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Agricultural research in Algeria

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The importance of agriculture and its vital role in the improvement of socio-economic conditions in Algeria constitute the main priority of the national development programs defined in the Second Five-year Plan (1985/89).

Over the past few years, the agricultural and fishing sector, in close coordination with the irrigation sector, has embarked on a program of various activities in the areas of organization, technology, economy and training.

More specifically, the efforts made by the agricultural sector aim at intensifying agricultural output through the use of the most productive and economic techniques that are best adapted to local conditions.

In this area, priority has been given to the following:

- cereals, dried legumes and fodder;
- market gardening: greenhouse crops and potatoes;
- citrus fruits, olive and wine growing;
- intensive cattle breeding (milk, meat) in mountainous areas; sheep raising in the steppe, and poultry farming; and
- seeds and plants.

This development program will be supported by specific actions directed toward the following areas:

- professional agricultural training,
- upgrading and transfers of senior personnel;
- implementation and reinforcement of extension services; and
- reinforcement of applied research and development of basic research.

I - Agricultural research

Within the general concept of agricultural development in Algeria, agricultural research is considered to be an essential and necessary function. As an important parameter of development, it cannot be disassociated from the preoccupations of the sector, namely the quantitative and qualitative growth of agricultural production and the promotion of rural development.

Agricultural research comprises several branches of science, and permits the formulation of methods and perfection of techniques which, once they have been checked and confirmed under optimal

conditions, are made available to farmers through extension services.

The methods presently used in Algeria are essentially directed toward applied research. In certain fields they are developing toward basic research within a general framework of complementarity in response to a need for agricultural development.

By its organization, functioning, evaluation and objectives, agricultural research in Algeria is "directed research".

1. General process in agricultural research

The perfection of new techniques is ensured by national research or by technology transfer.

In the latter case, it is absolutely necessary to experiment with the adaptation capacity to the specific agro-pedo-climatic conditions of the country, as well as to study the economic profitability and compatibility with the local society.

This process and the conditions underlying it prompted Algeria to set up a research system which brings basic and applied research together with the dissemination of technical progress by appropriate institutions.

2. General research program 1986-1989

The research program for 1986-1989, a description of which is given below, endeavors to present the main activities which are the responsibility of the national research system.

It is linked to the national plans for intensifying agricultural production, undertaken by the agricultural sector, namely:

- the improvement of plant and animal material;
- crop protection and animal health;
- production, reproduction and control of basic plant material and elite animals; and
- the most effective standards and techniques for cultivation and animal husbandry.

II - Institutions

Scientific and technical research in Algeria is undertaken by all sectors of the economy that are involved with development.

At the national level, the High Commission for Research, which reports to the President of the Republic, ensures the coordination and coherence of the proposed research programs.

As for agricultural research, two large bodies are in charge of this activity:

- the Ministry of Agriculture and Fisheries; and
- the Ministry of Higher Education.

1. Agricultural and fisheries sector

The Ministry of Agriculture and Fisheries conducts its research through ten institutions:

- National Institute for Agronomic Research (INRA);
- National Institute for Plant Protection (INPV);
- National Institute for Animal Health (INSA);
- National Institute for Major Crops (ITGC);
- Technical Institute for Market Gardening and Industrial Crops (ITCMCI);
- Technical Institute for Fruit Trees and Vineyards (ITAFV);
- Technical Institute for Cattle and Sheep Breeding (ITEBO);
- Technical Institute for Small Animal Husbandry (ITPE);
- Technical Institute for Development of Saharan Agronomy (ITDAS);
- Center for Study and Research in Fisheries (CERP).

All the above institutions are public establishments, with financial autonomy, and run their programs through 61 research and experimental stations, and 20 medium-sized laboratories.

This research system is supported by a program for the dissemination of technical progress, consisting of the National Center for Agricultural Education (CNPA) and local agricultural development structures (departments of Agriculture and development sectors), specialized

cooperatives and Centers for Training and Agricultural Extension (CFVA).

