

On the other hand, another link provides access to all regional level information, as well as to all relevant international organizations/institutions.

2.2. EGFAR Links

AARINENA web site contains two direct links to EGFAR site: to the Events section and to the Stakeholders section. That, again, shows in this preliminary phase the close relationship between the two organizations and allows users to understand the difference in accessing Regional/Sub-Regional information (AARINENA) and Global information (GFAR). That does not preclude of future required evolution in the content and structure of this web site.

2.3. Database Structure

For the time being a database structure is not yet precisely defined for AARINENA site, but it is a key component for which there is an urgent need (a) to fulfill the agreement of all the stakeholders in the proposed architecture and (b) to launch technical partnerships to achieve a cost sharing approach.

The structure is proposed to be articulated through five relational databases with the objective of monitoring agricultural research & development in the region and of facilitating regional cooperation in this area. The first one of these databases should be the regional NARI's database.

Other databases that should be developed in the future are as follows:

- NARS Database (broader content than NARIs data)
- Database on Regional/Sub-regional Research Networks (Date Palm, Olive, Aromatic & Medicinal Plants, Citrus, etc.)
- Database on Research Projects
- Database on Research Papers
- Economic & Statistical Database

AGRIS and CARIS Methodologies are tools widely adopted enabling an effective information sharing. XML technology could be a suitable tool in order to access to decentralised databases, allowing end-users not only to search in the AARINENA database set, but also connect to all other RAIS using the same system (Infosys and EGFAR for the moment). And of course XML technology will allow users search in other RAIS site to retrieve AARINENA data..

3. OTHER CONTRIBUTION FOR STRATEGIC THINKING TO BE TAKEN INTO ACCOUNT DURING THE WORKSHOP

3.1. iNARS Initiative

IICD and ISNAR have undertaken an electronic forum of discussion at the end of 2002.

The purpose of this forum was to examine how national agricultural research institutes and systems in developing countries are using ICTs to generate, adapt, synthesise and disseminate useful information for use by clients and stakeholders. It is expected produce and validate a framework by which local research institutes and systems can diagnose and address their own situations, helping generate the necessary vision and mobilising necessary capacities to execute next generation agricultural research information and knowledge exchange systems.

The discussion was focusing on the use of ICTs and knowledge in research and innovation systems themselves and the people and institutions that make them up. It had also to focus on the interface between research/innovation and the local communities and other stakeholders that research is designed to serve and support.

The starting point is an exploration of trends likely to affect research and innovation itself. What will a national agricultural research system look like in 2010, and how will this shape the demands that information, knowledge and ICTs will need to address?

Emerging from this analysis, at least two crosscutting critical aspects will be addressed: **Inclusion** and **integration**. How can ICTs be used as a tool to promote the participation of all actors and stakeholders in research policy making, priority setting, and execution? How can we use ICTs to help ensure that the concerns and voices of the poor and their representatives are heard and that they are the first to benefit from the useful information and knowledge held in a research system? And, finally, how can ICTs help foster knowledge and information flows across and among different research actors and stakeholders, delivering a more effective, coherent and co-ordinated approach to research and knowledge exchange?

Further information on this initiative is given in Annex 1.

3.2. IGAD Contribution

Intergovernmental Authority on Development (IGAD) was created in 1986 by six African states of Djibouti, Ethiopia, Kenya, Somalia, Sudan and Uganda to support regional efforts to combat the effects of drought and desertification. In 1993 Eritrea became the 7th Member State of IGAD. Ten years after its creation, IGAD was faced with new emerging geo-political and economic challenges that called for innovative approaches,

new strategies and directions. The IGAD Member States decided to restructure, revitalize, and expand the mandate of the organization. IGAD's priorities, goals, and vision are now towards regional integration for Food Security and Environmental Protection, Economic Cooperation and promotion of Peace and Security. Attainment of this goal implies a fundamental dependence on, and increased use of, quality information by policy makers, planners and the population at large as they adopt new technologies and practices. Thus information access and its dissemination are recognized as the regions greatest resource as it is intertwined with all aspects of important issues in IGAD Member States.

Initially the main objective of the Regional Integrated Information System (RIIS) is to enhance the sustainable production and dissemination of timely and reliable information for Food Security, Environmental Protection, Natural Resources Management, Economic Cooperation and Conflict Management. This will expand later to include other themes of interest in the Member States.

Further information on RIIS and followed methodology on users' needs assessment is given in Annex 2.

3.3. The Global-RAIS Project led by GFAR and supported by European Commission

Stakeholders in Agricultural Research for Development (ARD) have undertaken several initiatives to develop information and communication systems. The Sub-Regional and Regional Fora of the NARS have launched Regional Agricultural Information Systems (RAIS), and GFAR has launched its web site *EGFAR*. The project GLOBAL.RAIS offers consistency, economies of scale and the means to develop compatible systems so that regional and global information systems can work together. The two general objectives are:

- **To co-build a strategic agenda in Information and Communication Management related to ARD, at the Regional and Global level.**

Four specific objectives are proposed:

- To achieve a priority setting exercise for all the RAIS;
- To define common tools to promote exchanges of information;
- To encourage the RAIS offering comparative advantages to lead activities;
- To promote exchanges of experiences.
- **To launch *EGFAR* as a portal for ARD enhancing a transparent access to the RAIS information resources.**

Two specific objectives are proposed:

- To launch with all the RAIS stakeholders an *EGFAR* webring;
- To provide a multihost database search engine on the *EGFAR* gateway.

GLOBAL.RAIS intends to launch regional technical workshops in the less advanced regions to support their related Regional Agricultural Information Systems (RAIS). These regions are Near East and North Africa, Asia Pacific, Africa, Central Asia and Caucasus. They will be prepared by electronic discussions and e-mail conferences, and by a support through a technical mission assumed by a manager of an advanced RAIS and/or the *EGFAR* manager. After these four workshops an inter-regional workshop will be held, involving all the RAIS stakeholders.

These activities will be developed in close relationship with FAO, hosting GFAR, and in particular with the WAICENT Outreach Programme, with which previous co-operations that have been built.

