



Coordination of the Agricultural Research In the Mediterranean Area

D1.3 COUNTRY REPORT

**Overview on the research system and research programmes
on Mediterranean agriculture**

MOROCCO

IAV

Country Focal Point: Mohammed Sadiki

2010



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

BACKGROUND.

The overall goal of the operation of surveying and mapping agricultural research programmes, their owners, and research capacity was to gather comprehensive information so as to share better knowledge and recognition of the Morocco's agricultural research potential.

The operation was completed through the common and standardised questionnaire in order to bringing to light a description of the situation. Hence, the capacity and functioning of the funding mechanisms and sources as well as procedures of the national agricultural system were described.

The operation should allow to see how to contribute to defining the general orientations and opening the path for a scientific and technological cooperation among partners of ARIMNET within the frame of the WP2, WP3 and WP4.

What the questionnaire does seek to do, on the other hand, is to weigh up a country's scientific potential with a view to its classification by location and by discipline, and to pinpoint the issues that prevent it from fulfilling that potential.

The questionnaire has been developed to gather in standard way information on research activities, funding procedures and mechanisms covered by national programmes on Agricultural Research in the Mediterranean. The outstanding response rate made it possible to gain a closer look at the composition, funding, equipment, working relations and output of grassroots units in all their diversity.

It was distributed to the target institutions according the following steps:

- First, during a workshop held in November 2008 by PIN (National Focal Point for PCRDT programmes) on presenting and encouraging and increasing participation of Moroccan groups in the FP7 calls, a presentation of the ARIMNET was given to an audience including all partners concerned. In this presentation it was said to the partners that within the W1 they will be contacted to provide information on their programs and facilities. Additionally ARIMNET presentation was sent to the relevant partners.
- In March 2009, a workshop was held with partners involved in agricultural research to explain the ARIMNET workplan and the information needed from them. The structure of the questionnaire was explained. Additionally an announcement was



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

sent to the institutions asking to designate a contact person to monitor the questionnaire at their level.

- Several exchanges occurred with different institutions individually from March to June. Then one day workshop was held at IAV gathering contact persons of partners institutions of the NARS involved in the agriculture research in July 2009. The questionnaire was presented and explained.
- Given the language ability of the partner institutions, the French version of the questionnaire, provided by the ARIMNET coordinator, was then sent to the partners.
- The questionnaire filled by each partner was collected and data entered into the structured file designed in the ARIMNET website.

Further information was synthesised from the existing sources on national agricultural research programmes, owners, research institutions and capacities, and training scheme.

GENERAL ORGANIZATION.

Organisation of the overall agricultural research system and coordination

Main components

Most Moroccan scientific research currently falls within the public sector domain. However, the growth of the components the agricultural of the research system has been more the result of dynamics within professional circles than from other factors. Additionally, various services and laboratories are in the quasi-public sphere, created by offices and companies devoted to development and industrialisation, whose research needs they serve.

The main players on the Moroccan agricultural research scene are the research centres, high education and research institutes and universities. The major components are institutions that operate under the ministry of agriculture and marine fishery. Their budget and programmes are under this authority. They depend on the Ministry of high education and scientific research only for accreditation of training scheme. These are:

- Institutions for research and experimentation
 - National Agricultural Research Institute - INRA
 - National Center for Forestry research - CNRF
 - Service for Experimentation, Testing and Normalization - SEEN



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

- Institutions for higher education and research in Agriculture
 - Hassan II Institute of Agronomy and Veterinary Medicine- IAV
 - National School of Agriculture - ENA
 - National School of Forest Engineering- ENFI
- Institutions for technical training in different regions and coordinated by
- Direction of Education, Training and Research (DEFER)

There are 16 universities under Ministry of Higher Education. Some of their training programmes and research structures contribute to research areas related to agriculture. These institutions play a strategic role in the modernization of Moroccan agriculture.

Together these institutions:

- Ensure the training of most of the scientific and technical staff needed for Moroccan agriculture, rural development and associated sectors
- Conduct most of national agricultural research and innovation through national and regional programs
- Contribute to scientific production
- Innovation and technology packing and transfer

The Ministry of Agriculture is the main programme owners. It defines the policy, oversees the establishment of priorities with stakeholders and controls the budget. It delegates the ownership of national programmes particularly to INRA which may subcontract or open the programmes and projects to the other institutions (IAV, ENA and ENFI).

Research funding

The research budget comes from 3 major sources. The General picture across institutions and departments is:

- Public: 83 % (including Institutions funding and calls)
- Private: 7%
- International cooperation 10% (including : International competitive research grants; International project calls; Institutional agreements)

Over all sectors public expenditure (salaries not included) devoted to scientific research (investments and running costs) represent less than 0.9 % of the gross domestic product. The budget devoted to agricultural research is roughly around 30 % of this figure.



