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**STRENGTHENING NATIONAL FOCAL INFORMATION UNITS FOR EFFICIENT
ICT- NAIS CAPACITY DEVELOPMENT
The CASE OF MOROCCO**

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1. Introduction

Information is of key importance to INRA. Historically, INRA has supported adoption of new ICT in information management and access to online and Electronic information resources. In addition partnerships were made at national and international levels for information sharing. Collaboration through National and international information systems helps existing human resources to gain experience and to actively collaborate. INRA is seen as a major partner in the national agric information system. It is the leading Research institutions in the adoption on new ICT for information management and information sharing. INRA is coordinating several information systems dedicated to research data management. INRA is a potential and effective information producer and information consumer. Thus, the new role of INRA as a NAIS coordinator (National focal Unit) will help to strengthen its position and contribution within the Moroccan NARS to help dinamize the existing NAIS for an effective output and benefit to all partners.

2. Steps recently taken in establishing focal units:

INRA made use of existing NAIS. Most important entities that were contacted are the training entities (IAVH II and ENA Meknes). There is an informal commitment from the training entities to collaborate within the RAIS.

At the Agris NFU, first contact showed that there is a need to reconstruct what was left by previous team of manager who retired (voluntary retirement)

At the RAIS focal unit, Decision makers are aware of the role of the NFU but no practical step was taken in terms of budget and Human resource means.

Recommend:

Need a facilitator from external NAIS to rebuild what was broken down by previous AGRIS national focal point.

2.1 Capacity building activities:

Scientific and technical information used to be considered by INRA as one of the most important aspects to invest in. In the nineties, a strategy was adopted for capacity building aiming at giving opportunities to information professionals for postgraduate studies (Master Degree) in ICM and ICT and short training in ICT at commercial companies and in ICM and ICT at IARCs. In the last five years, it became difficult to continue providing support for capacity building due to budget constraints and the only offered opportunities were those provided by international agricultural research centers such as ICARDA.

Opportunities:

Train the trainers on ICM and ICT

Capacity building activity may be seen as an added value to encourage information specialists to collaborate into the NAIS

Threats:

ICT is evolving so rapidly that the only continued training will help ICT and ICM professionals to keep the pace with the evolving technology

2.2 Governance structure of ICM :

The actual governance structure of ICM in INRA is 20 years old. At that time a Division dedicated to Information, Communication and Training was established. In 2003, The Information and Communication Division was created in the new structure of INRA. This new structure combines two integrated units: The Documentation Unit which facilitates access to scientific and technical information for all researchers and partners and the Communication Unit which act as the INRA editor besides the management of the communication with national and external stakeholders.

The Documentation unit plays a major role in supporting regional centers by:

- Providing financial means for Journal subscription, documentation acquisition, bibliographic databases updating.
- Providing logistical support (Hardware and software) for Information management
- Ensuring that the same standards and tools are used for information management
- Providing technical support to information professional. Short term training is currently organized in different aspects of ICM.
- Strengthening partnerships within national and international information systems

Strength:

There is one formal body in charge of information and communication management with financial and logistics means to fulfill its mission.

2.3 Steps to integrate agriculture and agricultural research information in their NARS

Information is seen by researcher as a key component for their research. New technologies were introduced since 1987. The Documentation Unit was first connected using PSTN to the ESA/IRS ISP via the national Documentation center. Shortly after, ICT was introduced for information management. At regional centers where most Researchers are located there was a need to make existing information resources available. This was made possible firstly by giving access to online resources at the ESA/IRS ISP and then by making subscription to bibliographic databases on CDROMs. In the nineties the documentation Unit played a key role in implementing LANs and Internet access. More recently, the documentation unit is working to install servers at regional centers for online access to electronic resources via the LAN. In addition, subscription to online database AGORA was made and training was given to End-users

Strength:

Human Resource at the Documentation Unit gained experience in internet management (INRA ISP) and LANs implementation and management

Weakness:

Accounting procedures does not allow to make money deposit at information providers such as INIST France or BLDSC in UK. In the nineties, the documentation unit used to buy coupons for document ordering. This service ended after the BLDSC changed its procedure and encourage online documentation ordering.

