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Agricultural research in Portugal is done primarily under the auspices of the Ministry of Agriculture, Fisheries and Food (MAPA) and the Ministry of Education (ME).

The participation of the private sector in agricultural research is relatively low except for agricultural industries. In this sector, the Portuguese Catholic University, through its Porto Biotechnology School, is in the first phase of preparing a masters in food science and is also trying to respond to the need for development and modernization of all sectors of the agro-food industry in Portugal. To this end, it collaborates in this field with many different organizations, companies and university institutions.

With this perspective, we will now describe the MAPA and ME institutions which are responsible for the implementation of agricultural research activities.

I - Institutions

1. Ministry of Agriculture, Fisheries and Food

In this ministry, research activities are shared between the *Instituto Nacional de Investigação Agrária* - INIA (National Institute of Agricultural Research), the *Direcção-Geral de Pecuária* - DGP (Livestock Directorate) and the *Direcção-Geral de Hidráulica e Engenharia Agricola* - DGHEA (Irrigation and Agricultural Sciences Directorate). These two directorates are multipurpose agencies working simultaneously on research and development activities.

A. INIA

INIA, which is the main research agency of MAPA, was created in 1974 (see **Annex**). It is responsible for the definition and implementation of research policy in the agricultural and agro-industrial sectors, notably:

a) to promote the definition and implementation of a national agricultural research policy involving the development of studies and the definition of objectives and programs designed to invigorate research and thus hasten agricultural development;

b) based on already defined programs, to ensure and coordinate research activities and professional training at the university and post-graduate level through MAPA;

c) to ensure, internally, the efficient organization of the research system by invigorating and implementing integrated research programs on agriculture and the agro-industry; the results obtained are tested and adapted at the regional level to the current socio-economic conditions;

d) to ensure the existence of integrated research programs and to oversee their implementation;

e) to provide scientific and technical support to experimental and demonstration activities at the regional level;

f) to ensure that those interested have access to regional knowledge and available scientific and technical expertise;

g) to promote cooperation with national and foreign scientific institutions as well as specialized commissions in the field of agricultural and agro-industry research;

h) to promote the preparation, implementation and coordination of international agreements in the field of scientific and technical cooperation for the agricultural and agro-industry sector.

To implement the tasks that it has been given, INIA has the following research units (see **Map 1**):

* Units that do specialized studies, essentially analytical, to improve basic scientific knowledge in various disciplines as well as interdisciplinary research between various departments, dealing primarily with basic or applied scientific specialities and with different products:

- *Estação Agronómica Nacional* (National Agronomic Station): research in the field of agronomic sciences (entomology, statistics, plant physiology, phtyopathology, phtyosystematics and geobotany, phtyotechnology, genetics and improvement, microbiology, soils, chemistry).

- *Departemento de Estudos de Economia e Sociologia Agrárias* (Department of Agricultural Economics and Sociology).

* Units that work on specialized studies of an analytical nature to improve basic scientific knowledge in disciplinary and interdisciplinary fields, or which work primarily on applied studies in the field of production and transformation, divided between different departments by scientific specialities either basic or applied, by product or by transformation process:

- *Estação Zootecnica Nacional* (National Zootechnology Station): research on livestock (departments of animal physiology, genetics and improvement, food and nutrition, animal reproduction, raising of bovins, ovins and monogastrics).

- *Estação Florestal Nacional* (National Forestry Station): research in the field of forest and silvicultural sub-sectors (departments of biochemistry and fertility, biometrics and forest economics, natural resource conservation, ecophysiology and forest improvement, forest protection, silviculture, forest grazing and forest soils microbiology.

- *Estação Nacional de Tecnologia dos Produtos Agrários* (National Technology and Agricultural Products Station): research in the field of transformation of products from agricultural, forest and animal origin (departments of agricultural products, technology, technology of forest products and technology of products of animal origin).