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

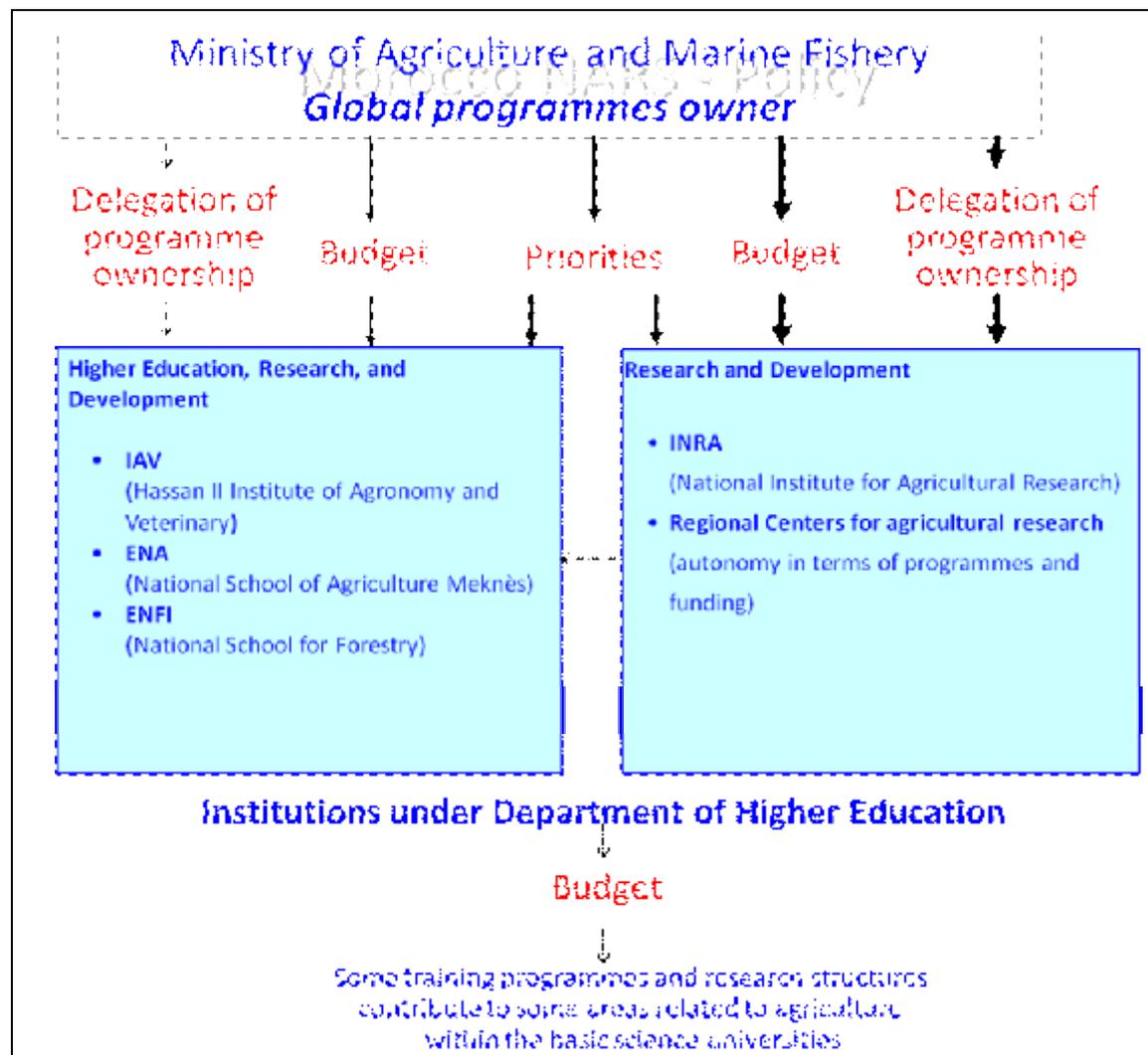
www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

The supplementary funding contributed by the private sector is difficult to quantify. It is likely to be confined to internal expenses and engineering purchases from abroad, much more than it is to feeding national public research contracts.