Opportunities:

Need to explore what is available as information resources for the benefits of the researcher's community

3. Current status and strategies in building info contents for:**3.1 STI: grey literature**

Grey literature is as important as conventional literature to researchers. Due to cost of editing and budget constraints, researchers tend to make use of existing DTP software to publish their results. Consequently, it becomes more and more difficult for information professionals to have a comprehensive list of what is published as grey literature. At INRA, information professionals are facing the same problem for collecting grey literature. There is no specific methodology for grey literature processing and management. Existing grey literature is referred at the same database as conventional literature. In order to ensure large dissemination and access of grey literature, the Documentation unit is planning to develop electronic format of existing reports. The outputs will be made available in CDROMs media and the INRA website. At national level, the National Research Center www.cnr.ma is planning to set a national information system for grey literature.

Weaknesses:

- Limited skilled information professionals to scan existing literature

Opportunities:

- Need to learn from other country experiences (success stories)
- Need to know of existing Electronic Document Management tools

Threats:

Unavailability or limited access to existing Grey literature

3.2 Research data management GIS and other aspects:

Most of them are undertaken by the research and development and the Training entities in conjunction with Other Moroccan Universities. Project research budgeting includes acquisition of Laboratories Hardware and data acquisition hardware. Quite often, computer and peripherals are included with applications software (word processing, Spreadsheets, DBMS, GIS, Expert Systems, and Statistical packages). Computer use has become in the late 80's a key components for data collection, processing, storage and exchange. Moreover, Computer use has contributed to new jobs creation "Electronic Journal Editing, proceedings, and Posters" which are the basis of result dissemination to research and Extension managers and funding agencies.

3.2.1 National Plant Genetic Resources Conservation Morocco Genebank:

There are over 4500 species of higher plants of which about 200 species are considered as rare or threatened. Following the agreement between Morocco and FAO Plant genetic resources undertaking and the adoption of the Global Plan of Action on plant genetic resources, INRA has developed a national Genebank for medium and long term conservation and utilization of plant genetic resources. Information on Moroccan Genebank is based on model used at genetic resources unit of ICARDA. The system allows users to create tables, query all fields in the

database, and create labels for storage and distribution. Other system, GRIS was developed by IPGRI in collaboration with INRA to meet Moroccan Genebanks needs. A small program (database importer) was developed to transfer data from ICARDA to IPGRI model. The National genebank holds more than 14522 accessions of different species. Those accessions were collected from different INRA research units or repatriated from international institutions and universities. More details can be found on www.inra.org.ma/ist/public.htm

3.2.2 Geographic Information Systems on Sustainable management of natural resources through development of decision making tools:

It is worth noting that improvement of a specific crop requires thorough data compilation on the soil and climatic factors of the country. Morocco is in a semi-arid region where rainfall is not regular and soil is varied because of geological substrate's of the country. There are no doubt that the use of new IT based methods for collecting, processing, storing and disseminating data will help to efficiently and effectively produce Moroccan land suitability maps.

Thus, this project make use of different IT hardware and software such as PC, Workstations, Table Digitizing, Scanners, GIS software, and Satellite data. The compilation of IT technology in conjunction with field observation will produce thematic map. Examples of thematic maps are:

- **Agro-climatic maps:** It's a join project between INRA and the Directorate of National Meteorology (www.mtpnet.gov.ma/vpm/MarocMaritime/Organismes/Organismes/Meteo.htm) with the objective of producing a decision tool related to limitations and constraints of agricultural development due to climate changes. International standards and models are used. The project is based on GIS tools (Arcview) and a database which stores data on climate and rainfall. In 2005, based on GIS tools a collection of thematic maps (growth period, potential yield mainly for cereals, relief) were published (cf. L'atlas agro-climatique in www.inra.org.ma/actualites/vparait.htm)
- **Land Suitability maps:** Land use and management is based on land suitability maps that combine ecologic, technologic, economic and social data. In order to optimize use of land resources within Morocco. A collaborative project coordinated by INRA was initiated in 1999. Partners working on this project are: INRA, Hassan II of Agronomic and Veterinary science Institute "IAVH2", Directorates of Agriculture and Development Agricultural Agencies (ORMVA). In its first term, the project was targeting useful agricultural areas (SAU) which count for 5 Millions of hectares. So far, over 50% of the area has been covered. For Data processing, several tools and models are used based on international standards (FAO Ecocropl Model, LGP "Lead Growth period" etc...) in addition a databases on soil, climate and agronomic data. Those data are combined using GIS tool "Arcview". In 2005, a collection of land suitability maps was published (cf. L'atlas des cartes de vocation agricoles in www.inra.org.ma/actualites/vparait.htm).