- *Electronic Discussions and E-mail Conferences*

Inter-regional e-mail discussions will be launched between and among RAIS regarding their information strategy, the critical issues they face, their ongoing activities and projects, and identification of opportunities. E-mail conferences will be specifically undertaken for specific technical problems to be collectively solved.

- *Support Missions and Regional Workshops*

Technical support missions will take in charge the various aspects of the management of RAIS and will help to design the activities to be developed at the regional and global level.

The four regional workshops would have about 8 to 12 participants. The main expected output, beyond the crosscutting of human resources, is to define a plan of work for each RAIS, both pragmatic and consistent with the other RAIS.

- *An Inter-Regional Workshop*

The following outputs of such an inter-regional consultation are expected:

- shared vision on activities to be developed at the regional level and to be developed at the global level (EGFAR);
- mechanism for networking enhancement between RAIS and EGFAR such as a web page to access to decentralised web information resources;
- identification through a comparative advantage analysis of a RAIS as a leader for a specific component of an ICM issue of common interest for other RAIS;

- *Post-Workshop Activities*

The outputs of these participatory processes will be disseminated at a worldwide level through the EGFAR web site and those of the various RAIS. They also will be used to monitor the ICM activities.

The first workshop of the GLOBAL RAIS Project will be held in the AARINENA Region, in February/March 2002.

3.4. Related technical information

In Annex 3, you will find further technical information related to: (a) the Node XML prototype led by Infosys + and IAO in Italy, (b) information on the third phase of the EIARD Infosys Initiative and (c) some information on APAARIS, the RAIS of the Asia & Pacific Association of Agricultural Research Institutions.

4. OBJECTIVES OF THE AARINENA-RAIS WORKSHOP: KEY ISSUES TO BE ADDRESSED

This workshop will take place two years after the first regional workshop, which was held in Cairo, Egypt. It will take place after the design by AARINENA Secretariat of a RAIS Project for US \$ 1M., as of to day not yet funded.

Therefore this workshop could be twofold:

- To update the current regional situation on Agricultural Information and Communication Management (ICM) and to share preliminary conclusions regarding the ongoing situation;
- To address further pending questions.

4.1. A shared vision statement

Common responses to the following questions, through a participatory approach, could build a common vision statement, first step of a collective commitment for the RAIS.

- (?)Is it needed to update the data on : (a) human and institutional skills in ICT/ICM, (b) ongoing ICM Initiatives in ARSD at national or regional levels, (c) internet connectivity availability and use by the RAIS stakeholders, and (d) emerging leadership of a regional organisation
- (?)Can we say that there is a good and healthy portfolio of projects and initiatives, but that there is a need for a better: (a) follow up and monitoring, (b) fund raising and financial strategy.
- (?)Does the ownership of the RAIS by the national stakeholders must be improved or not, and if yes how to do that
- (?)Is the AARINENA web site launched by AREO a first step for the RAIS or an external initiative

4.2. Further questions to be addressed

Five main sets of questions can be articulated:

(1) How to improve the ICT skills of the human resources involved both at a national level (NINPS) and the regional level (RAIS).

- Definition of a specific PWB
- Crossbreeding and knowledge sharing at an (a) intra-regional level, and (b) an inter-regional level

(2) What the expectations of the National AARINENA Stakeholders in their RAIS

- Definition of national priorities
- Validation and endorsement of the twofold RAIS Strategy : (a) MIS through its four sub-components (Regional Research Networks Database, NARIS/NARS Databases, ARD Projects Database, Agricultural Research & Development Indicators Database) , and (b) RRS

(3) How to articulate national web information resources and regional requirement of the RAIS

- Definition and role of what could be National Information Nodde Points (NINPS)
- Role of NINPS in MIS and RRS
- Added value of the RAIS
- How to steer the RAIS activities form the NINPS and AARINENA points of view

(4) SWOT Analysis (Strengths, weaknesses, opportunities and threats) of the AARINENA Web Site launched by AREO (Iran)

- Definition of the next steps
- Specific plan of Action including Management Information Tools for of ARD activities, including the straightening of the gateway function

(5) How to support NINPS and RAIS activities

- Improvement of the institutional networking and commitment of the institutions, at a policy level, involved in the AARINENA-RAIS
- Definition of a sustainable funding strategy and access to funds
- Definition of cost sharing activities at all levels (from the local to the regional through the national)
- Co –operation with other RAIS
- Definition of a well articulated set of collaborative programmes with FAO, GFAR and other stakeholders to be further defined

These are the main questions and pending issues to be further discussed during the 2nd Cairo Workshop. In order to be sure that key issues are not missing an electronic discussion on the first draft of these background will be launched in order to prepare consistently: (a) a comprehensive agenda for these two days meeting, and (b) a related timetable.

ANNEX 1: iNARS CONTRIBUTION

ICTs and improved information systems will enhance communication within research. Email, for instance helps in creating research-based communities of knowledge where information can be shared and exchanged and applied to research problems.

ICTs and improved information systems will enhance farm level communication among farmers and between farmers and researchers as well as with other infomediaries like extension, thereby improving the quality and relevance of the research and empowering the farmers.

ICTs offer an enormous opportunity to better link formal research with farmers, resulting in technological and social innovations that are both scientifically valid and locally relevant. ICTs can offer rural people easier access to research results and better enable them both to share knowledge among themselves and provide feedback to researchers. Specific applications, like local multi-lingual plant glossaries, can help to cross the worlds of research and farms.

But, applying ICTs effectively for rural innovation will require the creation of new institutional arrangements and roles. Some research systems do not know how to listen to the people they are supposed to serve. We need ICTs in the hands of new institutions that will bridge the communication gap between farmers and consumers, and between farmers and researchers, so that they can share their concerns and build necessary social capital from their relationships. We also need to understand what factors hinder or facilitate farmers to be seekers of information, and not simply passive receivers.

However, missing visions on what to do with ICTs and information, or, if they exist, the inability to convert them into reality, ensures that agricultural researchers remain disconnected with the actual needs of the farmers. A serious challenge is to find ways to use the improved connectivity offered by ICTs to build multi-stakeholder communities that collaborate in the use of new agricultural technologies. This process is not very well understood and therefore appropriate visions do not come to the fore.

