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The National Agricultural Training System in Tunisia

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A considerable effort has been made for the development and modernization of the agricultural sector in Tunisia since independence.

The massive departure of key foreign personnel coincided with the implementation of a vast renovation program, and the few national technicians available at the time could not respond to this imperative.

The considerable need for senior personnel highlighted the acute lack of training.

To respond to these needs, a general system of agricultural education ranging from training workers to training engineers, was progressively established. During the first decade (1960- 1969), it concentrated primarily on the massive training of general agricultural technicians, essentially medium level personnel.

As of 1970, it became necessary to rethink the agricultural educational system in order to respond to changes in this increasingly specialized and diversified sector.

These orientations have resulted in a training system consisting of three levels:

1 - **Professional training** *for students having completed the primary education cycle, is aimed at providing qualified agricultural workers.*

2 - **Secondary education**, *provided in agricultural high schools, for students having completed the third year of the common core in general secondary education. This is aimed at training medium-level management personnel (baccalaureate level).*

3 - **Higher education** *is aimed at training senior technicians, engineers and veterinary surgeons, and consists of several programs.*

The purpose of this report is to give a general picture of the organization and operation of the advanced agricultural training system in Tunisia.

I - The advanced agricultural training system

1. Different types of training

Higher agricultural education in Tunisia consists of four programs of study:

a) A short program for training specialized senior technicians. Studies last for two years, and are designed for high school graduates and graduates from agricultural high schools who have gone through a special preparatory section .

For this course of studies, training is specialized in the following areas:

- rural engineering
- agricultural mechanization
- horticulture
- major crops
- forestry
- livestock
- food industry
- rural economy.

b) A medium level course, for training field engineers, which lasts four years after the baccalaureate. It is organized into two cycles :

- a preparatory cycle of one year of general education, focusing primarily on basic subjects;

- an engineering cycle, that includes **two years** on the art of engineering, in the following specialities:

- agronomy
- fishing
- rural engineering
- agricultural mechanization
- management
- horticulture
- livestock
- major crops
- food industry

and **one year** in one of the options within the speciality taught during the two preceding years.

c) A specialization cycle that was instituted for training specialized agronomic engineers. This course lasts two years and is designed for graduates from the medium level course that meet certain selection criteria. The specialization cycle includes about 20 specialities in agronomic sciences, in particular:

- phytotechnology
- plant protection
- zootechnology
- earth sciences
- hydraulics
- agricultural mechanization
- sanitary engineering
- food technology
- rural economy
- fishing.

d) A program for veterinary studies aimed at training veterinary surgeons. It lasts for five years after the baccalaureate and is given in an establishment especially created for this purpose.

These programs are distributed as follows in the existing nine establishments for higher agricultural education shown in **Table 1.**

2. Links between training courses and with other programs

Several possibilities for transfer between programs and establishments have been planned by the higher agricultural training system:

- graduates from agricultural higher schools who show a special aptitude in basic sciences are directed toward a preparatory section that will allow them, after one year and following an examination, to enter the short program of higher agricultural education;

- graduates from the short course may, within the limits of available space and after successfully passing a qualifying exam, enter into the third year of the corresponding medium level course;

- graduates from the medium level course may be admitted to the specialization cycle, if they pass an examination;

- students who have gone through the first year of the medium level course, and who were not admitted to the second year, can be directed into the first year of the short course;

- finally, there are also transfers between schools of higher agricultural education and university

establishments, since graduates holding a university degree in scientific studies (two years after the baccalaureate) can be admitted into the third year of the medium channel, after having taken a competitive examination.

3. Number of degrees

The annual number of graduates of the present higher agricultural training system is shown, by training sector, in **Table 2**.

II - Administrative, financial and pedagogical organization

1. Governing authority and operational bodies

Higher agricultural education is given in advanced schools or institutes that are classified as being public administrative establishments enjoying their own legal status and financial autonomy.

a) Governing authority

Until the end of the academic year 1985-1986, higher agricultural education was under the authority of the Directorate for Education, Research and Extension, which is attached to the Ministry of Agriculture.

Following the recent creation of three universities in Tunis, Monastir and Sfax, higher agricultural education institutions are now subject to the joint authority of two ministries, namely:

- the Ministry of Education, Teaching and Scientific Research, and

- the Ministry of Agriculture.

This joint authority is exercised in particular by:

- defining training objectives

- establishing university curricula and courses

- establishing regulation texts concerning training

- defining profiles for training

- establishing priority topics for research and development to be entrusted to the teaching staff.

b) Operational bodies

Within each higher agricultural training institution, the various administrative, financial and pedagogical tasks are divided up among different bodies, the attributions of which are determined as follows:

- Management

A higher agricultural training institution is run by a director who manages it within the framework of existing regulations and following the directives of the responsible authority (supervising activities of the other bodies, discipline inside the institution).