* Units working primarily on the synthesis of analytical data provided by specialized units in order to help define production systems possible for specific agro-socio-economic conditions. They are divided between various departments, by product or process, and by fields of applied agricultural sciences:

- *Estação Nacional de Melhoramento de Plantas* (National Plant Improvement Station): research in the field of production and improvement, primarily cereals, forage, and oil plants (departments of analytical biology, cereals, forage and pasture, oil crops and others, and seed production).

- *Estação Vitivinícola Nacional* (National Vinegrowing Station): research on growing vines (departments of vine growing and oenology).

- *Estação Nacional de Fruticultura "Vieira Natividade"* (National Arboriculture Station): research in arboriculture and oil plants (departments of citrus fruit, fruits with pits or nuts, oil plants, fruit tree biology and nutrition, dried fruit).

- *Departemento de Horticultura e de Floricultura* (Department of Horticulture and Flower Growing).

- *Departmento de Regadio* (Department of Irrigation): research in the fields of agricultural irrigation and plant and animal production in irrigated areas.

* Other units:

- *Centro Nacional de Reconhecimentoe Ordenamento Agrário* (National Centre for Agrarian Registration and Management): research in the fields of agrarian registration and management (departments of cartography and statistics, births, soil classification and mapping, rural planning, soil conservation and agro-ecology and registration of land-uses).

- *Centro Nacional de Protecção da Produção Agrícola* (National Centre for Agricultural Products Protection): research in phytiatry, phytopathology, agricultural entomology, weeds, phtyopharmacology, quality control of plant reproduction material, and other scientific and technical activities in the fields of standardizing phytopharmacological products, seeds and plant certification and phytosanitary inspection.

- *Laboratório Químico Agrícola* (Agricultural Chemicals Laboratory): research on soil fertility, mineral nutrition of plants and efficient use of fertilizers, (divisions of agricultural analyses, soil fertility and crop nutrition, and food and fodder).

In addition to these national services, INIA has experimental units studying the adaptation of technical innovations to agrarian production systems under conditions defined by nature and the practical and concrete needs of both biophysical and socio-economic environments.

These units ensure that integrated research programs are complemented by field tests on operating farms.

These units and the operational services are also expected, in collaboration with the Regional Agricultural Offices, to encourage and support the elaboration of prototypes and demonstration projects.

B. Livestock Directorate General (DGP)

This Directorate undertakes research activities at the following:

a) *Laboratório Nacional de Investigação Veterinário* - LNIV (National Veterinary Research Laboratory) which supports the DGP in all areas related to animal health, hygienic quality and sanitation of animal products for human consumption; undertakes research and development studies on problems in these fields; and does research likely to contribute to scientific progress in these fields;

b) *Estação Nacional de Selecção e Reprodução Animal* (National Animal Breeding Station) which ensures liaison with the regional agricultural services and is responsible for:

- the evaluation of animal reproduction behaviour

- diagnosing and studying the causes of sterility

- development of programs designed to improve animal fertility and reproduction

- undertaking or collaborating with studies or tests on animal reproduction techniques

- coordinating artificial insemination

- implementing, supporting and controlling reproduction tests.

C. Irrigation and Agricultural Engineering Directorate General

Through its Work Organization Division and Mechanization Projects, this Directorate:

- undertakes studies to perfect operational techniques in order to reduce unproductive periods;

- studies solutions to problems that affect the efficiency of farm mechanization: form, dimensions, distances between plots, etc;

- develops projects for various production units and for typical uses of machines, including cooperative uses;

- studies the location of new buildings and the enlargement or transfer of agricultural facilities dealing with mechanization.

2. Ministry of Education

A. Higher Education Institutions

In accordance with the Law on the Reform of the Educational System, higher education in Portugal is ensured by universities, polytechnical institutes, special graduate schools and other similar institutions.

These higher education institutions are primarily responsible for graduate and post-graduate education, for promoting adult education and cultural programs, and for stimulating knowledge of and contributing to the resolution of regional and national problems (through their community service programs).