Organising and Accessing Information

ICTs and improved information systems will make existing information more available and more accessible. ICTs are often seen as tools that allow us to easily create and publish information. However, one of the primary opportunities is for researchers and farmers to use ICTs to gain access to existing information on an unprecedented scale.

Thus, ICTs and improved information systems will help agricultural research and development stakeholders (including farmers and Farmer Organizations, NGOs, universities, research centres, policy makers, etc.) to easily find answers to their questions, or at least to know what is not available. By improving access to up-to-date information regarding research activities/projects, by providing quality research outputs, and by sharing of research results, we will avoid duplication of research projects and ensure that limited funds are properly used.

But this will only be possible if existing information or knowledge has first been organised. In many places, relevant information exists but is often not accessible. So designing local databases and implementing local area networks (LAN) within the various agricultural research related institutions is a critical issue. Once the information has been locally organised and made accessible, it needs to be made available to concerned end-users. This will require affirmative actions in poor (rural) areas where investments in connectivity are lowest. Co-ordination, linkages, and institutional arrangements need to be put in place to ensure that the various projects and initiatives work in a coherent way.

The information also needs to be made available in ways that emphasize quality over quantity. Already farmers and scientists have great difficulty in wading through the all the data and information that is available on the internet and elsewhere. It is essential that they get the right information.

Finally, the accessibility of information on the internet will become increasingly subject to intellectual property considerations – preventing people with fewer resources from gaining access.

Reforming Research

ICTs and improved information systems will be one of the drivers that change research systems so they are more responsive to the needs of farmers and consumers.

Without appropriate use of ICTs, current agricultural research systems will become irrelevant and eventually die. But, to use ICT appropriately, they will need to restructure and reform. ICTs will thus drive many changes. They will also be key components in other changes that are necessary – such as changes to the structure and processes of research and the emergence of new intermediary institutions and agents that will satisfy the new information needs of a multitude of actors in agricultural and rural development.

It is not just the systems that need reforming. The ways we think and act will also need to evolve. While the technological environment will change everywhere for the better, what people think and how they work does not change so easily. It is critical that we adapt the ways we work in response to the new opportunities that technology offers. Part of this change is to re-design what we produce. Instead of using ICTs to produce and distribute digital equivalents of the paper information resources that we are familiar with, we need to free ourselves from old concepts and begin to design more effective information products.

Understanding ICTs

Widespread understanding of what can be done with ICTs and how to best to use them is essential to stimulate appropriate use and to mobilize support.

A key challenge concerns the limited understanding of ICTs and their requirements – which can lead to fear and non-adoption. It can also lead to a too great focus on visible and tangible hardware and technology at the expense of the information itself and the communication processes involved in its creation and exchange.

Beyond organizations, policy-makers are not sensitised to the various applications and opportunities that ICTs and improved information systems offer. The vision of many leaders and influential people is focused on computers rather than on information and its use. They believe that providing hardware is the same as providing relevant and useful information.

Top level awareness and commitment, as in Senegal, can result in a booming cyber-café sector in even the remotest places as well as a thriving ICT service sector. The most important result is likely to be additional national funds for information, cheaper ICT access and connectivity prices, and more sustainable local systems.

Nevertheless, it will be a challenge to find enough committed and knowledgeable actors who are willing to do the work on-the-ground and that are able to link up with the right institutions to establish new and innovative partnerships to ensure genuine relevant local content.

ANNEX 2: IGAD CONTRIBUTION

RIIS' goal is to establish National Policies, Institutional and Technical Protocols for development, maintenance, and management of standardized and spatially compatible databases, as well as a documentation system, which promote and facilitate exchange of data and information for sustainable economic development and management planning in IGAD region.

A set of principles have been adopted as the basis for developing an effective framework for RIIS in the IGAD region. The following are a set of principles for the RIIS that include a demand-driven process designed to:

be highly participatory, providing an opportunity for Member States, as well as key regional stakeholders and information users, to be involved and have a stake in the outcome.

lead to outcomes that are demand-driven and therefore have the potential for sustainability.

capture opportunities for building institutional capacities of the Member States and key collaborating agencies to produce or utilize needed information products.

build upon investments and lessons learned from existing efforts in the region to develop information systems.

harmonize approaches methodologies, policies, protocols, procedures, and information product specifications in the region to minimize duplication of effort and maximize impact of limited resources;

engender an information culture and enabling environment in the region for the use of broad and routine information in decision-making to support strategy planning and regional policy harmonization, and

formalize control over the management of coordination and project design process in the IGAD Secretariat

RIIS involves Organizations, Institutions and Agencies (data centres) in a cooperative and participatory opportunity and effort to provide a mechanism for data access and exchange in the IGAD Member States. In order to prevent duplication and conflicts, data centres will collaborate on a complimentary and non-competitive basis, developing the specified data sets in compatible formats based on a harmonized data model and classification system to facilitate aggregation and integration.

The need assessment process was defined during a regional stakeholders' workshop, held in Uganda at the beginning of the project.

The workshop's recommendations can be summarized as follows:

"The **Needs Assessment** process of potential data users and producers in the member states will ensure that the information products by RIIS match the priority information needs of its targeted users. The Information Audit will involve the collection of information on data availability's in each country, information on databases, data format, data acquisition procedure, algorithms, models and methodologies, first and second level product, data protocols. This process will compare the list of information product specifications identified in the need assessment process with an inventory of data available to produce those products. The Institutional assessment process will provide an inventory of the strengths and weaknesses of targeted collaborators and stakeholders of RIIS. This information will be used during implementation to target its efforts to increase the capacities of participating institutions to produce or utilize information products generated by RIIS. "

The Need Assessment Survey consisted of questionnaires distributed mainly among governmental and NGO institutions; it was made of 13 pages, divided into two main sections: Institutional Details and Data Sets.

At the end of the study the two main limitations of it were related to: a) Surveyed institutions representativeness and b) Questionnaire answers reliability.

A preliminary list of institutions was prepared by the RIIS Team on the basis of their visit to the countries, but given the limited travel and the few meetings attended it can be said that the contacts were as representative as they were under the circumstances.

This survey had a limited validity in terms of time.

There were already clear indications from more than one source that some of the information were already obsolete. A possible solution for keeping the information updated was to make the results of the survey a "public domain" so that information providers became active players, interested in keeping the information reliable.