3.2.3 National Plant genetic resources

For the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture, as adopted by 150 countries at the International Technical Conference.

INRA, was acting as a national coordinator for collecting data on plant genetic resources at national level and making this data available on a website. The Information and documentation Unit played a key role in providing technical assistance to national partner for training on data input.

Once data collected electronically, it was then, validated and merged in a national database prior to being made online at the following URL address

www.inra.org.ma/ist/bdd.htm. The Website informs on institutions, contact persons, projects, taxon, cultivars, bib reference, and bilateral and multilateral agreements. In addition, other aspects were presented such as activities related to in situ and ex situ conservations, use of phylogenetic resources and capacity building of institutions

Strengths:

- Several projects involving National partners regarding GIS (Agro climatic maps, land suitability maps, Plant genetic resources. are in progress in collaboration with IARCs
- INRA documentation Unit Human resources gained experience in PGR database and Web interface management

Weaknesses:

Most research databases are not accessed on line because of:

- Lack of an ICT strategy within the NARS.
- Fragmentation of scientific data
- Little use of database technology
- Stand-alone computing
- High risk of data loss
- No backup facilities
- Very limited Workgroup-based LANs at various locations with no file servers

Opportunities:

- Put in place a plan for capturing scientific data into structured databases
- Use web-based technology
- Need to learn from IPGRI, FAO and other IARC's experience in sharing information resources through the web based interface.

Threats:

- High risk of data loss

3.3 Research Management information:

3.3.1 Institutions:

Information on institutions is provided on published material. Most important one is outdated (1998). Very updated information has to be taken from the Ministry of Agriculture Department website www.madrpm.gov.ma/ministere_bref.htm, High Commission for Water, Forests and Desertification www.eauxetforets.gov.ma in addition to related sites of agricultural institutions: INRA www.inra.org.ma, graduate

schools such as Hassan II Institute of agronomic and veterinary science www.iav.ac.ma, National school of agriculture www.enameknes.ac.ma, state companies SOGETA www.sogeta.ma. SODEA www.sodea.com, Public lab. Of analysis and chemical research www.loarc.co.ma, Institute of export coordination and control www.eacce.org.ma

With relation to Moroccan universities, information is provided by the Department of higher studies www.enssup.gov.ma/etablissemments/listeuniv.htm. This website provides only information of universities affiliated to it.

With regard to information management related to institution, an extra work has to be done to group all existing data according to our needs and RAIS specifications.

3.3.2 Expertise:

At INRA level, data exists on researcher's expertise. Data was collected directly by the Information and Communication Division but not yet made available at the INRA site. For the training entities, the Hassan II institute of Agriculture and Veterinary science provide a list of professors and administrative staff on its related website www.iav.ac.ma/annuaire/aa.htm.

At the Research and Extension Directorate, a list of expertise within the ministry of agriculture is hold in electronic format.

Moreover, at the national level, the National Research Center www.cnr.ma is in charge of providing data on National research expertise

For a comprehensive list of agricultural experts, the National Agricultural of information system has to play a key role making available an updated list of experts according the RAIS requirements and specifications.

3.3.3 Projects:

By analogy to the Agris based scientific information system, information on Current agricultural research is of key importance to researchers, research managers. CARIS which is Current Agricultural Research Information System of the FAO was implemented by agricultural and Training Institutes to facilitate exchange of information about current agricultural research projects carried out by those Institutions. Training and Research Institutions use to contribute to the FAO input of CARIS. In late 90's, the first and last Moroccan CARIS Directory was produced by the Training, Research and Extension Directorate with assistance of INRA and IAVHII. As no coordination exists is this field, INRA current research projects are presented in its medium term program (2005-2008) (available on its website: www.inra.org.ma/activities/listpr.htm). The main entity for the PRMT is the Research Unit "RU" which depends on the Agric. Research Regional Centre. INRA's MIS project is integrating research module related to research program budgeting and management. The last aspect of the module (research program management) will incorporate CARIS aspect.