A. The research system of the agricultural sector

This system is made up of three complementary groups of organizations:

- National Institute of Agronomic Research;
- technical institutes;
- institutes in charge of prevention and counteraction.

National Institute for Agronomic Research

INRA, organized into laboratories and research stations, is in charge of basic research. As such, it develops horizontal scientific programs that are of common interest for the technical institutes, such as genetics, plant and animal physiology, bioclimatology, biometrics and computer science, rural economy and sociology.

At its present stage of organization and reinforcement of its personnel, INRA's program of activities is centered upon the following:

- follow-up on the fertility of agricultural soils;
- experiments on mineral treatment of saline soils;
- phytogenetic resources (cereals, pulses, fodder);
- crops for materials (palm and date trees); and
- coordination of research, training and cooperation programs of the technical institutes.

Technical Institutes

Through experimental stations and specialized laboratories, the main purpose of the technical institutes is to provide solutions to the constraints tied to production.

They are also in charge of all applied research activities that arise from the programs of agricultural intensification, in the following sectors:

- developing user standards for the main factors of production;
- perfection and/or adaptation of better production techniques;

- the production and conservation of basic plant material and elite animals;

- the control and certification of the above materials;

- contributing to the training and upgrading of teachers and to extension programs.

Institutes in charge of prevention and control programs

In addition to their assignments in the fields of research and experimentation linked to their area of intervention, these institutes (INPV and INSA) are responsible for the prevention and control of crop and domestic animals pests.

In this capacity, they run the following activities:

- phytosanitary and sanitary control at borders and the approval of pesticides and veterinary products;

- epidemiology and the control of epidemic diseases: crickets, cereal pests, ceratitus and dacus, tuberculosis, brucellosis, rabies, sheep-pox, etc.

B. Functioning of the agricultural system

Institutions for orientation, coordination and consultation

Aside from the High Commission for Research whose responsibility for coordination and harmonization of programs operates at the intersectorial level, the coordination of research and extension programs is also ensured inside the agricultural sector by two specialized institutions under the auspices of the Ministry of Agriculture and Fisheries (Directorate for Training - Research - Extension):

- Scientific Council for Research and Development (CSRDA),

- National Council for Agricultural Extension (CNVA).

Within the research institutions, orientation and control councils support the institute in managing resources while scientific councils orient the research programs to ensure their conformity with the National Plan.

Organization and operation

All of the institutes are organized into specialized technical departments, assisted by an administrative and financial department. They are in charge of supporting and controlling the execution of programs and evaluating results.

For each technical institute, there are generally five departments covering:

- the production of seeds and plants;
- research and experimentation;
- studies and programming;
- production support; and
- administration and finances.

INRA, an institute with horizontal activities, includes six departments covering:

- the physical environment;
- phytotechnical resources and the creation of new varieties;
- zootechnical resources and animal selection;
- rural economics and sociology;
- biometrics and computer science;

as well as a documentation and communications service.

At the present stage of development, only the departments of physical environment, phytotechnical resources and rural economics and sociology are operational.

In order to carry out their research programs, the institutes have research and experimentation stations, as well as control laboratories (seed, soils, bioclimatology).

Pilot farms attached to the Directorates for Agriculture and Fisheries make up the most decentralized transmission-belt for the dissemination of technical progress, to which the institutes make their contribution.

As far as their operation is concerned, the institutes – as administrative public establishments with financial autonomy – have operating and equipment budgets that are granted by the State.

Because of its administrative constraints, this type of status is presently under examination in view of changing it into an economic type of

status, which would nevertheless benefit from State subsidies.

2. The higher education sector

In the field of agricultural research, this sector works through research units which are created within:

- the National Agronomic Institute (INA): Research Unit for Agronomic Sciences (URSA); and,
- the University of Science and Technology (USTHB): Research Units for Arid Zones (URZA) and terrestrial biology (URBT).

These research units are coordinated at the sectorial level by a Directorate for Scientific Research set up within the Ministry for Higher Education.