The Needs Assessment Survey provided a very wide spectrum of information about what are the Institutions' expectations from the establishment of a Regional Integrated Information System. At page 8 of the questionnaire, there is the following question: "What would you expect from such a network (RIIS)". The following categories summarize the answers of the institutions:

Data/Information exchange: This includes all those calls for easier, faster, more up-to-date access to data and/or information in the region.

Strengthening Capacity: Expertise, facilities, training, technical assistance are some of the most common answers grouped in this category. Other answers, i.e. "savings in cost" were also included in this category since considered by products of the actions mentioned above.

Sharing Experiences: Many institutions expect benefit from RIIS in terms of easier circulation of ideas. Workshops, seminars and, more in general, exchange/sharing of ideas are seen as a valuable RIIS product.

Data Standardisation: This category includes those institutions which see the "data format and standards" as one of the priority topics to be approached by RIIS.

Harmonizing Policies: This includes those answers specifically related to information policies and harmonization of information exchange.

Regional Cooperation: This could be considered a sub-group of category 2. It was separated from the previous since these answers reflect the "regional perspective" rather than generic data/experience exchange (problem often felt at national level too).

The outputs of the survey can be classified into three main groups:

Institutional Profile

State of the Information

Information needs

Institutional Profile: The survey addressed mainly governmental institutions, but it is interesting to highlight that they sometimes classified themselves as non-profit organizations and often declared themselves as belonging to more than one category. The operational level of institutions was mainly National, followed by international and district level. In this case again a number of institutions declared themselves as belonging to more than one category. Regarding Core Activities, the most represented branches were Research, Information/Monitoring, Coordination, Facilitation and Education and Training.

In terms of expertise available and needs , it was clear that institutions in the region felt the need of incorporating/strengthening information technology expertise in their core activities.

And finally in terms of information infrastructure available, the result was that less than 50% of the institutions had Internet access points, where very often access is limited to some hours per day or to some authorized persons only, and less than 17% had their own website.

State of the information: The surveyed institutions declared having 238 datasets, but most of them interpreted the term "dataset", used by information specialists to indicate a collection of organized digital data, in a broader sense, thus including any collection of material, both analogical and digital. Inquired about the form of data, institutions indicated that approximately 60% of the datasets are stored in digital files. It has to be noted that the availability/accessibility of the remaining datasets, made exclusively of hardcopies (including reports, maps, satellite imageries, videos, etc.) will be obviously constrained by the resources needed for their reproduction (when applicable). For this category a primary goal should be the generation of digital catalogues of the datasets' contents (metadata).

Regarding the status of the data, 18% of the institutions did not provide any information about the development stage. The others show that 53% of the datasets are still under development while only 19% are completed.

In terms of data accessibility, considering all Datasets, the percentage of free accessible one is not very high, while when we look at dataset available via FTP this percentage decreases dramatically, most probably because there is a lack in the "information culture" and in the sense of sharing information.

Information needs: based on the answers to the questionnaire was clear that all institutions felt the need of more Information management in every discipline they were dealing with.

In conclusion the main "technical" outcomes of the IGAD survey were:

There was a good number of institutions producing information;

Documentation of such information was rather poor;

The capacity in sharing "quickly" the information was limited;

There was a lack of communication among these institutions (most of the partnerships were either at national level or with UN system agencies);

A RIIS based on the use of Internet technology for data/information sharing was viable but institutions needed support in introducing/strengthening the use of such technology. This meant mainly, but not only: staff training and facilities upgrading.

ANNEX 3: VERCON/Egypt A Model for Extension Research Networking

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Introduction

Internet is a potentially powerful tool for improving communication between research, extension and farmers. The **Virtual Extension, Research and Communication Network (VERCON)** employs this potential to establish and strengthen linkages among the human and institutional elements of agricultural research and extension. The VERCON enhances two-way communication, establish links between geographically dispersed people and, collects processes and rapidly disperses large volumes of information in a variety of forms. The VERCON concept was developed as a joint effort between FAO's Research, Extension and Training Division (SDR) and the FAO World Agricultural Information Center (WAICENT).

The Egyptian VERCON FAO/TCP project is the first field application of this innovative approach. The objective of the project is to establish a Virtual Extension and Research Communication Network in Egypt in order to strengthen and enable linkages among the research and extension components of the national agricultural system. The overall goal of the project is to improve, through strengthened research-extension linkages, the agricultural advisory services provided to Egyptian farmers and in particular to resource poor farmers, in order to increase production in food and agriculture with the goal of raising farm incomes. This project will provide valuable lessons for Egypt as well as for other countries in the region. It is very important here to emphasize that VERCON strengthens the research-extension linkage by providing an electronic medium for communication, storage, and retrieving information that has mutual benefit of researchers and extension workers such as research results, and growers problems. This information will help researchers to develop their research programs and extension workers to make use of the research results.

Due to the limited number of pilot sites, we could not add all the Research Institutes in this phase and we decided that the Agriculture Extension and Rural Development Research Institute (AERDRI) be representative of the Research Institutes in this phase. It will work as a mediator between the Extension body and the research body. In the future, the research institutes will interact directly with VERCON.

This paper will concentrate VERCON Information System Contents identified based of needs assessment of the Researchers and Extension workers. These contents will grow with time and more contents types will be added for the current and future stakeholders.

The following sections describe the physical structure of the communication network and the VERCON information system main functions namely: a search facility for extension brochures, a grower's problem solving component, a search front end for an agricultural statistical database, expert systems consultation facility, a discussion forum where participating parties in the VERCON system can exchange ideas, and news broadcasting system.

Overall Structure of the Network

The proposed physical structure of the network was to have CLAES as the central node because the infra structure and human resources it has. All sites are connected through national backbone. Two sites in Cairo are connected through dial-up connection: Agriculture Extension and Rural Development Research Institute (AERDRI), and Central Administration for Agricultural Extension Services (CAAS). The AERDRI will be connected this year to the ARC Local Area Network and hence will have permanent connectivity with CLAES. The Economic Sector (ES) has already Internet connection through a leased line. The four sites in Kafr El-Sheikh: The AERDRI office at the Regional Research Station, the Agriculture Directorate, and the two Extension Centers at E-Khademia and Aremon, have dial up connectivity through a local Internet Service Provider.