3.3.4 Projects outputs:

Agricultural Research projects are published in institutional journals. At INRA, the Division of Information and Communications (Communication Unit) is acting as a secretariat for two scientific journals *Al Awamia* and *Les Cahiers de la Recherche Agronomique*,

Researcher's papers are grouped at this unit and then sent to the scientific editor for evaluation by scientific readers. Once a paper is accepted it is published at either *Al Awamia* (116 issues) or *les cahiers de la Recherche Agronomique Journals* (43 issues).

In addition, technical collection of books and proceedings are also published. The Documentation Unit is maintaining an updated database of 1300 records for most of those publications using Agris standards and tools.

At the Training institutes, bibliographic information is kept updated for papers published in their respective scientific journals

Strengths:

- Information professionals are familiar with AGRIS & CARIS tools and methodology
- Existing data on INRA's publications and journals is updated and may be directly exported to the RAIS application software (Nerakin or Narims)

Weakness:

Existing data on Moroccan projects and expertise need to be updated. The process is time consuming

Information professionals are limited

Opportunities

IARCs support will benefit to sustain NAIS and boost information exchange and sharing at national and regional level

The web based system (NERAKIN) can help experts to online input data by themselves. IT professionals will intervene to validate and correct data

Threats:

Limited access to existing information resources

3.4 Extension and outreach information:

Agricultural extension is the primary responsibility of the ministry of Agriculture. The Directorate of Training, Research and extension has this mandate. This Directorate is providing finance support to publish written extension materials. The main extension newsletter is now available on Cdrom and on website (www.vulgarisation.net) The majority of smallholder farmers in Morocco today are relatively old (over 60 years) and are slow to replace this generation with young and educated farmers. Currently the department is running a number of specific programs to address this challenge, including educating the young, rural population, conducting gender and literacy

campaigns and helping NGOs with management skills. Extension messages are communicated by field demonstrations, extension bulletins, brochures, videos and radio and televisions programs.

INRA as the main entity of the NARS is playing a key role in agricultural technologies transfer within Moroccan National Agricultural System. In order to perform this task, a number of mechanisms are being used to strengthen these linkages and to ensure effective feedback, including the participation of extension staff in priority setting meeting, development of extension bulletins and brochures (over 70), periodic meetings of extension staff with INRA and regional centers, Participation in national technology transfer committees; active participation of senior management extension staff in INRA's National Technical Committee; and sharing of diagnostic information

Strength:

Extension material is available on electronic format

Weakness:

Online material is outdated

Opportunities:

Need to learn from other experiences

Threats:

Limited access to agricultural technologies by farmers resulting in unbalanced competition with countries where ICT is well integrated

3.5 Agric Education and E-learning :

Is still in its infancy. First attempt was made in 2002, when the Hassan II Institute of agriculture and veterinary science hosted an international meeting on ICT in academic networks in collaboration with the CIHEAM and CIDEFA. At that time IAV has stressed on existing ICT infrastructure aimed at developing e-learning material. A multimedia center is already operational and helps professors developing training material in electronic format. In addition a conference room is provided with a visio conference material. For an online e-learning process, existing bandwidth for internet access is not suitable 1 Mbits/s.

Weakness:

Existing internet bandwidth is not suitable for E.learning

Opportunities:

Need to learn from other experiences

Threats:

E-learning can make the difference between institutions that have already developed e-learning material and those that are using traditional methods

3.6 Market information:

Currently, the Directorate of programming and Economic Affairs is in charge of all producing agricultural information statistics information. Most important is the Agricultural Census which provides valuable data on different agricultural aspects (land tenure, crop production, animal production, cultivated area etc...) In addition, this directorate is providing statistics on national market. Data is collected by means of survey from most important crop and animal markets in Morocco. Collected data is stored in a Database. Though no online access is provided, Statistics are published in serial monographies (Crop and animal production).

In addition, the directorate of Statistics (www.hcp.ma) which is under the High commissioner for Planning is also providing market information on different sectors including agriculture. Information is collected by means of survey according to their own objectives and criteria.