General scheme of agricultural research programmes organisation



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

In terms of priorities the major broad domains/sectors targeted developed as follows:

- Food and Agro-Industries & Post-Harvest,
- Animal Production & Health,
- Biotechnology,
- Fishery & Aquaculture,
- Forestry & Agroforestry,
- Land & Water,
- Plant Production & Protection,
- Socioeconomic & Farming Systems,

Cooperation

Cooperation and partnership are fundamental in the development of the Moroccan NARS which widely open internationally, particularly on the Mediterranean environment and African countries. It holds strong linkages with different donors in the agriculture domain. The following figure summaries linkages of cooperation entertained by the components of the system at different levels.



ARIMNET ERANET Coordination Action

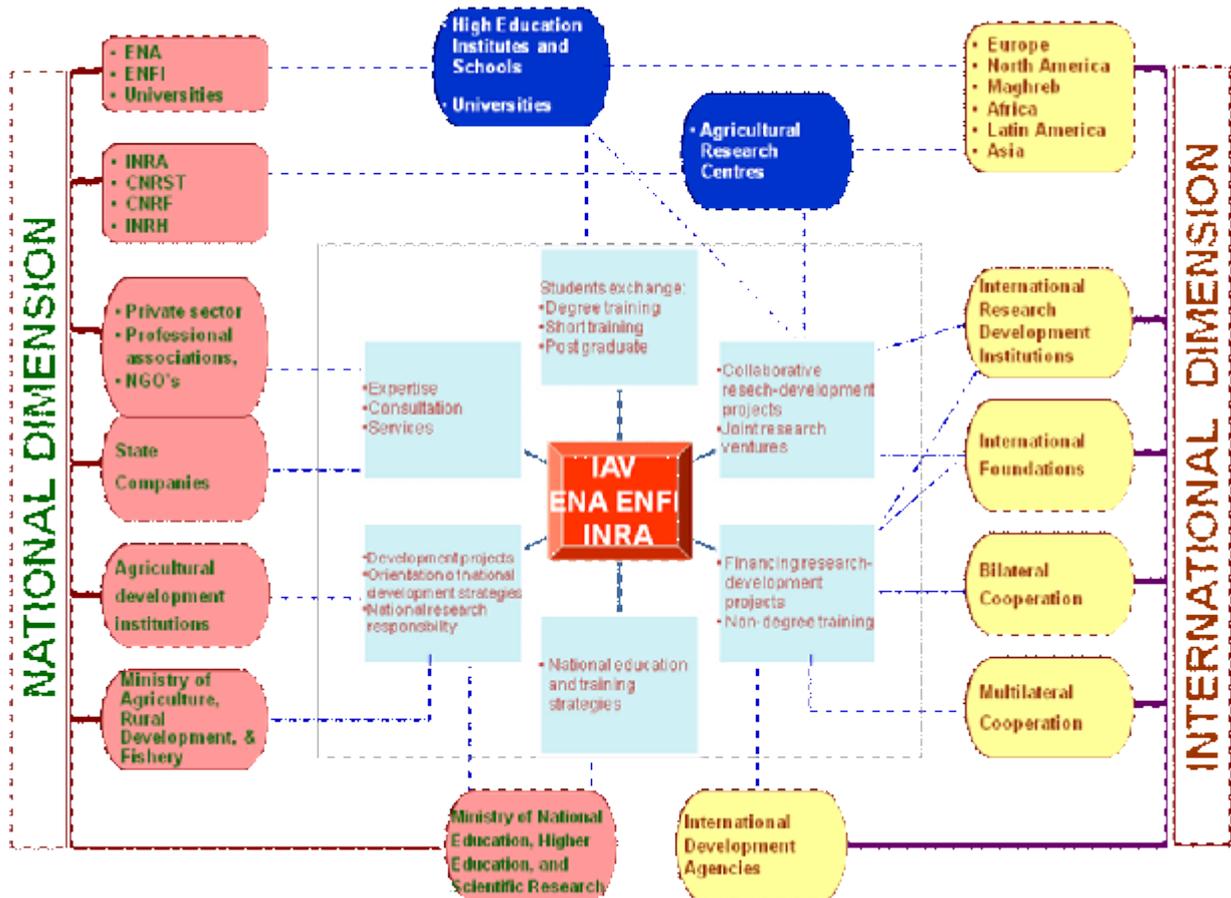
Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

NARS: Cooperation, partnership, and networking



These linkages include local, national, regional, and international levels:

- **National cooperation and partnership**

Large and strong partnership networks with clients and target groups (public development institutions, private industry, local communities, etc.) for:

- field research,
- demonstration,
- practical training
- commissioned research



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

▪ **International cooperation and partnership**

The agricultural research system includes two major dimensions in its programmes and activities:

- Mediterranean dimension
- Heavy involvement in Africa: regional initiatives, projects, expertise, etc.