The Extension Brochure's Search Facility

Over the years, the Central Administration for Agricultural Extension Services (CAAS) has issued a number of brochures in order to bring awareness to farmers as to common issues relating to the farming of various crops. To enable rapid retrieval of this information, a specialized search interface, was provided. In addition, a facility for simply browsing those brochures online has also been made available through a separate link that has been provided in VERCON's front page. Though most of these documents are available in paper form, providing a search facility for targeted information retrieval can save extension workers valuable time and effort. To do so, sections within these documents have been automatically indexed based on domain specific information. The system that implemented this functionality was composed of a number of components including:

1. 1. A Structured Document Indexing Component: This component generates an index record for each section of a given HTML tagged extension document. The generated index will be used later for achieving targeted retrieval where sections rather than documents are returned in response to a query.
2. 2. A Keyword based Document Indexing Component: This component indexes each section in an extension document based on the significant keywords contained within it.
3. 3. A Structured Query Interface Component: The structured query interface helps the researchers to rapidly fetch the required information from the extension documents by selecting one or more values of the index parameters.
4. 4. A Free Search Query Interface Component: This component provides another way for users to search the extension documents using keyword search supported by most of the web search engines.

The Growers Problem Solving Component

The general problem-solving component provides an environment in which extension workers and farmers can put their problems directly to researchers and have answers to those problems available for other users to reference. The component will serve both as a searchable repository of solved problems as well as a medium for posting problems in a structured manner. When confronted with a problem, it is expected that an extension worker will consult the expert system and/or the search facility and that in most cases a solution will be found from either source. However, in rare cases when such a solution cannot be found, the problem will be entered using the Problem Solving component and appropriate sources will be consulted to find a solution. A detailed description of the problem in free text as well as a simple classification of it will be used to characterize the problem and its solution.

When a farmer approaches the extension officer with a problem for which a solution cannot be found using the expert systems or information found in extension brochures, the extension officer will enter the problem (without its free text description). A search utility will attempt to match the problem to previously solved ones and to present the extension officer with matching solutions. If a solution is found, then the extension officer will simply use the offered solution. The search utility will also attempt to match the problem against similar unsolved problems. If a match is found against unsolved problems, then the extension officer will be allowed to indicate that he/she too is facing the same problem and is interested in the solution. A counter and a log of all those who are facing any one given problem will be kept and used to set the priority for solving different problems. If however, neither a solution nor a similar problem is found, then the extension officer will have to enter the problem. (by entering a free text description for it). The extension officer may also record what he/she thinks is a solution for that problem. The problem will then be automatically dispatched such that extension officers at the appropriate agricultural directorate can review it. Subject matter specialists who have been assigned problem-solving privileges within the directorate will be able to view the problem and either modify the suggested solution, if one was entered by the extension worker, or to simply enter a solution. After a solution is entered, the problem and the solution will be available for reviewing by the Agriculture Extension and Rural Development Research Institute (AERDRI) representation of the regional research station which will forward it in turn to a specialized institute within the station. The solution will be reviewed by authorized researchers in the station and modified if necessary. The extension institute in the regional station will be responsible for publishing the approved solution. Once a solution is published the problem as well as its solution will be stored in the problems DB for future reference, and both will be visible to all users of VERCON. Figure 1 represents this sequence. This model will be repeated for all regions across Egypt.

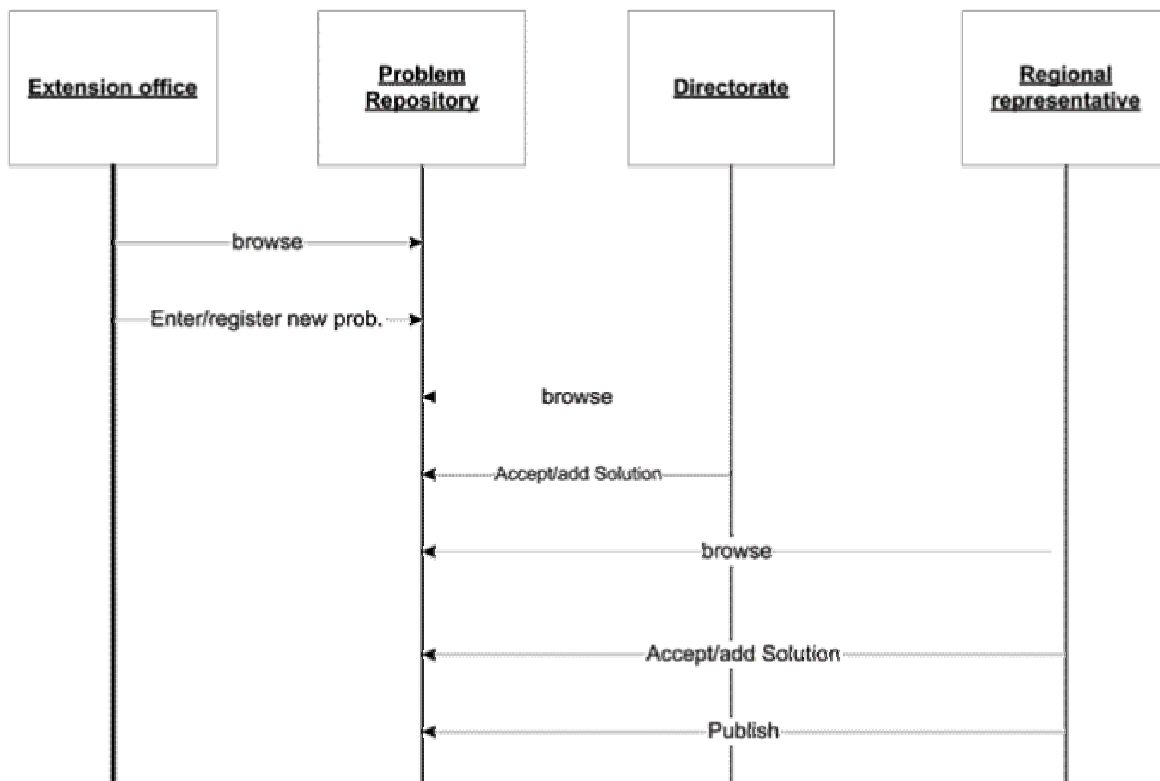


Figure 1: Problem solving and publication sequence model

As time goes by, it is expected that this component will develop into a rich repository of problems and their solutions and that it can itself be used to update extension brochures and the knowledge within expert systems.