As with the the agricultural institutes, these research units are endowed with a scientific council and manage, on their own, the funds which are put at their disposal by the structure to which they are attached (INA - University).

Globally speaking, the research programs of these units come under the following headings:

INA - URSA

- improvement of genetic heritage and cultivation techniques,
- seed and plant pathology,
- animal parasites of cultivated plants,
- protection of forest and steppe formations in semi-arid zones,
- agricultural development in arid zones (evolution of soils),
- improvement of animal production through the exploitation of local animal and food resources,
- economical use of water,
- valorization of industrial by-products.

USTHB - URZA

- improvement and protection of palm plantations: bayou, pedology, microbiology and fertilization, hydroponic crops,
- preservation and regeneration of Saharan and steppe species: reforestation of arid zones, fixation of dunes, biology of Alfa, Terfes,

- improvement of animal breeding, adaptation to the desert: ovines - camelines.

USTHB - URBT

- steppe and Saharan ecosystems: phytosociology, phytomass and pastoral applications,

- pre-Saharan and Saharan ecosystems: arid and Saharan phytocenoses,

- silting up (sand).

III - Organizational framework of research and institutional relations

General organizational framework

Scientific and technical research in Algeria is governed by the 1983 texts (emanating from the National Seminar on Research, organized in 1982 which instituted the following:

- the High Commission for Research, the main role of which is to steer research toward national preoccupations in matters of development and to ensure the coherence of programs and the rational utilization of mobilized resources;

- the modalities and procedures for the establishment and operation of new research entities (research centers and units attached to the concerned economic sectors); and

- the status of researchers and associate-researchers.

In addition, under the auspices of the Commission for Research, joint committees were constituted. Throughout 1985 and at the beginning of 1986, these committees developed National Priority Plan for Research in the agro-food industry.

This plan, together with an inventory of existing research structures and an evaluation of the national human scientific potential, constitutes the main reference of the Commission for Research for the study and approval of annual and pluri-annual research, financing, investment and cooperation programs that are proposed by the research institutions.

Even though the research institutions are under the responsibility of the concerned ministerial

department, they are subject to the orientation, evaluation and control of the High Commission for Research.

The operating and equipment budgets which are specified within the sector per institution, given their financial autonomy, are subject to approval by the High Commission for Research, which expresses its judgement to the Ministries of Planning and Finances, and are presented by the Government to the National Popular Assembly.

2. Institutional relations

A. Within the agricultural sector

As mentioned above, the coordination of research and experimental activities, and the circulation of information within the agricultural sector occurs through the following:

- the Scientific Council for Research and Development (CSRDA) attached to the Directorate for Training, Research - Extension of the Ministry, on the one hand,

- and the National Council on Extension, attached to the same Ministry, on the other hand.

Finally, it should be noted that these institutes are members of the Scientific Council on Research of INRA, and the latter institute is represented within each Technical Committee constituted in the institutes.

B. Inter-sectorial level

The research system of the agricultural sector strives to establish and maintain inter-sectorial relations with its main partners, namely institutes of higher education.

The concerned research units, namely those of INA, USTHB, and USTHB, which were recently set up and thus in the process of being organized, are drawn upon for the development of research activities in the following fields: soil fertility and mineral improvement applications, the bayou in the palm and date plantations; and the phytosociology of the steppe and its regeneration.

Recently, mechanisms for the coordination of these activities were instituted within INA, through the participation of INRA in its Scientific Council, and *vice versa*, and through the participation of each technical institute in the

Scientific Committee of the departments of INA which are concerned by the activities of each institute.

It should be noted that, while waiting for the researchers from these units to be working within the agricultural research institutes themselves, the engineers and researchers of this sector contribute to specialized courses, particularly at INA.

IV - Resources for agricultural research

As far as research resources are concerned, the presentation below will deal mainly with personnel, structures and finances.

1. Human potential in research

The human scientific potential (permanent and associate researchers) involved in the national priority plan for research in the agro-food industry, consists of approximately 450 persons (professional researchers, professors, researchers, masters students), to which one should add about 135 technicians.