Weakness:

Data on agricultural statistics produced by the Ministry of agriculture is not online

Opportunities

Need to learn from other expericne

Threats:

Limited access to Market information is harmful to decision makers, stakeholders and farmers

3.7 Communication infrastructure with NARS

Effective research requires rapid and reliable information exchange. Computer Networking was made possible after implementation of Internet in Morocco. Research and training entities were first to set up their own network.

The Research and Development entity "INRA" have made very important progress in the use of information technology. Over 400 of desktop computers are currently installed, most of which are Pentium 4 based but some are of old generations (Intel PentiumI/II/III- based). Most scientists have their own Pcs but some scientists have to share PCs because of the inadequacy of computers available. The Pcs are running with mixture of windows XP, 2000, 98 and 95.

Servers are mostly based in central sites. They are using windows server NT, 2000 and 2003. In addition Linux and HP-UX are also used for internet services management.

For desktop applications, MS office is widely used. For scientific computing the following softwares are used: SAS and SPSS for statistics, Excell , access, ARC-INFO, ARC View for GIS and Imagine for remote sensing. In addition, one important application has been the implementation of ICARDA – developed Plant Genetics System for the INRA Genebank.

3.7.1 Local Area Network:

The Research Entity: with exception to experimental stations, Existing Small and medium network cover all 12 sites of which 9 are regional sites, with a total of 500 outlets with Internet access. LANs are mostly workgroup networks with dedicated file server in central sites. Ongoing projects aims at extending and upgrading communication line using fibber optics for the backbones of LANs in Central sites of Rabat.

The Training Entities "IAVH2 and ENAM" have set up their own CAN "Campus area Network" in late nineties. This enables all their agricultural department buildings to be interconnected. Though, little data exists about their network equipments. Their Ethernet LANs is used mainly for Internet access.

The Ministry of Agriculture entities: Most important sites are those located in Rabat. Ethernet LANs were installed and interconnected via leased lines to the most important Directorate "Directorate of Programming and Economic Affairs". Most important servers used for agricultural census, statistical data and budgeting are located at this Directorate. In addition a leased line is used for WAN access.

At regional sites, little data exists, but most important are Agricultural Development Agencies "ORMVA" which should have implemented their own Ethernet LANs for Internet access.

The same situation for Regional sites of the Ministry applies to The Quasi Governmental Organizations, Professional Associations, NGO and the private sector.

3.7.2 Internet :

Research Entity: As a Member of the MARWAN, INRA is connected to internet since 1996, via a 2 Mbps leased line. The Information and communication unit "DIC" is in charge to provide the internet access. It plays the role of an ISP using

- Internet server HP 3000 under HP-UX
- Domain name inra.org.ma
- IP address 196.200.148.0 class C
- 2 Mbps leased line
- a Website www.inra.org.ma using apache

The 11 Remote sites of INRA located either at Rabat and other Moroccan Cities used to access Internet using a standalone PSTN dial up connection to the DIC INRA. Due to LANs development, all those remote sites are connected to the Internet via Leased line, DSL lines and VSAT according to the following:

- 1 Mbps DSL line in 2 central and 9 regional sites

Training and Development Entities: the IAVH2 and the ENAM are connected to the Internet via a 256kbps leased line using

- CISCO Access Router 1600
- 2 Synchronous modems
- IP addresses rent from Maroc Telecom
- A DNS iav.ac.ma / enameknes.ac.ma
- A Website www.iav.ac.ma www.enameknes.ac.ma
- Internet servers with Most Internet Services (Telnetd, Ftpd, SMTP, Httpd)

The Ministry of Agriculture Entities:

The Rabat located sites are connected to the Internet through the DPAE Internet connection

A 256 kbps leased line is used by the DPAE for Internet connection. The DPAE is the ministry ISP. All other Directorates have leased lines access connected directly to the DPAE routers.

For the rest of the Ministry regional sites, little data exists, but most used internet connections are standalone DSL connection as the Monthly subscription cost for Internet access 128Kbps is only (\$20).

The Quasi Governmental, NGO and Professional Association Entity:

Most internet connection are DSL which is cost effective in term of price and Internet connection quality as compared to PSTN and ISDN.