The Economic Statistical DB Search Front End

Information within the Economic database provided by the Ministry of Agriculture and Land Reclamation, will be made available through a search front end. The database provides historical statistical information about the productivity of various crops across Egyptian governorates as of 1980 and to the present day. The database is implemented in SyBase and maintained by the Economic Sector of the Ministry. A Web interface for accessing these statistical data will be part of VERCON. This information will serve in measuring the impact of the research program and extension services nationwide. The implementation of the Web interface was done using active server pages (ASP) that are capable of translating queries into SybaseSQL form.

The Expert System Consultation Facility

Expert systems are powerful tools that can assist farmers in identifying problems and solving them rapidly. The central laboratory for agricultural expert systems will aim to make the rice and wheat expert systems available on-line for use by any interested party though specifically aimed for extension workers. These expert systems will be available through the “Consult the Expert” option in the system’s front page. Once they entered the

Expert System front page the extension worker will be asked to enter the static data of grower farm first. Extension workers will then be offered the facility of selecting from among a number of expert system subsystems and consulting those regarding: Land preparation, Variety selection, Planting, Irrigation, Fertilization, and Harvest (in Wheat only)

Each module will be provided independently of others. Investigating the integration of the various modules will be carried out after successful deployment of each to the Web. A communication model will be implemented for each module so as to promote intelligent question asking behavior. Static information about the user's farm, equipment, available material, etc. will be requested from the user when he/she registers for using the system. The user will be provided with a username and a password, which will uniquely identify him/her when he/she next uses the system and which will be used to load his/her static information for use by all expert system modules.

The static data of the farm are kept in a database such that the user does not have to enter these data each time he/she consults the system. The database is shared by the various expert systems, thus permitting the user to enter farm data only once, as opposed of entering it for each expert system. The database includes four types of data namely: general farm information, soil and water data, equipment data, and fertilizers data.

The land preparation module gives specific advice to the user about how to prepare his/her specific land for rice cultivation given: Plantation Area, Soil Salinity, Planting Type, and Previous Crop Residues, time available before planting. Its output operations are: Soil tillage, soil leveling, Basin dividing, and wet leveling.

The variety selection module recommends to the user the varieties most suitable for his/her land given: soil salinity, irrigation water availability, irrigation water quality, and the user requirements such as odor for rice. The output of this module is the suitable Varieties, its expected yield, growth period in days, and its resistance to some disease, and other feature of the variety.

Planting outlines planting methods best suited to a user's land given the variety to be cultivated, and soil salinity. The output of this module is the planting date, tool and method.

Irrigation produces an irrigation schedule given soil salinity, planting type, water source, variety, and planting date. The output of this module is the Irrigation Schedule.

Fertilization produces a fertilization schedule given soil salinity, planting date, variety, planting type, and previous crop. The output of this module is the Fertilization schedule.

Diagnosis determines the causes of abnormal observations on the plant given plantation date and abnormal observations on the plant. The output of this module is the causes (disorders) of the abnormal observations.

Treatment provides the user with the treatment of identified disorders given the causes of abnormal observations (disorders). The output of this module is the treatment schedule.

The Discussion Forum

One of the main goals of the VERCON project is to enable extension workers and researchers to communicate either directly or indirectly through the various components provided by the project. Among these components, are the discussion forum that will provide a means for extension workers to share their views and experiences and discuss issues and problems pertaining to their activities. Researchers will also be expected to have an active role within the discussion forum and to offer their views and advice whenever appropriate. The scope of topics to be covered is envisioned to be, though not limited to, the following:

- Issues and problems related to using the various offered expert systems
- Issues and problems related to a given crop

Unlike the general problem-solving component, the forum will allow users to informally share various ideas and opinions.

The interface provided for this forum will allow various users to either establish a new discussion group for the purpose of discussing a specific issue, or to subscribe and/or participate in already established ones. Once users have subscribed to a group, they will be able to see and search all messages that have been previously posted to the group to which they have subscribed. They will also be able to create new discussion threads or add their input to existing discussion threads by posting messages to that group.

The News and Events board

The news and events board enable extension workers and researchers alike to post news or event announcements that are of interest to the VERCON community. By default when a link to the board is followed, all events that have been posted will be presented. The generation of a web page containing all announcements is a dynamic process, which utilizes a data store containing information about the announcements as well as a presentation template. In addition, a link for allowing the posting of a new event will be offered. Similarly, when a news item is published, it will be dynamically added to VERCON's front page. A copy of each posted news item, or event announcement is forwarded to one or more people who have the authority to approve it so as to ensure the legitimacy of the items. A person, who has approval privileges, is offered tools to delete or modify an announcement of a news item or an event as well as a tool for publishing it.

The implementation of this board utilized the FAO's News and events Management System (NEMS). The authority for entering and publishing news is given to AERDRI as a first step. Later authorization for other participants will be given to enter news but the authority for approving and publishing the news will be only preserved for AERDRI.

Conclusion

The main achieved outputs of the project are:

- A prototype version of the VERCON information system established under the technical leadership of CLAES (<http://www.vercon.sci.eg/>).
- 7 pilot centres, representing research, extension and administration. The Agricultural Extension and Rural Development Research Institute (AERDRI), and its branch in Kafr El-Sheikh Regional research Station represent the research stakeholders. It is expected later that all research institutes will be part of VERCON. The Central Administration for Agricultural Extension Services (CAAES), KafrEl-Sheikh Agricultural Directorate (AD), and the two Extension Centers (EC's) at Khademia and Aremon, represent the Extension Stakeholder. It is expected later to replicate this model for all extension centers in Kafr El-Sheikh Governorate, and later on for all other governorates nationwide. The Economic Affairs Sector (EAS) represents administration stakeholders. EAS already has its own statistical database that it availed to VERCON.
- 15 technical staff at CLAES have participated in developing WEB applications of VERCON. 30 researchers and extension workers were trained on using Internet, 11 researchers and extension workers were trained on reporting problems using growers problem component of VERCON. It is expected to train 66 extension workers in the very near future. More training courses are scheduled for other components of VERCON.