This group of personnel belongs mainly to the sectors of agriculture, fisheries and higher education. Data for personnel in the irrigation and light industry sectors were not available for this document.

This group is governed, on the one hand, by the statutes of the technical corps of the agricultural sector (while awaiting the formulation of a statute that would specifically concern researchers in the agricultural field), and on the other hand, by the statute of the associate-researcher for the professors-researchers.

Even though these researchers often come from the same establishments (INA - ITA - universities), they are presently governed by different statutes which are unfavourable to personnel in the economic sectors, namely full-time researchers (agriculture - irrigation - industries).

This situation should soon be cleared up by the promulgation of specific statutes for research personnel in agriculture.

As regards the human potential for research support (administrative personnel, professional and agricultural workers), the numbers are rather large (approximately 1245 persons), mainly in the sector of agricultural research (**Annex 1**).

2. Laboratories and research stations

As a whole, the agricultural research system benefits from a large infrastructure, including:

- 31 laboratory units, generally medium-sized as far as agriculture is concerned, and large in institutions of higher education, but mainly used for training purposes;

- 68 research and experimentation stations, mainly in the agricultural sector, concentrated in the northern part of the country and totally absent in the mountainous regions (**Annex 2** and **Annex 3**).

3. Financial resources

Financial resources for agricultural research come from the State budget, and are composed of subsidies for operational costs and purchases.

The operational budget is almost exclusively reserved for salaries and benefits (80% of the funds). The section concerning funds for the operation of services remains minimal.

The problems connected with the operational budget are mainly tied to the management methods and procedures that are characteristic of establishments governed by administrative statutes.

The equipment budget is very large, considering how recent the structures are (they were mostly built between 1974 and 1980), and is characterized by a high proportion tied to infrastructure (construction and renovation of facilities) and agricultural equipment (irrigation, traction and tracted materials, etc.).

4. International assistance

Through bilateral or multilateral agreements, Algeria engages in international cooperation in the field of agricultural research, in connection with development projects.

A. Multilateral level

This concerns mainly cooperation with certain specialized institutions of the United Nations system, the EEC, the AOAD and ICARDA.

United Nations Food and Agriculture Organization (FAO)

Several research and development projects are currently underway and their termination is projected for the next planning cycle of UNDP.

- Study and guidelines for the development of olive-growing (ITAFV);
- Intensification of crop protection (INPV);
- Integration between cereals and animal breeding (ITGC);
- Phytosanitary protection of forests (INRF); and
- Pilot operations of agricultural extension (CNPA).

United Nations Educational, Scientific and Cultural Organization (UNESCO)

A single project is currently underway with the University of Algiers (URSA), concerning the development of assistance and activities of the research station at El-Golea (in the southern part of the country).

United Nations Development Program (UNDP)

These consist of regional or international projects conducted with the direct assistance of the UNDP:

- regional program for water resources in northern Africa (Ministry of Irrigation);
- regional program for the prevention of the bayou (INRA - INPV).

European Economic Community (EEC)

This mainly concerns cooperation in the fields of scientific research tied to the training of researchers, expert assistance and documentation in arid zones and in agronomy.

The Arab Organization for Agricultural Development (AOAD) and ICARDA

These institutions contribute to the development of agricultural research mainly through technical consultations and by sending high performance plant materials as well as documentation (cereals, pulses, fodder and hardy arboriculture).

B. Bilateral level

Algeria is striving to diversify its international bilateral cooperation in order to respond to real needs in the research field.

This cooperation is currently strongly marked by post-graduate training, involving the following countries: France; the USA; Great Britain; Canada; and the USSR.

5. Documentation - Publications

This is certainly the most deprived sector in the field of agronomic research.

The efforts made by research institutions in the sector of agriculture and higher education have not satisfied the demand considering its magnitude.

The need was thus felt to set up two institutions in charge of coordination of scientific and technical information: the National Center for Scientific and Technical Information and the National Centre for Agricultural Documentation.