The universities are pluridisciplinary institutions that try to ensure better coordination of the different branches of knowledge. They are particularly responsible for both long and short-term higher education as well as post-graduate education, for promoting basic and applied research in both the different scientific disciplines and in interdisciplinary fields, and to encourage and undertake studies in Portuguese culture (also as part of the community service program).

When university teaching is done in institutions that specialize in one or a limited number of disciplines, they are called University Institutes. They grant the same titles as universities.

Polytechnical Institutes are technical and professional centres that are in particular responsible for ensuring short term higher education oriented primarily towards concrete problems and practical applications, as well as for promoting applied research taking into consideration existing needs in the technology field and service sector, notably regional services.

Special graduate schools are training and finishing centres for teachers of basic subjects, particularly preparatory studies to ensure short, advanced courses covering the humanities, sciences, arts, pedagogy and school administration. This emphasizes educational research and provides pedagogical support to both normal and continuing education organizations, creating centres of cultural learning in the corresponding regions.

The teaching staff of universities is especially involved in basic research; in the Polytechnic Institutes, most research is applied.

B. INIC

The *Instituto Nacional de Investigação Científica* - INIC (National Institute of Scientific Research) is an organization in Lisbon reporting to the Ministry of Education which coordinates and finances the research activities undertaken in the university centres.

INIC contributes to the development of scientific research through the definition, coordination and implementation of science policies, and collaborates in the definition and implementation of plans to prepare the qualified staff needed for the country's development.

The names and locations of the advanced educational establishments where agricultural research is done are listed in the **Annex**.

Responsible to the same ministry, and also located in Lisbon, is the *Instituto de Investigação Científica Tropical* - IICT (Tropical Scientific Research Institute). While it is oriented primarily towards studies and research concerned with agricultural development in tropical regions, this institute (through its Department of Agricultural Sciences) is also involved in research activities in the fields of agricultural technology and production, veterinary medicine and zootechnology.

3. Private companies (industrial)

Private companies such as Bayer, ICI Valagro and SAPEC, are essentially involved in commercialization which is limited to tests of the adaptability of the agro-chemical products (fertilizers, pesticides) imported from their own factories elsewhere.

Quimigal Portuguesa, which has 19 researchers, does research in the fields of soil fertility, phytosanitation and agrarian economics. It is currently involved in the following activities:

- manures and phtyo-pharmacological products judged to be the most cost-effective for soil/crop/plant systems;

- the impact on Portuguese agriculture of joining the EEC;

- demonstration agricultural farms;

- rehabilitation of small irrigation systems;

- plans for improving cooperative results;

- training of young farmers; and

- promotion of technological measures that are operational.

The Galucho company, which is part of the metalmechanic industrial sector, is engaged in research on the development of new agricultural machines.

II - National organization of agricultural research

The Secretary of State for Scientific Research (SEIC) was created at the end of 1985 as part of the Ministry of Planning and Territorial Administration. One of the main features of this ministry is its "coordination of scientific and technological research activities".

SEIC is responsible for the programming, distribution and assignment of research activities for the Central Administration Investments and Development Program (PIDDAC). It includes two advanced scientific research bodies: the *Conselho Superior de Ciencia e Tecnologia* - CSCT (Senior Council on Science and Technology) and the *Junta Nacional de Investigação Cientifica e Tecnológica* - JNICT (National Council on Scientific and Technological Research).

1. The creation of the CSCT was a major step in the definition and invigoration of the national scientific and technological system. It constitutes a special forum for the coordination of the interests and activities of the departments and institutions responsible for the implementation of scientific and technological research policies with the private producing sector, the main user of the results of such research.