It should be noticed that VERCON provides the Researchers and Extension workers with tools for strengthening their interaction. The proper usage of these tools will strengthen the linkage between research and extension. The Research-extension direct linkage can be observed in the Grower Problem Solving and Discussion Forum components. Indirect linkages exist in the Extension Brochure and Expert Systems components. The researchers provide their research results to the CAAS that use these results to produce the extension brochures published on VERCON. Extension workers can provide their comments on these brochures through the direct linkage components. The same can be said for Expert System Consultation Facility component as CLAES acquire the knowledge in the expert system from the researchers. Extension workers using the Expert Systems can provide their comments through the direct linkage as well. Although this sort of linkage exists now but it is very difficult to store, retrieve, classify, and produce reports from verbal and undocumented interactions. Providing an electronic medium to store all these interaction will help in documenting and rapid retrieval of all types of interactions.

In the future when all research institutes are connected to VERCON a component to provide a mechanism for proposing the research programs collaboratively with the extension workers may be developed. However, the

current set up facilitates this to be done through the discussion forum. The disadvantage of using the forum is that it is a general tool and hence is not oriented specifically to do this.

We are currently in the phase of deploying all the components in the field to monitor and measure the impact of using VERCON in Kafr El-Sheikh governorate. Preliminary evaluation showed that the extension workers are interested in using the extension brochure component, as this is the first one to be deployed. Extensive training is being conducted for other components of VERCON that are ready now.

ANNEX 4: Technical Highlights: Node XML

The internet has become the incarnation of a global, almost unexhaustable source of diverse information. Still many informational treasures are inaccessible, because the platforms and formats they are using form a barrier.

Even if an access is possible, the fact that the resources are widely spread over the web makes it laborious to reach each of them.

These problems require a solution that reconciles the power of a wide pool of decentralized sources generating information of high quality with local expertise and the usability of an access-point retrieving and displaying the desired content in an appropriate format. **NodeXML** and its **Gateway**, together representing our **multiple host search** engine, offer one possible solution.

Node XML prototype is focused on project data concerning research for development distributed in different databases in Europe.

Developed in cooperation between IAO and ZADI then enlarged with INIA and METAFRO hosting the databases.

The **Gateway** yields the functionality of a **search interface**:

- formulating standardized requests using the users input
- communicating with different hosts
- processing and displaying XML-based content

And **NodeXML**, installed on each host, implements the functionality of a **database interface**:

- translating a standard request into a database specific query
- wrapping the data returned by the database in an XML format
- sending back the XML data

The system is conceived in a way that takes the differences of platforms and formats into account.

The **Gateway** takes in the parameters determining what specific kind of data someone looks for (like a given geographical focus).

It then constructs a standardized request leaning against the SQL-standard and sends it to each nodeXML engine residing on each host.

NodeXML translates this standard request into a specific query adapted to the shape of the local database and communicates with it using an adequate API.

NodeXML then picks up the content returned by the database and wraps it in an XML format before sending it back to the Gateway.

At this point the Gateway processes the XML-stream, correcting it for faulty content, adapting it for homogenic layout and formatting it with XSLT and CSS for display purposes.

This search engine is based on PHP-scripts, XML-files and XSLT-sheets. The choice was an open source based environment and publish under GPL. So anyone willing to use this system can do it for free and is able to adapt the code to individual needs and even contribute to the project.

More technical information can be found at <http://nodexml.sourceforge.net>.

ANNEX 5: Lessons learned from other RAIS

a) EARD-Infosys+

In 2000 the network “InfoSys”, consisting of partners from all the countries of the European Community plus Switzerland, was launched to provide information on ARD. The system is a service to EIARD, functioning as a policy instrument.

The objective of InfoSys is to offer data on ARD in order to support decisiontaking at the policy level. It is also aimed at fostering the cooperation between institutions, the people working on ARD and the goal to jointly provide data regarding the scientific landscape in Europe.

When InfoSys was launched, search engines were not very abundant on the web and therefore the concept was to insert to specific metadata (“Yellow pages”) into a central database. For this reason partners –the National Nodes- came together to form a motivated group of colleagues working together over years. The experience of the last years showed that it was possible to tighten the links between institutions and specialists within Europe, very much due to personal bonds having evolved with time. The concept of feeding data into a central system in principle works, but it has disadvantages. Colleagues with little time resources provide data for a system, without profiting of credits and very much financing. Most active National Nodes succeeded in obtaining funding for personnel serving the network. Others worked hard in their sparetime, while actually being engaged in their proper jobs. Not to forget that the task to insert data very often is very laborious. Further with the development of web technology most of the institutions implemented their own website and database, seeking funding for their own systems. With this a competition for donors in the field of ICT lead to the idea of data being owned by institutions. Therefore several partners within InfoSys programmed a tool allowing a cross-database-search on databases located all over Europe (this tool is called nodeXML), always preserving the property right concerning the data.

Further concepts for the future have been developed regarding three aspects: the implementation of a demand driven system and the goal to offer communication platforms for working groups on the web and concentration on promotion to inform on the expertise available within the network of people and institutions.

Regarding the concept of a demand driven system, an E-Mail Alert Tool will send E-Mails to subscribed users, when data were newly inserted into the database. This should have the two effects that users are instantly informed, without having to search databases and with this are offered a service two widely distribute their updated information. This tool will also serve the promotion campagne, as users are frequently updated on the research results. It is hoped that with promotion and the E-Mail Alert Tool it will be possible to further involve scientist, as they are given the possibility to inform about their work.

Within the networks, which have evolved over the years, working groups frequently form to accomplish specified tasks. As it is always time consuming to contact the partners on the telephone, distribute documents, InfoSys+ is presently testing a communication platform, which offers a closed work surrounding to present documents, send serial E-Mails, comment on ideas presented etc.

With these concepts, building on the fundamentals of successful networks, InfoSys+ hopes to strengthen the ties within the community of scientists InfoSys+ and support cooperation in ARD.

b) APARIS

The primary objective of the APARIS project is to contribute to the improvement of rural livelihoods and agricultural development in the Asia-Pacific region by improving knowledge exchange and outreach, easing the dissemination of experiences and technological developments, and increasing the efficiency of such interchanges. This will be achieved through the application of three interconnected components within the APARIS project: ARD Gateway, applied in two stages; Thematic Networks of Knowledge; and Training and Meetings.