- Administration

The Administrator, under the authority of the Director, is in charge of managing the institution's administrative and financial services, as well as ensuring order and discipline. He also takes care of the secretarial tasks for the institution's boards.

- Coordinator of Training Profiles

Educational programs in each institution are combined into training profiles.

The coordinator of training profiles, under the authority of the Director, and in cooperation with the Department Directors, is responsible for coordinating and supervising programs, and organizing apprenticeships pertaining to the training profile in his charge.

- Study and Engineering Center

The study and engineering center is responsible for carrying out research and study projects and facilitating the insertion of graduates into professional careers.

- Departments and Department Boards

A higher agricultural training institution is organized into Departments of Education, Training and Research, the designation and number of which vary from one institution to another.

A department includes all permanent teaching personnel in related disciplines.

It consists of a board made up of four professors and lecturers, as well as four assistant lecturers and assistants. It may also seek the advice of any person on a consulting basis whose presence is judged to be useful in meetings.

Each board is headed by a director who ensures that the programs entrusted to it are properly carried out. The board must also prepare drafts of educational, training and research programs and present the department's estimated budgets.

- Institution's Board

Whenever the number of teachers makes it possible, the institution's director is assisted by the institution's board. The latter is composed of the department directors, two representatives of the assistant lecturers and assistants, members of the department boards, two representatives of the students and of any other person nominated by the Rector on the basis of a proposal made by the Director.

The institution's board assists the Director in managing the institution. It examines questions pertaining to overall operations, in particular, education, training and research.

- Disciplinary Board

This board includes the Director, as chairman, two teachers from the institution's board, a representative of the students, the Administrator and a representative of the Rector.

2. Relations between teaching and research

Until the end of the last decade, the contribution of higher agricultural education to experimentation and research programs was very modest. This situation, which was due to the limited number of researchers-teachers, has improved significantly over the past five years, following an increase in teaching staff.

This improvement is reflected by the number and diversity of topics studied, most of which are used for the preparation of final term papers. The methodological capability and mastery of techniques that this implies is an important factor in evaluating students' work.

Furthermore, teachers entrusted with both teaching and research assignments have had to associate research with teaching activities, which leads to a constant updating of knowledge and to an enrichment of the content of their courses.

The development of such research activities, however, is restrained by inadequate financial means, because the institution's budget is mostly designed for training activities and leaves little room for financing research.

These establishments, however, have highly qualified scientific personnel which is able to contribute, in a major way, to the development of agronomic research in the country.

Efforts are thus presently being made to launch research programs that involve pluridisciplinary teams associating teachers and researchers in predefined priority topics, for which specific funds have been allocated.

The objective of this new approach is to progress beyond the present system of research, which is characterized by occasional and isolated activities, and to promote an overall integrated view which is the only way to stimulate and promote the agricultural sector.

The experience of the last two years has shown that team work between teachers and researchers, and between different institutions, is difficult to initiate, and that such cooperation remains based on personal relationships among those involved.

However, one may hope that in the future this approach to research will be productive, and make it possible to establish institutional ties between teaching and research, and by the same token, to ensure more effective coordination of activities in this field.

3. Status and number of teaching personnel

3.1. Status

In higher agricultural education institutions, the teaching staff belongs to two categories of government employees:

- teachers regulated by various higher education statutes;

- agronomic engineers governed by the special status of engineers and administrative technicians.

a) Teachers regulated by higher education statutes

These teachers can be classified into three categories:

a.1. Teachers in charge of agricultural technical education:

They are governed by a special status that includes the following ranks:
* Professors of higher agricultural education
* Lecturers
* Master-Assistants
* Assistants.

The attributions and employment conditions for these different categories are summarized as follows:

1. Professors

They are responsible for providing basic or applied teaching, supervising master-assistants and assistants, and directing research activities.

They are nominated from among lecturers with four years seniority in this position with appropriate research activities and scientific publications.

2. Lecturers

Same attributions as those of professors.

They are recruited among holders of State doctorates, or from among master- assistants with four years seniority in this position with appropriate research work and scientific publications.

3. Master-Assistants

They are in charge of assisting professors and lecturers in organizing courses and exams, as well as supervising assistants. They also direct practical and guided work sessions and possibly basic or applied teaching.

They are recuited from among holders of a State doctorate or among assistants with at least two years seniority in this position with satisfactory research work.

4. Assistants

They are in charge of practical and guided work sessions and of all activities arising from the organization of courses and exams.