The system is widely open on the world with strong partnerships, regionally and internationally based on:

- International networks for research, education, and training
- Collaborative research and participatory research
- Strategic regional alliances.

MAPPING OF RESEARCH PROGRAMMES.

The Moroccan agricultural research strategy is primarily based on:

- Decentralised research: projects and actions performed nationally in various regions
- Strong partnership with clients and donors
- Strategic linkages with scientific and development institutions

Description of thematic area

Orientation of the agricultural research strategy

The agricultural research in Morocco is particularly clients oriented. A participatory approach is frequently conducted to determine research needs and their valorisation through dialogue with clients and partners, especially through the regional councils for research orientation.

The principal orientations of the national research strategies include the following fundamentals:

- Integration of research and training
- Priorities of the national agricultural development policy,
- General orientations of national scientific research,
- Strategic orientations of the national agricultural research,
- Reforms in progress in the higher educational system
- Need for high quality training of engineers and veterinarians,
- Requirement of the national and international partners,



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

- Needs of the farmers and of the economic operators
- Existing resources.

Agricultural research is structured around:

- Transversal thematic programmes.
- Production-chain (filières) programmes, and agroecosystem/regional/local programmes.
- General programmes for supporting research-development in agriculture structured into projects organized through calls targeting national research institutions and their partners.

Major transversal thematic areas of national agricultural research

Transversal strategic thematic research domains	Main components of National Agricultural Research System of Morocco (NARS)			
	INRA	IAV	ENA	ENFI
Characterization and conservation of natural resources: water, soil and agrobiodiversity	X	X	X	X
Biotechnologies applied in agriculture	X	X		
Economic water management, Climate, drought control, and desertification mitigation	X	X	X	X
Crop and animal improvements in harmony with the regional and local potential	X	X	X	
Development of management practices that improve productivity and quality of products of different commodities	X	X	X	
Diversification of agricultural products and improvement of their competitiveness.	X	X		
Improvement of the human nutrition through the quality of agricultural products and ensured food safety	X	X		
Valorization of agricultural products	X	X		
Development of systems for geoinformatics and teledetection and geographical information systems	X	X		
Socio-economic and impact studies	X	X	X	X



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

Development of tools and strategies to support economic operators in decision making	X	X	X	
Control of animal diseases and protection of the public veterinary health		X		
Research-development and technology transfer	X	X	X	X

Mid-term Regional Programs 2008-2012

The mid-term regional programmes are developed for a 4 years period (2008-20012) based on five general orientations:

- "Mise à niveau" of different commodities concerning the two pillars of "Plan Maroc Vert" and improvement of their competitiveness;
- Agroecological characterization of the environment and sustainable management of natural resources (soil, water, biodiversity) ;
- Climate change studies and impact on agricultural production;
- Production systems, socio-economic and institutional environment studies and impact of agricultural policies;
- Coverage of different ecosystems and regions (arid and semi- arid, oases, irrigated land, mountains, rangelands, Sahara and pre-Sahara zones).

Domains of activities of PRMT 2008-2012

The major domains of activities are as follows:

- Sustainable management of natural resources, especially, water, soil and agro-biodiversity of both plants and animals;
- Improvement of agricultural productivity and diversification of agricultural productions:
 - *Plant Production*
 - *Animal Production*
- Improvement of quality agricultural products and their valorization;
- Strengthening research development activities and valorization of technologies through technical assistance and technology **transfer**.

The major programmes owned by the ministry and delegated for management and execution to INRA are:

- Agricultural Land Suitability Map
- Climate change and risk management
- Plant breeding and genetic resources conservation



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

- Agricultural and range lands monitoring
- Oasis rehabilitation and development
- Valorisation of agricultural products
- Medium term research program of regional center of Settat (PRMT CRRA SETTAT)
- Medium term research program of regional center of Meknes (PRMT CRRA MEKNES)
- Medium term research program of regional center of Rabat (PRMT CRRA RABAT)
- Medium term research program of regional center of Marrakech (PRMT CRRA MARRAKECH)
- Medium term research program of regional center of Tangier (PRMT CRRA TANGIER)
- Medium term research program of regional center of Tadla (PRMT CRRA TADLA)
- Medium term research program of regional center of Kenitra (PRMT CRRA KENITRA)
- Medium term research program of regional center of Agadir (PRMT CRRA AGADIR)
- Medium term research program of regional center of Errachidia (PRMT CRRA ERRACHIDIA)

Programmes owned by the Ministry of Agriculture and delegated to DEFR

Federating projets of research-development (Projets Fédérateurs de RD: PROFERD)

Programmes owned by the Ministry of Higher Education and Scientific Research and delegated to CNRST

Thematic programme in support to scientific research (PROTARS)

MAPPING OF RESEARCH INSTITUTIONS.