3.7.3 Website:

Most agricultural institutions have their own websites. The following table gives a list of Website address in agricultural sector.

| Name | URL |
|---|---|
| The Ministry of Agriculture, rural development and Fisheries | www.madrpm.gov.ma (Dept of agriculture) www.mpm.gov.ma (Dept of fisheries) |
| The High commission for water and forestry | www.eauxetforets.gov.ma/ |
| The National Institute of Agricultural Research | www.inra.org.ma |
| The Hassan II institute of Agriculture and Veterinary Science | www.iav.ac.ma |
| The Hassan II institute of Agriculture and Veterinary Science: the School of Horticulture in Agadir | www.iavcha.ac.ma |
| The National School of Agriculture in Meknes | www.enameknes.ac.ma |
| Directorate of Training, Research and Development | www.vulgarisation.net/ |
| Haouz Regional office of agricultural development | www.agriinvest-marrakech.org.ma/ |
| Agricultural association (irrigation and drainage) | www.anafid.org |
| Agricultural Portals in the Maghreb | http://membres.lycos.fr/marocagri/ |

Strength:

The majority of the Moroccan NARS are using ICT (LANs), have Internet access and Websites

Weakness:

- ICT infrastructure of old generation
- Most Existing websites are descriptive and does not include a web-based database interface.
- Existing IT Human resources are very limited

Opportunities:

Existing IARCs facilities (application softwares) can benefit to NARS information centres

Threats :

Limited use of ICT can be a barrier to collaboration and communication between NARS

4. Available human resource capacities in ICT/M :

There are over 250 of information professionals around the Ministry of agriculture and autonomous institute, of which 40% are working in ICT/M. The rest is doing administrative work. This situation was worsened two years ago when the government gave incentives for a voluntary retirement.

At INRA, there are 12 information specialists of which only 50% are working in ICM.

Weakness:

- Skilled Human resources on ICM and ICT are very limited
- Low percentage of Information professionals involved in ICM
- Capacity building of existing Human Resource is limited due to budget constraints and limited opportunities at national level

Opportunities :

IARCs can contribute to Human Resource capacity building

Threats :

Difficulties to keep with the pace of the rapid evolving ICT technology.

5. Existing mechanism of accessing and exchanging info

In mid 60's, information on agriculture was the first aspect to be considered by the creation of national information center (CND). CND was assigned the task of collecting, processing, storing and disseminating Moroccan agricultural information. The process of information collection includes all agricultural organisations (public as well as quasi governmental). In addition CND plays a coordination role within information centers in order to maintain the use of the same standards and to assess the compatibility of any newly developed system within the national agricultural information.

In mid 80's, the national agricultural Information system was established because of : Importance of agriculture in the national economy and existing infrastructure and qualified personnel in this sector. The NAIS called REDOCAM was based on four entities:

1. Research and Development Entity, composed mainly by the National Institute of Agricultural Research.
2. Training Entity composed of three main postgraduate Institutes the Hassan II of Agronomic and Veterinary science Institute "IAVH2" in Rabat , Tbe National School of Forestry "ENFI" in Salé and the National College of Agriculture "ENAM" in Meknes. Those three Institutes provide training on all discipline of Agricultural Science
3. The Ministry of Agriculture Entity composed of Major Centralized Directorates, Regional Directorates "DPA" and Regional Agricultural Development Agencies "ORMVA" supervising agriculture in rain fed and irrigated areas.
4. The last Entity is composed of Quasi Governmental Organizations, Professional Associations, NGO and the private sector.

The NAIS did not fulfill its objectives because the NAIS coordinator at the Directorate of economic affairs and programming did not share the same interests as the Research and training entities. For this reason, a bilateral agreement was signed between the Research and the Training entities. The two entities are collaborating on a complementary basis to avoid duplication of work in journal subscriptions and also technical collaboration. In addition, INRA is exchanging its publications mainly the two journals with over 70 institutions at national and international (30 countries) levels.

Strenths:

Good collaboration between INRA and the training entities

Weakness:

Collaboration among institutions is not well developed due to lack of coordination by former Moroccan NFU which only act as the AGRIS NFU Moroccan NAIS is not serving NARS partners and the research community

Opportunities:

Need restructuring based on successful experience and IARCs support

AARINENA RAIS project will be a good opportunity to re-dynamize existing NAIS
Need restructuring based on other successful experience from regional countries

Threats:

Access to national information is very limited and there is a risk of duplication of work and research.