The CSCT also assumes a significant role as a government advisor for the coordination of scientific and technological research policies in the different sectors, and in the establishment of mechanisms designed to support innovation in the priority sectors for the development of the country. Among other things, it is responsible for:

a) giving advice on:

- the bases on which national scientific and technological policies should be defined;

- the coordination and standardization of plans, programs and financial resources to be approved by the government for research and technology;

- coordination between the objectives of social and economic development policies of the country and the objectives of national science and technology policies;

- institutional and structural legislative measures needed for the development of the national science and technology system;

- the implementation of financial plans and scientific and technological research programs to propose, notably, any adjustments that might be necessary;

- the general orientation of criteria for evaluating the results of scientific and technological research activities.

b) to develop proposals for the national science and technology policy.

The CSCT is chaired by the Minister responsible for the coordination of scientific and technological research activities. Board members include the President of the JNICT; the presidents of research institutes and regional coordination commissions; representatives of the universities and the producing sectors most directly concerned by problems of scientific and technological research; and well known representatives of the science and technology communities.

2. The JNICT, which was established in 1973 under the Council of Ministers, is the financing body of science and technology projects and programs designed to develop and support national scientific and technological cooperation. It has considerable powers in the field of relations between national research institutions and the corresponding community institutions.

As a coordinating and development body, the JNICT should be given the financial means to enable it – as a research financing agency – to reduce the structural imbalances that exist in the country, especially given the fact that it has the supervisory, implementation and evaluation abilities to do so. One thus hopes that an allocation to this effect, which is already included in the national budget for 1987, will be approved.

As part of the JNICT, the following bodies were created:

a) the JNICT *Conselho Consultivo* (Consultative Council), which covers the large field of the

different sectors and means of scientific and technological research. This includes pure research as well as applied research and development in which the universities are also involved.

Among its other responsibilities, the Consultative Council coordinates the activities of the *Comissões Coordenadoras de Investigação* - CCI (Research Coordination Commissions) and gives its opinions on the research and development programs or projects and on the training activities proposed to the JNICT or supported by it, and proposes the creation or dissolution of working groups involved with "problem areas";

b) the CCIs of the JNICT: these commissions correspond to the large and permanent sectors of national activity, for example, agriculture, forestry and animal production.

Their functions consist primarily of giving advice on research programs and projects, development and training related to the corresponding sectors, and to contribute actively to the planning, coordination and invigoration of research and technology. This is notably done by proposing new projects and programs as well as supporting JNICT in the supervision and evaluation of research in the corresponding sector:

c) Working groups involved in "problem areas".

Although the coordination of agricultural research is the responsibility of the JNICT, the research organizations of MAPA still report to this ministry.

There is no coordination at the MAPA level and the research, as noted above, is divided between the *Laboratório Nacional de Investigaçao Veterinária* (LNIV), the *Estação Nacional de Selecção et Reprodução Animal* (part of DGP) and INIA, which is the main body.

The major decisions are taken at the Cabinet level of MAPA, and it is also at this level that the overall resources of the ministry are allocated to the different organizations.

As part of its research activities, recognizing the need to give its operational services the institutional means (including common programs) for communicating and cooperating with economic agents, social partners and other public agents and users of the agricultural and agro-industry sector, in 1985 INIA created "interprofessional consultative councils for the operational services of INIA".

The advantages of these relations are obvious as they enable direct contact between the research system and the questions and problems of the country. They also enable a critical analysis that can not only facilitate a better understanding of research methods but also avoid getting involved in research methods and programs of little relevance for development.

Research users are thus given the possibility to participate in not only the definition of the major orientations and priorities of INIA but also the periodic evaluation of its activities.

This has resulted in the creation of good perspectives for the reinforcement of the communication system, in both directions, between the creation of knowledge and its users, upon which finally depends the cost-effectiveness of investments in research.

To date, five Interprofessional Consultative Councils for Operational Services have been established: National Agronomy Station, National Plant Improvement Station, National Vinegrowing Station, National Forestry Station and the Irrigation Department.