The main players on the Moroccan agricultural research scene are the research centres, high education and research institutes and universities. The major components are institutions that operate under the ministry of agriculture and marine fishery. Their budget and programmes are under this authority. They depend on the Ministry of high education and scientific research only for accreditation of training scheme. These are:



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

- Institutions for research and experimentation
 - National Agricultural Research Institute - INRA
 - National Center for Forestry research - CNRF
 - Service for Experimentation, Testing and Normalization - SEEN
- Institutions for higher education and research in Agriculture
 - Hassan II Institute of Agronomy and Veterinary Medicine- IAV
 - National School of Agriculture - ENA
 - National School of Forest Engineering- ENFI
- Institutions for technical training in different regions and coordinated by
- Direction of Education, Training and Research (DEFER)

These institutions play a strategic role in the modernization of Moroccan agriculture.

Together these institutions:

- Ensure the training of most of the scientific and technical staff needed for Moroccan agriculture, rural development and associated sectors
- Conduct most of national agricultural research and innovation through national and regional programs
- Contribute to scientific production
- Innovation and technology packing and transfer

Human resources in the main institutes

In terms of human resources, the capacity of the major national agricultural research institutions under ministry of agriculture is as follows:

Institution	Number of permanent scientists
IAV	260
ENA	56
ENFI	25
INRA	191
Total	532

INRA

INRA is entirely devoted to research-development. The activities of research are undertaken at the level of Units of Research (UR) sets of themes or disciplinary having a



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

minimum of six permanent researchers. From its mission, the INRA undertakes finalized research having aimed at the development of agriculture. Thus, the research programmes of the medium-term is structured in in 74 research projects. The INRA chose a regionalization and a devolution of its activities of research which resulted in the establishment of its research programmes on the level of 10 regional centers of agronomic research (CRRA) and 23 experimental fields (OF) distributed through the various ecological agro zones of the country.

Thus the 10 Regional Centres have a medium-term research work plan based on orientations determined with the regional partners. Research projects are complementary and deal with different production sectors and diverse regional centres mandate zones.

The institutions in charge exclusively of research, mainly the INRA, the activities of research are undertaken at the level of Units of Research (UR) sets of themes or disciplinary having a minimum of six permanent researchers. From its mission, the INRA undertakes finalized research aimed at the development of agriculture. Thus, INRA has medium-term research programme of 4 years structured in 32 Orientations of research (or unit of research) declined in 74 research projects. The INRA chose a regionalization and a devolution of its activities of research which resulted in the establishment of its research programmes in 10 regional centers of agronomic research (CRRA) and 23 experimental stations distributed through the various ecological agro zones of the country.

IAV-ENA-ENFI

For the agricultural higher educational institutions (IAV, ENA, ENFI, the activities of research carried out lie within the scope of a global program of research and development structured around a fundamental research, of a strategic research having a general impact on the agricultural and rural development and of a finalized and adaptive research leading to the creation of new technologies in the agricultural field. This research is undertaken by approximately 80 disciplinary teams made up on average of six teacher-researchers.

Research related to water and techniques of irrigation and the water-soil-crop relations is undertaken at the level of specialized laboratories and in 11 experimental stations of water control managed by the regional offices of agricultural development (ORMVA) at the level of the large irrigated perimeters of the country.



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

MAPPING OF RESEARCH FACILITIES.

The research facilities and platforms are entirely owned and managed by research institutions. Indeed, the research facilities developed by the research institutions are entirely devoted to the activities of the institutions and are accessible to outside users only through common activities or projects. The institutions of research and agricultural higher education developed structures specialized in strategic fields for agricultural research. INRA set up the center of biotechnology installed to the CRRA of Rabat, two centers of conservation of the phylogenetic resources of the cultivated species installed with the CRRA of Reduction and Settat, the world collection of the olive-tree with the CRRA of Marrakech, the collection of fruit trees with the CRRA of Meknès and the center of radioelements to the CRRA of Tangier. The IAV has a veterinary hospital complex, of a market of technology, a clinic of the plants, a botanical garden, a center of environmental education and a station of purification of worn water. The CRF developed several collections of forest trees. Just as the ENA of Meknès created an platform on the level of the area devoted to the olive-tree.

The only currently open and shared facilities belong to the National Center for Scientific and Technical Research (CNRST). These platforms are named UATRS (Units for technical support to scientific research. Operating under the Ministry of higher education this organization has national mandate to promote research. These facilities are open to all agricultural research institutions upon payment and agreement.