6. Available Infrastructure and financial facilities:

6.1 Hardware /software

Agricultural information has been the first area in which Moroccan government provides means for restructuring. Early in the 80's, Information centers at the IAV HII and INRA were equipped with Minicomputer and information management software (Minisis). In the Nineties, most agricultural information centers introduced

Microcomputers using Win/ISIS and AGRIS Standards. In addition, the French cooperation provides technical assistance, IT facilities, SDI "Selective Dissemination of Information" via Internet to main agricultural institutions.

6.2 Standards and Tools:

Are mainly based on AGRIS standards and Agrovoc Thesaurus (French Version)

6.3 LAN and Internet:

All Information centers have Internet access via their Local area Network

6.4 Budget:

Most information centers have their own budget dedicated to Journal subscription, acquisition of books and Electronic databases, and subscription to Online access to AGORA Database.

Strengths:

Most Information centers have ICT infrastructure and Internet access

Weakness:

Existing IT facilities are of old generations

Lack of coordination leading to duplication of work and expenses for journal subscription

Opportunities:

IARCs support to set an advocacy program to decision makers to support and sustain existing infrastructure

Threats:

Limited access to available information resources can be a barriers to development of agricultural sector

7. Important Constraint affecting the building of their NAIS :

7.1 NAIS strategy:

Existing NAIS strategy does not respond to institutional expectations. It is more targeted to AGRIS objectives. The national AGRIS focal point was serving as a national database site. Focal point located at DPAE is not functioning. Data input to Agris stopped since 2000 (227 records sent in 1999-2000 to AGRIS). This situation worsened after most ICM managers retired within a voluntary retirement program.

Recommend:

Need to re-dinamize the existing Agricultural information system to better collaborate nationally and within regional fora.

7.2 Decision makers:

Previous experience with the National agric information system "REDOCAM" showed that the system did not fulfill its objectives. There is a conflict of interests between the different agric. Directorates due to absence of a national strategy on information resources sharing.

Recommend:

Need a advocacy program to Decision makers

7.3 Human Resources:

Limited number and lack of skilled ICT & ICM specialists:

- problem of regular database input and information processing at regional and central site.

- Absence of a continuous training for ICT and ICM

7.4 Standards and Tools:

- Translating information databases into a Arabic and English may be time consuming and seen as an extra unuseful work for partners.

- Existing databases at partners level may be of different format according to the used software (ISIS family software, MS software) and processing tools

7.5 ICT Infrastructure:

At national level: some institutions have bad or no internet connection. Decision makers' problem related as they sought internet access not important to their staff and also lack of qualified ICT staff.

8. Required support at national regional and international

Most constraints are related to human resources (professionals) and Decision makers aptitude to collaborate and facilitate the work within the NAIS

For these reasons, required support must be targeted toward those two aspects

8.1 Advocacy issue

Some steps related to advocacy need to be taken to facilitate and boost the NAIS Implementation within NARS partners

8.2 NAIS charter:

Need a facilitator for a one day workshop to define the NAIS charter that will clearly define membership and objectives of the NAIS and get a formal commitment of the NARS partners and define the work-plan activities for the starting year.

8.3 Training

- Train the trainers on Web based application, Tools and methodology
- Continuous training of existing Human resources on ICT and ICM to keep pace with the evolving technology

- Training must be on two levels:
 1. NFU for coordinating partners contribution
 2. Partner level to facilitate input within the NAIS

8.4 ICT infrastructure:

Improve existing infrastructure at the partners level (PCs) and NFU level (Server, Laptop)

8.5 TOOLS, Standards and application software:

A package including the necessary tools, methodology, tutorials and the application software need to be prepared distributed to NFU's with a defined work-plan of activities

9. Conclusion:

INRA and some training entities are already committed to collaborate within the RAIS. Thus by supporting development at national level, the RAIS will be more and more effective helping fostering partnership at regional level for the benefit of the research community. AARINENA and the collaborating IARC's must give specific attention to support the starting of the RAIS in order to join the existing RAIS fora for an effective collaboration.