They are recruited from among candidates holding a degree in specialized agronomic engineering (Bac + six years) or a (third cycle doctorate) (equivalent to a masters).

Applications for the various ranks in higher agricultural education are submitted to a jury which, after having duly considered, proposes to the Ministry of Agriculture the list of candidates that have been retained in accordance with the positions to be filled.

It should be noted that each rank in higher agricultural education has its own recruitment jury.

Each jury is composed of five members, all teachers, three of whom are elected by their colleagues and two appointed by the Minister of Agriculture.

a.2. Teachers in charge of teaching basic disciplines.

These teachers are governed by the statutes of higher education personnel, the same as those used on a national scale in the universities and various faculties.

a.3. University/Hospital teachers in charge of veterinary studies.

They are governed by a statute that is related to the two others and includes the following ranks:

. University/Hospital Professor

. Approved University/Hospital Lecturer

. University/Hospital Assistant.

Recruitment for the various positions in veterinary education is generally conducted through competitions open to veterinary surgeons with the degrees and diplomas required for each rank.

b) Agronomic Engineers

In addition to the above mentioned personnel, institutions for higher agricultural education also employ engineers with different specializations and a proven track record.

As is the case for their colleagues who are governed by the special statute for higher agricultural education, these engineers are in charge of conducting courses and practical work sessions in technical disciplines.

Their contribution is very important because it helps to give this type of teaching a practical aspect inspired by the realities of the agricultural sector.

This staff as a whole is regulated by the special statute that governs the administration's engineers and technicians. It is different from that of teachers, being less advantageous, thus making it difficult to attract high level engineers into this type of activity.

For all categories of teaching personnel, the age of retirement is 60.

3.2. Number of teachers

The evolution in the number of teachers over the past five years is illustrated in **Table 3**, below.

It appears from this table that the rate of tunisianization has risen from 76% to 86%, an evolution which is all the more significant given that the total number of permanent teachers increased by almost 82%.

During the 1985-1986 academic year, institutions of higher agricultural education employed 240 Tunisian permanent teachers, and 29 foreign teachers, and used the services of 249 Tunisian and foreign teachers on contract which represented approximately 40% of the total teaching volume in hours.

4. Admission of students in various institutions for higher agricultural education

Students are admitted into these institutions, if they have the baccalaureate, through the Ministry of Education, Teaching and Scientific Research by a system of university guidance that takes into account the candidate's expressed choice, results during the second cycle of secondary school, and available space in each program offered by the structure that is to receive them.

Agricultural high school graduates from the seventh preparatory year may also, under certain conditions, be admitted into the first year of higher agricultural education.

5. Cost of training

The cost of training students has not been studied precisely. However, it is possible to give an indication on the basis of funds allocated to the establishments for their operational budget. The annual cost of training, in dinars for one student, varies with the course of studies and the establishment, within the limits indicated in **Table 4** below.

In evaluating this cost, the following was taken into account:

- current operational expenses and salaries for the entire staff employed in the establishment; and

- the cost of university services (cafeteria, accommodation and student scholarships).

It should be noted that the budgets for institutions of higher agricultural education are supplied by funds allocated by the State, in the form of subsidies, and by their own resources from the sale of goods produced by their estates.

In the present state of affairs, public and private entities, as well as students, do not contribute financially to these institutions.

III - Training objectives and curriculum development

1. Planning training programs - Decision-making authorities

Major training orientations are defined as part of successive plans for the country's economic and social development. All forces of the nation participate in drawing up these plans.

These orientations are then translated into operational programs by the Directorate for Teaching, Research and Extension, attached to the

Ministry of Agriculture, which determines the specific objectives to be reached in training, both in terms of quality and quantity, as well as the ways and means to do so.

Given these objectives, each institution draws up its programs and submits them to its board for approval.

It should be noted, in this regard, that the institution's board includes representatives from the Administration and the profession, as full members. It can also call upon any person for advice on program content and the profiles to be trained.

2. Curricula

The disciplines taught in institutions for higher agricultural education can be classified into two major categories: basic disciplines and technical disciplines.

a. Basic disciplines

At the present time, basic disciplines or fundamental subject matters (mathematics, physics, chemistry and biology) take up a major place in the medium level course's training program (Bac + 4).

These disciplines, which are taught in particular during the first year, are aimed at preparing for the study of technical subjects and developing the students' analytical capacities.

In the future, it is planned to organize this basic teaching program in a single preparatory cycle for all institutions of higher agricultural education.

b. Technical disciplines

This program is based on the art of engineering and deals with specialities that vary with each establishment's vocation.