The ARD Gateway is considered to be the cornerstone of APARIS. Ultimately, the Gateway will be a comprehensive resource that identifies strategic and relevant sources of information providing the user with a simple, yet dynamic and sophisticated navigational tool for locating and managing information. It will serve multiple functions: a regional reference centre, a platform to connect regional specialists, a data resource, a

networking centre, and a form of institutional memory. Content will originate from within the APAARI membership base and the global ARD community.

It is anticipated that the implementation of the Gateway will occur in two phases, however the first of which will establish the bulk of the project, and the second phase will simply refine and enhance phase one as well as add the database function. Stage one consists of ten specific elements: 1) using the existing APAARI Homepage as a host and announcer of sorts; 2) linking of existing agricultural organization resources, in addition to assisting in the creation of content by organizations; 3) providing links to appropriate national and international databases; 4) providing access to publications and library catalogues; 5) compiling a library of information synthesized by the efforts of the Thematic Networks; 6) linking of existing networks; 7) providing timely news summaries and bulletins; 8) providing specific information on APARIS activities and plans; 9) providing a database on APARIS associations and networks, and finally 10) supplying a CD-ROM based version of the Gateway for those with limited internet access.

Following the establishment of the ten elements APARIS will subsequently endeavour to enhance the Gateway, add a metadata design and a global thesaurus of agricultural terms and finally develop criteria for evaluating the quality of information collected from a variety of outside sources.

The second segment of the project, Thematic Networks of Knowledge, is closely related to the Gateway and a positive feedback cycle will be created between them. It is anticipated that a number of thematic electronic conferences will be held per year with the choice of topic at the discretion of members and the Support Unit of APARIS. Participation will initially be limited to approximately 30 invited individuals, primarily scientists and experts from the Asia-Pacific region. During and subsequent to each Network a keynote paper and summaries of user contributions will be produced, additional background information will be added on current issues associated with the discussion topic, and related events will be announced. A moderator will be assigned by APARIS and will in turn assign a Network chairperson in a similar capacity as a chairperson at a face-to-face conference. Again, this information will be made available on CD-ROM.

The third component of APARIS will be in the realm of providing training workshops. Initially, the theme of these workshops will be focused on capacity building at the NARS level and increasing awareness of and training in the activities conducted by APARIS. Ideally, the selected participants will consequently impart this knowledge to other members at their respective institutions. As resources permit, the workshops will eventually expand to include topics derived from the Networks of Knowledge. Conclusions and recommendations will then be fed back to the Networks, thus creating a second positive feedback mechanism.

The APARIS activities will be developed and managed by APAARI in partnership with three defined groups. The Steering Committee will direct the development of the project and define the plan of work. The Support Unit will be charged with the daily operations of APARIS and they will be responsible for reporting to the Steering Committee at regular intervals. And the Information Nodal Points will be selected ICT officers or senior researchers from APAARI's membership base to act essentially as field staff and to provide feed back to the Support Unit.

Regardless of the highly technical component of APARIS, sufficient human resources are critical to the success of the project. It is estimated that one full time staff member will be required provided the staff support provided by APAARI, CABI and FAO-RAP remains constant over the next three years. Human resource requirements will decline once the project is up and running. In order to make the program truly participatory, it is anticipated that APAARI member organizations also contribute in the future. This, however, does not negate the need for an established core of people to provide continuity and leadership.

ANNEX 6: Survey Questionnaires: some examples

1. Infosys (Italian Node) Model

Institution/Organization

Name
 Acronym (if it exists)
 Address
 ZIP
 City
 Contact Person
 Tel
 Fax
 E-mail
 URL
 Are your activities focused on DCs?
 Are your activities “focusable” on DCs?
 Brief Description (in English)
 Keywords (max 10)
 Geographical focus of your activities

Projects

Title of the Project
 Interested countries
 Length/Starting date
 Donors
 Do you have collaborations?
 with foreign Institutions/Organizations
 with Italian Institutions/Organizations
 with other stakeholders
 Contact Person
 Tel
 Fax
 e-mail
 URL
 Brief Description (in English)
 Keywords (max 10)
 Geographical Focus

2. IGAD Model

The Need Assessment Survey consisted of questionnaires distributed mainly among governmental and NGO institutions; the questionnaire is made of 13 pages, divided into two main sections:

A. INSTITUTIONAL DETAILS

B. DATA SETS

A. INSTITUTIONAL DETAILS

- | | |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------|
| 1) CONTACT DETAILS | Name of Institution, address and other details like the contact person. |
| 2) DESCRIPTION | Kind of organization, core activities, budget, staff; list of programmes/projects relevant to RIIS. |
| 3) INFORMATION MANAGEMENT | Checklist of themes for which the institution is managing/using/needing information; needs. |
| 4) EXPERTISE | Checklist of professional staff with different levels of academical background; needs |
| 5) FACILITIES | Checklist of facilities, including computer hardware and software, available with the institution; needs. |
| 6) PARTNERSHIPS | Five lists (to be filled) of active or proposed partnerships including data/information and expertise/facilities sharing. |
| 7) CONCLUSIONS | Proposed contribution to RIIS; expectations |

B. DATA SETS

- | | |
|----------------------|-----------------------------------------------------------------------------------------|
| 1) CONTACT DETAILS | Name of the dataset, name of the stakeholder and other details like the contact person. |
| 2) DESCRIPTION | Details about source, form, geographic coverage, thematic coverage, etc. |
| 3) PURPOSE | Original and current use of the dataset; limitations. |
| 4) DATA DEVELOPMENT | When and how the dataset was developed; data quality details. |
| 5) DATA MANAGEMENT | How regularly the dataset is updated; documentation and metadata. |
| 6) ACCESS PROCEDURES | Details about costs and restrictions to access the dataset |
| 7) WISHLIST | Wishlist. |
| 8) THANKS | Checkbox to receive survey results. |

While the first section is unique for each institution the second can be either empty or multiple (more than one data-set).