III - Human resources

1. Researchers

Table 1 shows the number of researchers (in the equivalent of fulltime researchers - ETP) for the institutions of MAPA, ME and the private sector.

Table 2 shows the research staff of INIA, including its distribution by service.

The latest recruitment of researchers has been by competition and promotions have been through open examinations.

The latest recruitment of research staff at INIA was done in 1980 by applying the transitory dispositions of the law on national research careers. After an evaluation of the *curricula* of the researchers and without open exams, this enabled the reclassification and integration of people in their new careers.

Since this time, because of both budgetary restrictions and considerable indecision on the direction of the institution itself, there have been no recruitments of researchers. It has only been during this current year that funds have been made available to enable 20 research trainees to join INIA.

The training of career research staff has been ensured through training courses and diplomas obtained from foreign universities, notably in the United Kingdom, Holland, Spain and the United States.

2. Other personnel categories

Because data from other institutions were not made available, **Table 3** deals only with INIA (which has four categories of personnel).

A quick analysis of these tables reveals the extremely unfavourable situation of INIA compared to similar institutions in more developed countries. In effect, the ratio between the number of researchers and the total number of employees reaches the disproportionate level of 1 to 6.

The considerable number of manual and administrative personnel at INIA can be explained by the granting of civil service status (which includes guaranteed employment until retirement age) during the 1975/76 period when rural workers were hired under contract without taking into consideration the long-term need for their services.

IV - Physical and financial resources

1. Network of national facilities

For the implementation of its programs, INIA has a total land area of 2,395.9 ha (see **Map 1** and **Table 4**).

2. Equipment and services

Generally speaking, the services are poorly installed, in small, old buildings.

The equipment is generally defective and the documentation centres are not computerized.

Apart from the periodic publications noted in **Table 5** and in the directory of *On-going Research and Development Experimentation Activities* at INIA, the following publications (among others) have been published since 1980:

- *Organização e Plancamento da Investigação Agrária em França,*
- *O Problema da «Geada Negra» no Algarve,*
- *Propagação da Oliveira,*
- *Produção de Leite no Ex-Posto Experimental da Fataca. Alguns Parâmetros Produtivos,*
- *Conservação dos Recursos Genéticos. A Posição do Problema no Sector Animal. A Situação Portuguesa*
- *Perspectivas do Melhoramento Ovino*
- *Melhoramento da Cebola (Allium cepa L.). Observações na Colecção de Cultivares.*
- *O Eucaliptal da Serra de Osse. Utilização Integral para a Produção de Celulose. Estudo Químico. Pastas Kraft e Valor Papeleiro. Componente Tronco.*
- *Da Acção de Alguns Reguladores no Crescimento e Produção de Duas Variedades de Macieira.*
- *Considerações Práticas sobre Amostragem. Métodos de Extracção e Observação de Nemátodos.*
- *Ensaios de Apreciação do Comportamento de Linhas Híbridas e de Novas Cultivares de Arroz Realizados em 1980.*
- *Caracterização Ampelográfica de Castas Portuguesas (1a parte) - Castas do Oeste : Fernão Pires, Jampal, Camarate, João Santarém, Mortágua, Preto Martinho e Tinta Miúda.*
- *Adaptação Varietal de Gladíolos em Ociras e Pegões.*
- *Primeiros Resultados do Ensaio de Rega Gota-a-Gota sobre a Variedade Galega Vulgar na Subestação de Olivicultura de Elvas.*
- *Comportamento de Cultivares Indígenas de Damasqueiro em Diferentes Condições Ecológicas. Aspectos de Biologia Floral que Deverão Ser Considerados na Estruturação de Um «Projecto de Estudo do Damasqueiro em Portugal».*
- *Plancamento da Investigação Agrária nos EUA.*
- *Caracterização da Sub-Região de Aveiro.*
- *Acções Prioritárias de I-D para o Fomento da Produção de Leite na Sub-Região de Aveiro.*
- *Acções Prioritárias para a Produção de Batata na Sub-Região de Aveiro.*
- *Para Um Diagnóstico de Fertilidade dos Solos na Sub-Região de Aveiro (Concelhos de Agueda, Aveiro, Ovar e Mealhada).*
- *Perspectivas de Melhoramento Genético dos Efectivos Ovinos e Suas Produções.*
- *Práticas Culturais de Sequeiro. Possíveis Alternativas em Portugal.*