It should be noted that the content of this program is increasingly fed by the results of research conducted by teachers.

Furthermore, efforts made by the institutions to open up to the socio-professional milieu have made it possible for trainers to draw material from this sector for their teaching and study activities.

c. Teaching methods

Teaching now makes use of more and more elaborate methods based on audio-visual aids and on concrete case studies associated with practical work sessions and field trips.

Apart from the fact that these sessions prepare the student for his insertion into professional life, they allow him to deepen his knowledge by preparing a final term paper in a specific area of agricultural techniques.

Furthermore, training in the specialization cycle is to a great extent achieved by the student's own research and documentation work, carried out under the supervision of his professor. The student thus contributes to his own training by undertaking a personal experimentation and study project. Such practical projects help to introduce the student to thinking about concrete development problems.

3. Continuing education

Continuing education has been evolving over the past few years and now covers all profiles and technical levels of agents active in the agricultural sector.

In 1982, the Ministry of Agriculture created a public establishment for this purpose, the National Institute for Pedagogy and Advanced Agricultural Promotion. Its mission is to organize retraining sessions for agricultural technicians of a medium level who work in teaching and extension services, and to coordinate, at the national level, the continuing education activities conducted at the regional level by other establishments attached to the same ministry.

As far as the engineering level is concerned, continuing education cycles have been offered since 1979 by some of the institutions of higher agricultural education.

Since 1985, continuing education entitles all State employees, as well as those in local public bodies and administrative establishments, to professional promotion.

It should be specified that current laws also make it possible to have such training provided at the administration's initiative by private bodies or institutions located abroad.

Finally, it should also be noted that although continuing education currently reaches only a limited number of technicians, it is going to experience strong growth in the future since it will be the main way for State employees to benefit from professional promotion.

4. Sectors of activity concerned by agricultural training

Until the late 1970s, the training system operated primarily to satisfy the needs of the administration and public enterprises.

Beginning in the 1980s, it was increasingly oriented toward training engineers to work in the production sector, without neglecting the needs of the administration which were still being felt in certain areas of activity that were still lacking high level personnel.

At the present time, graduates from the agricultural educational system are to be found in the following sectors, in the proportions indicated:

a. Public sector

- Administration and development structures : 40%
- Teaching and research : 11%

b. Economic sector

- Agricultural production enterprises, both state-owned and semi state-owned : 32%

- Private sector (agro-food industries, banks, etc.) : 5%

c. International organizations : 1%

d. Miscellaneous : 11 %

5. Strategy for agricultural training in the future

The main orientations of agricultural policy, as defined by the VIIth Plan (1987-1991), are designed to reach nutritional self-sufficiency in cereals, milk and meat products, and to produce a certain surplus for export.

In order to reach these goals, a training system will have to be entrusted with a crucial mission, namely to contribute to satisfying the sector's need for increasingly qualified and operational personnel of a professional level that is in harmony with the sector's rapid evolution.

In addition, readjustments in curricula should allow these structures to become more integrated in the country's development process, and therefore to be more open to the concrete problems of production and to operate more effectively in the regions where they are located.

Finally, an effort will be made to consolidate relations that have already been established by these institutions with the outside in the framework of both bilateral and multilateral cooperation programs.

IV - Agricultural training constraints and possibilities for cooperating with ICAMAS

Establishments for higher agricultural education are confronted by certain constraints, some inherent to the system itself and others due to external causes.

We will only deal here with problems related to employment opportunities for graduates and to competition with other programs of study both inside the country and abroad. We will also discuss the role that ICAMAS could play in setting up a consultative authority that could facilitate exchanges between Mediterranean countries in the areas of training, research and development.

1. Employment opportunities for graduates

Until very recently, agricultural graduates found employment either in Ministry services or associated production entities.

We can now observe a gradual saturation of the public sector. The private sector, however, has so far played only a very limited role in promoting employment and integrating graduates into the production circuit (an exception being the agro-food industries).

This situation has prompted the Ministry of Agriculture to take measures aimed at :

- encouraging employment of graduates in the productive sector in general and in private enterprises in particular;

- facilitating their establishment as self-employed farmers; and

- promoting placement of young technicians abroad, as part of bilateral agreements.

2. Competition with other programs of study

As far as those courses that are unique to the Tunisian system of advanced agricultural training, there is no competition between establishments as each institution is in charge of training its own particular profile.

As for other training courses under the authority of other ministries, one can now observe that training structures are being instituted with a vocation that is sometimes similar, without being quite identical, to those existing within the Ministry of Agriculture.

The fact that establishments of higher agricultural education are attached to recently created universities will allow for better coordination between the different training programs for engineers.