UATRS are technical platforms open for the Moroccan scientific community in universities, in specialized centers and in small/medium Enterprises and Industries. Such a structure is unique in Morocco the aim of which is to offer an expertise that helps develop research activities and specific analytical studies. In fact, in order to bring new ideas and innovation to completion, and therefore to meet a market, the UATRS has the possibility to help technology developers maximize their chance of success and by the way achieve their objectives. Operational since January 2005, the UATRS is composed of about 10 laboratories that include chemical analysis, materials characterization, and biology/life science diagnostics. Because of the high cost of the available heavy infrastructure, either at the purchase stage or during its use and maintenance, the CNRST decided to assemble all the equipments in one site and to promote the culture of mutual use of expensive and sophisticated instrumentation. It also has the advantage of



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



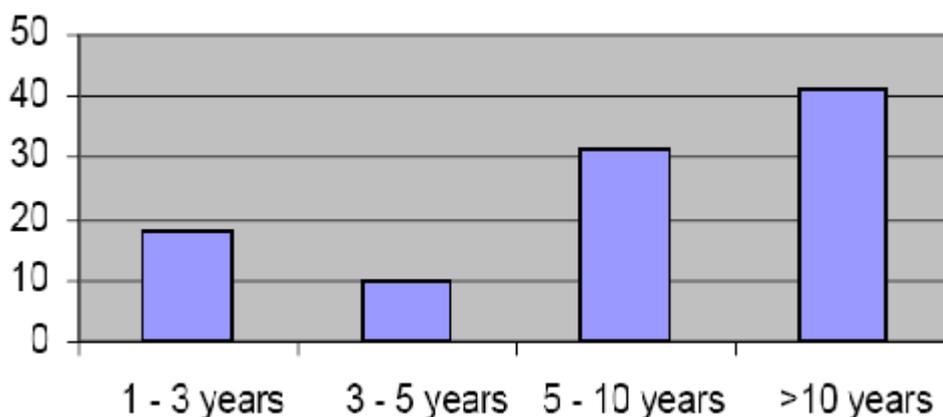
Coordination of the Agricultural Research In the Mediterranean Area

producing complementary results which is usually a fundamental and a strongly recommended approach for state-of-the-art scientific research.

The research facilities are generally small size units and have limited capacity. They are scattered and cover most areas depending on institutions. Generally, the situation of the capacities of research is characterized by:

- A scarcity of the equipment (difficult acquisition - even for the small equipment - because of the cost, the intermediaries, the times due to the administrative formalities, the penalizing customs duties) and of the frequent deficiencies of maintenance (because mainly of a lack of specialized technicians);
- Acquisition of the heavy equipment through projects funded through international co-operation and often thanks to a personal effort of the researcher. It is often a park of old equipment: 41% of the apparatuses having more than 10 years;

Average age of scientific equipments



- A broad underutilization which concerns most of equipments. A real problem of profitability of an expensive material arises as for its purchase and its use which must be planned on an institutional level. Thus there is need for the installation of technological platforms accessible to all. The UATRS of CNRST brought a partial solution to this problem but there is a need for such system for NARS;
- Medium equipments and in particular computer equipment, seem to better function. 68% of the machines are in good or excellent operation. However, it is to be announced that sometimes certain machines are not used any more, even if the



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

breakdowns are very simple, and this, because of the shortage of specialized technical staff for ensuring their maintenance;

- Several handicaps block the acquisition of the material of which most important are:
 - Luck of funding,
 - Administrative aspects of the procedures of acquisition (obligatory passage by the public calls, terms of payment);
- Absence of regular repairing of the material and equipment broken down because of:
 - the absence of permanent technicians and the absence of maintenance contract for the apparatuses,
 - the absence of systematic purchase of spare parts during the delivery of the equipment..

MAPPING OF TRAINING SCHEMES.

The agricultural education and training system strongly integrate research is summarised in the following figure combining all three institutions: IAV, ENA, ENFI. The system just finished the implementation of the reform cycle that concerned all higher education in Morocco in light of the European Bachelor-Master-PhD architecture.