As far as publications are concerned, it should be noted that the *Annals* of the National Agronomic Institute (INA) and the journal *Algérie Verte* of the Ministry of Agriculture, have recently begun to be published again.

V - Development of research in a cooperative framework

The organization of seminars which bring together all countries having similar and sometimes common preoccupations (the main concern of which is to ensure the social well-being of their populations as well as a more equitable economic development), is, from our point of view, a great asset for the science of agronomy.

The general operational and organizational problems which are bound to be brought up by the national reports show the need to set up inter-institutional exchanges, on a permanent and well-organized basis, for sharing acquired experience. This could only be beneficial at a time in our history when food blackmail is still being used in certain regions of the globe.

This seminar offers us the occasion to put forth a few propositions for cooperation in the Mediterranean region:

1. Themes of common interest

- phylogenetic resources in view of the creation and improvement of varieties of cereals, fodder and pulses (a gene bank for north west Africa);
- the rapid production of acceptable quality potato, artichoke and palm and date tree plants through tissue culture;
- the improvement of animal husbandry and feeding for intensive milk-cattle breeding and mountain cattle;
- the valorization and regeneration of the steppe and the development of ovine breeding; and
- the development of techniques and materials for irrigation and drainage in arid zones, integrating national resources.

2. Training researchers

The human investment which constitutes the training of researchers should be encouraged and reinforced.

The difficulties arising from taking in the unfortunately already limited number of young researchers in renowned universities or research centers deserve particular attention during the seminar, particularly for the following:

- the exchange of information on existing possibilities and required conditions, within the countries of the Mediterranean basin;
- to ensure the country concerned accepts and takes charge of the proposed research theme; and
- the organization of short specialized seminars on research themes that have been recognized as presenting a common interest.

3. Documentation and exchanges

It is obvious that scientific documentation, the exchange of publications and various plant materials constitute precious means of information transfer and reinforcement of the ties between research institutions and researchers.

This activity, which is at present very limited, should be developed in the framework of inter-institutional conventions and/or through CIHEAM, which could perhaps set up an information system (of the AGRIS type) on specific themes.

Annex 1: Personnel levels in the largest research institutions

Organization	Doctorate	Prof. Engineer	Applied engineer	Technician	Poorly qualified personnel
I - Agriculture					
INRA	5	14	24	25	270
Plant production	23	28	109	18	750
Animal production	7	13	34	51	195
Fisheries	3	6	1	3	8
<i>S/Total</i>	38	61	168	97	1,223
II - Higher education					
INA-URSA	18	97	-	33	22
USTHB-URZA	20	28	-	5	-
USTHB-URBT	18	3	-	-	-
<i>S/Total</i>	56	128	-	38	22
Total	94	189	168	135	1,245

Annex 2: Distribution of research and experimentation stations
by major region

Organization	Number and regions							Total
	West	Centre	East	Mountains	Steppe	South	Total	
I - Agriculture								
INRAA	4	2	1	-	-	5	12	
INPV	2	2	3	-	-	2	9	
INSA	-	-	-	-	-	-	-	
Plant production institutes	11	11	7	-	-	2	31	
Animal production institutes	-	2	2	-	3	-	7	
Fisheries	-	1	1	-	-	-	2	
II - Higher education								
URSA (INA)	-	-	-	-	-	-	-	
URZA (USTHB)	-	-	-	-	-	2	2	
URBT (USTHB)	-	-	-	-	5	-	5	
Total	17	18	14	-	8	11	68	

Annex 3: Distribution of laboratories by organization

Organization	Number and regions					Total
	West	Centre	East	South	Total	
I - Agriculture						
INRAA	1	2	-	-	3	
INPV	-	3	-	-	3	
INSA	1	1	1	-	3	
Plant production institutes	1	15	1	-	7	
Animal production institutes	1	1	-	-	2	
Fisheries	-	1	1	-	2	
II - Higher education						
URSA (INA)	-	8	-	-	8	
URZA (USTHB)	1	2	-	-	3	
URBT (USTHB)	-	-	-	-	-	
Total	5	23	3	-	31	