10 Summary Tables

10 Summary Tables

| | Current status | Strength | Weakness | Opportunities | Threats |
|---|---|---|---|---|--|
| Governance structure of ICM | A Division dedicated to information and communication is involved in ICM and ICT | one formal body in charge of information and communication management | | | |
| Steps to integrate agriculture and agricultural research information in their NARS | Use of ICT to share existing electronic resources (CDROMs, online and via the LANs) | | | | |
| Grey literature | No specific methodology and database. | Very important | Limited skilled information professionals to scan existing literature | Need to learn from other country experiences Need to know of existing non commercial EDM tools | Unavailability or limited access to existing Grey literature |

| | Current status | Strength | Weakness | Opportunities | Threats |
|---------------------------------|---|--|---|--|------------------------|
| Research data management | Several projects involving National partners regarding GIS (Agro climatic maps, land suitability maps, Plant genetic resources. are in progress In collaboratio with IARCs | Human resources Gained experience of using tools and application softwares. Some projects are available online | - Lack of an ICT strategy within the NARS. - Fragmentation of scientific data - Little use of database technology - Stand-alone computing - No backup facilities - Very limited Workgroup-based LANs at various locations with no file servers | Need to learn of IARCs (IPGRI) experience in sharing information resources through the Web-based interface. Existing thematic networks and fora will help communication among research community and improve the use of ICT | High risk of data loss |

| | Current status | Strength | Weakness | Opportunities | Threats |
|--|---|--|---|--|--|
| Research management information | With exception to research outputs which is referred in databases. Research projects and institutions data need to be updated | <p>ICM/ICT specialists are more familiar with int.l standards and tools used for information management</p> <p>Existing data on INRA's publications and journals is updated and may be directly exported to the RAIS interface</p> | Existing data on Moroccan projects and institutions has to be updated. The process is time consuming and collected data is incomplete | IARCs support will benefit to sustain NAIS and boost information exchange and sharing at national and regional level | limited access to existing information resources |

| | Current status | Strength | Weakness | Opportunities | Threats |
|---------------------------------------|--|------------------------------|---|-------------------------------------|--|
| Agric Education and E-learning | Is in its infancy (2002). Existing ICT facilities and infrastructure aimed at developing e-learning material | | Existing bandwidth is not suitable for video conference | Need to learn from other experience | e-learning can make the difference between institutions that have already developed e-learning material and those that are using traditional methods |
| Market information | Two bodies responsible for market information | Data is in electronic format | Access to information is still in hard copy format and not online | Need to learn from other experience | Limited access to Market information is harmful to decision makers, stakeholders and farmers |

| | Current status | Strength | Weakness | Opportunities | Threats |
|---|--|---------------------------------|---|---|---|
| Communication infrastructure with NARS | Most NARS are using ICT (LANS), have internet access and Websites | ICT is fully integrated in NARS | ICT of old generation Bad on no internet access Existing websites are not dynamic | Existing IARCs facilities (application softwares) can benefit to NARS | Limited use of ICT can be a barrier to collaboration and communication between NARS |
| Human Resources capacities | Existing ICT and ICM professionals are very limited and only a small percentage of available HR are involved in ICM activity | | Existing skilled ICT/M professionals are limited Lower percentage of Information professionals involved in ICM Capacity building of existing HR is limited due to limited offered opportunities at national level | IARCs can contribute to HR capacity building | Difficulties to keep with the pace of the rapid evolving ICT technology. |

| | Current status | Strength | Weakness | Opportunities | Threats |
|--|--|---|---|--|--|
| Existing mechanism of accessing and exchanging info | The Moroccan NAIS was historically supported and established by the government. Existing agric. Institutions are grouped under four entities | On-going collaboration between INRA and the training entities | Existing NAIS is not functioning Collaboration among institutions is not well developed due to lack of coordination by former Moroccan NFU which only act as the AGRIS NFU | Need restructuring based on successful experience and IARCs support AARINENA RAIS project will be a good opportunity to re-dynamize existing NAIS | Access to national information is very limited and there is a risk of duplication of work and research. |
| Available infrastructure and financial facilities | ICT is used Intern.l standards and tools are used Existing budget dedicated to journal subscription and books acquisition | Most Information centers have ICT infrastructure | IT facilities are of old generation Lack of coordination lead to duplication of expenses (journal subscription) and work | IARCs support on advocacy to decision makers to support and develop existing infrastructure | Limited access to available information resources can be a barrier to development of agricultural sector |