In the Mediterranean region, one can observe that several structures are being instituted that lead to similar profiles, in particular at the third cycle level. These structures, however, consume scarce human and material resources.

In this regard, a regional consultation would make it possible to make better use of existing capacities in order to develop training programs that are complementary rather than competitive.

3. Cooperation with ICAMAS

The interest shown for agriculture in countries from the northern and southern coast of the Mediterranean has expressed itself in the reinforcement of training structures in the region. This is done to both respond to needs in this sector and to integrate training more fully in the development process.

Nevertheless, these training institutions, particularly those in southern Mediterranean countries, can only reach their full potential if they can work with the international scientific community.

Indeed, Tunisia already maintains cooperative relations with several countries, either as part of bilateral agreements or through the intermediary of international organizations such as the FAO, UNESCO and the OADA.

But at the regional level, ICAMAS is, in our opinion, the framework for allowing such exchanges, all the more so that training activities constitute its major preoccupation.

In this context, ICAMAS could help to bring together various training establishments in Mediterranean countries, to publicize their existence and contribute to setting up a system which would allow them to consult with each other on problems of agricultural development in our area.

As far as Tunisia is concerned, the ICAMAS contribution could take several forms. Among them, we could mention the following:

- training key personnel for a very high level of teaching and research, leading to a doctorate or a Ph.D.;

- improving trainers through short practical training sessions;

- high level vocational training of development engineers in very precise specializations.

Furthermore, Tunisia would like to establish, in cooperation with ICAMAS, a research and planning office for human resources in the agricultural sector.

As for research, ICAMAS is requested to contribute to implementing research programs related to training and dealing with priority themes involving cereals, livestock, and the development of irrigated areas.

On a more general level, it would be desirable if ICAMAS activities were developed and broadened in such a way as to facilitate wider and more diversified cooperation among the area's countries.

To attain this objective, it is recommended:

- to set up networks that would allow for the exchange of information and research results on

topics that concern pedagogical matters, training, programs, curriculum development, etc, and

- to create centers for information, documentation, publication and production of pedagogical material that could serve as databanks, and provide logistical support for agricultural training establishments in the Mediterranean region.

V - Conclusion

Ever since it was founded, ICAMAS has undertaken training work that has been productive in many ways for the countries of this region.

The effort made by the Center's different institutes is all the more worthy because it has contributed to satisfying numerous and very diverse needs.

However, the gradual establishment of increasingly effective training structures in the area's countries, and particularly those on the southern coast, should lead ICAMAS to undertake a gradual revision of the missions that its institutes are entrusted with in order to adapt them to the present situation.

This evolution is necessary if one wants ICAMAS to acquire a truly Mediterranean dimension and be able to respond to the expectations of its member countries.

Thanks to the exchange of information and experience that it will generate, this seminar constitutes an excellent opportunity for establishing new bases for intense and far reaching cooperation among countries of the region, through the framework of ICAMAS.

Annex

Tables

Establishments	Agricultural Studies			Veterinary studies
	Short Course	Medium Level Course	Specialization Cycle	
National School of Veterinary Medicine				*
National Agronomic Institute of Tunisia		*	*	
Advanced School of Horticulture of Chott-Hariem	*	*		
Advanced School for Engineers and Rural Equipment of Medjez El Bab	*	*		
Advanced School of Agriculture of the Kef	*	*		
Advanced School of Agriculture of Materu	*	*		
Advanced School of Agriculture of Moghrane	*	*		
Advanced School of Agriculture of Tunis	*	*		
Forest-Pastoral Institute of Tabarka	*			

Table 1: Distribution of programs by establishment

Training sector	Number of graduates per course of studies trained each year			
	Short Course	Medium Level Course	Specialization Cycle	Veterinary Studies
Agronomy		40		
Major crops	20	20		
Horticulture	25	25		
Livestock	20	15		
Grazing and Forestry	15			
Fishing		10		
Rural engineering	15	40		
Mechanization	15	20		
Food industry		15		
Agro-economy	30	20		
Other specialities			65	
Veterinary medicine				25

Table 2: Number of graduates per course of studies trained each year

Teaching personnel	Number		Growth rate
	1983	1986	
Tunisians			
Teachers with rank	56	142	
Engineers	56	98	
	112	240	+ 114%
Foreigners	36	29	- 19%
	148	269	+ 81.7%
Rate of tunisianization	76 %	89 %	

Table 3: Growth of teaching personnel

Course of Studies	Minimum Cost	Maximum Cost	Average Cost
Medium Course	2 500	4 000	3 500
Short Course	1 800	4 500	2 700

Table 4 : Annual cost of training per student (in dinars)