Architecture of the newly reformed training system



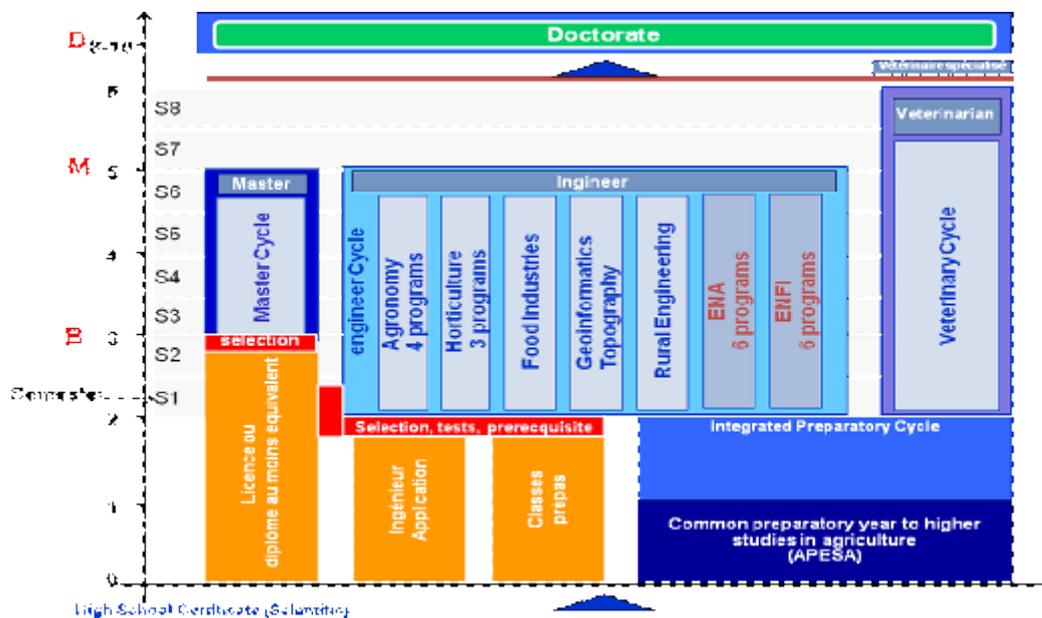
ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area



Accreditation

Since 2006, all education and training programmes are submitted to accreditation by the Department of Higher Education and Scientific Research which carry this mandate. This new accreditation process has many advantages:

- Duration of accreditation: 4 years, renewable upon evaluation. This allows the necessary adjustments to adapt curricula to the needed profiles
- Possibility of setting-up new programs depending on needs and priorities
- Curricula oriented towards more professional skills
- More options and choices for students in terms of programs and disciplines
- A process of quality control and maintaining standards
- Tool for strengthening partnership and interaction

Sectors

The main broad teaching and training sectors are:

- Agronomy and related areas (crop production, plant protection, animal production, soil sciences, natural resources, pastoralism, social sciences)
- Veterinary Medicine



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

- Topography - geoinformatics
- Food Technology
- Rural Engineering
- Horticulture
- Forestry

Master level (engineering and master diploma)

The currently accredited curricula and specialties for the Master degree level (engineering and master diploma) are listed here after.

Domain of training	Curriculum and specialties
Agronomy	Biotechnologies et Amélioration Génétique Végétale et Animale
	Plant Production engineering
	Animal production engineering
	Natural Ressources and Environnement
	Economy and management
Horticulture	Horticulture
	Plant Protection
	Landscape architecture
Food and agricultural industries	Engineering in Agricultural and Alimentary industries
Topography and surveying	Geomatics, photogrametry, and topograpy ingineering
Rural engineering	Water-irrigation, Infrastructures Energy and agroequimpments
Veterinary Medicine	Veterinary medicine sciences

Access

Access to the agricultural education system is regulated. Students are hired among candidates holding fresh high school certificate to enter engineering and veterinary training cycles. Selection is base on high school records. Students enter the preparatory cycle of 3 years (4 semesters). After this cycle, the student can choose to enter the engineering cycle (3 years after preparatory cycle = 5 years after high school) or veterinary cycle (4 years after preparatory cycle = 6 years after high school).



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

Master degree (as it is in basic sciences universities) has been introduced recently through two programmes: biotechnologies applied to agriculture and water and irrigation. It is open to bachelor students from basic sciences universities.

All graduates from these cycles can enter doctorate cycle (PhD) based on selection procedure. This cycle is also open to candidates holding master degree or equivalent diploma from other Moroccan or foreign universities.

Doctoral studies

Center for Doctoral Studies has been accredited at IAV with 4 doctoral programmes accredited:

- Agronomic and agroalimentary sciences
- Veterinary sciences
- Sciences et ingénierie Geodesic, geoinformatics, water and irrigation and food processing
- Economic and social sciences applied to agriculture

The doctoral programmes are based on 9 units of research (groups and teams of research) accredited by the institute, organized around 10 principal axes of research which fall under the scientific policy of the organization and its schools and answer the national priorities. Each group or team is organized around common and multi-field sets of themes. These units also include associate members among the scientists from partner structures belonging to the higher educational and research system. More than 230 scientists animate this research.

Figure 1 presents the total architecture of the CED-IAV, its doctoral programs and the structures of research to which it is associated.

Research fellowship

Progress has materialized in a research fellowships program set up to promote quality and excellence in doctoral studies. Starting in 2006, a three-year grant is awarded each year to each student of the 600 best master diploma holders in any discipline, enabling them to pursue a PhD. This program contributes to the structuring of research by helping promote excellence and focus attention on priority themes.



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area

Doctoral studies scheme



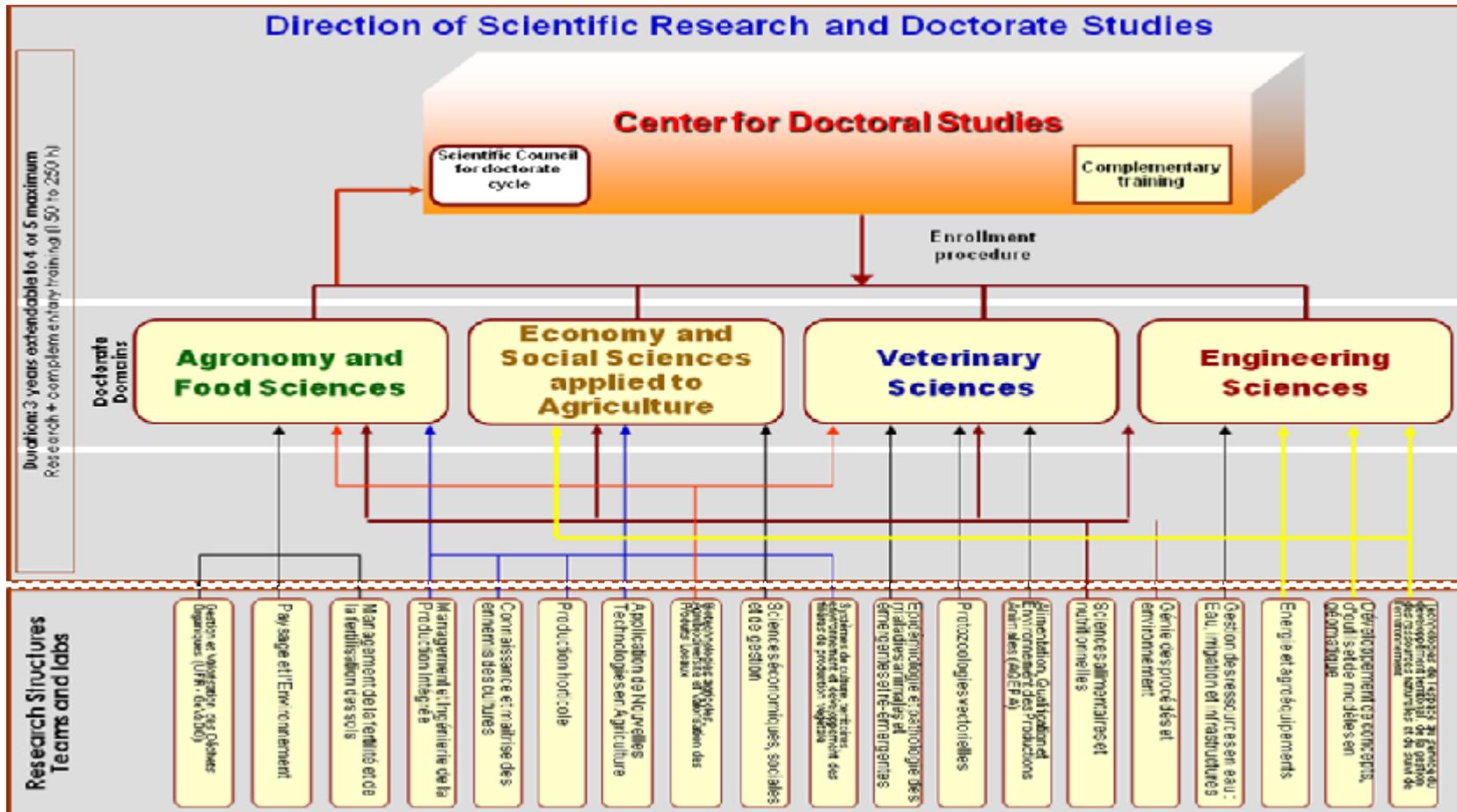
ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net



Coordination of the Agricultural Research In the Mediterranean Area



ARIMNET ERANET Coordination Action

Grant agreement FP7- 219262

www.arimnet.net