- *Composição Antociánica das Uvas de Algumas das Principais Castas da Região do Oeste. Evolução dos Compostos Antociánicos ao Longo da Maturação.*
- *Potencialidades Frutícolas em Portugal Continental. Diagnóstico e Quantificação.*
- *Documentação sobre Forragens e Pastagens.*
- *Sincronização do Ciclo Reprodutivo num Rebanho de Vacas Holando-Portuguesas com PGF 2a.*
- *Manual de Instruções para o Utilizador do AGRINDEX. Livro de Exercícios A.*
- *Contribuiçaão para o Estudo da Biodegradação das Toiças do Eucalyptus globulus Labill.*
- *Características Morfológicas Usadas na Taxonomia dos Afídeos (Homoptera, Aphidoidea).*
- *Guia para as Bibliotecas Agrícolas.*
- *Estimativa do Produto Agrícola Bruto no Continente (Média do Trénio 1979-1980-1981). Metodologia de Regionalização.*

There are very few researchers who publish in foreign journals.

3. Financial resources

INIA has three budgets to draw on:

* An operational budget (OF) that ensures the normal functioning of services and through which are paid salaries, running costs and capital costs.

* A PIDDAC budget (Central Administration Development and Investment Plan) which includes running and capital costs.

* A Current Account budget (CO) that is financed by the institute's own income from the sale of agricultural products, publications and services provided to public bodies, particularly cooperatives.

Table 6 shows the relative amounts of these three budgets for the 1986-1987 period.

The obstacles that restrict the amount of money received normally include the late approval of budgets and cutbacks that are often made to programs that include the largest expenditures.

At the national level, research expenditures in 1984 for the sub-sectors of agriculture, fisheries and food, and education are shown in **Table 7** (taken from the 31.12.84 JNICT Survey of National Scientific and Technological Potential).

V - Research programs and results

The imprecision of the objectives of the agricultural sector at the MAPA level, in combination with other financial factors and the lack of motivation of scientists and technicians over the last ten years, resulted from 1985 onwards in decisions to take measures to eliminate the existing institutional and functional obstacles and to create new and more flexible programs to respond to the real needs brought on by the accelerated progress of Portuguese agriculture.

Under these conditions, it was thought that the highest priority should be given to revise the programming of the Institute over a longer time horizon by defining new areas of interest without threatening the current objectives and programs deemed worthwhile.

It was also recognized that the new programming should include much more effective coordination, based on the planning and selection of activities requiring priority action as well as on continuing supervision of their implementation through evaluation systems including outside inputs.

In the same way, cooperative relations were established with the University and with those private institutions involved in research (for example, the Gulbenkian Institute of Sciences in Oeiras). These initiatives resulted in joint research and professional training projects as well as the participation in Institute programming of highly qualified researchers of these institutions as jury members and new program coordinators.

To summarize, the current revision of Institute activities, which is already reflected in the programming proposed for 1987, emphasizes the following two main objectives:

a) regionalization of agricultural research, through projects developed to respond to the needs of farmers, and notably their participation in integrated regional development plans (PIDR);

b) participation in professional training activities, considered a fundamental part of these plans.

With the help of outside funding, government grants and its own resources, the Institute is

preparing (through the allocation of bursaries in conjunction with its research activities), a vast training plan (both university and post-graduate levels) for its scientists and other senior personnel working for other state agencies or the private sector.

To this end, in those scientific and technical fields in which it has the experience, the Institute is developing specific professional training programs designed to maximize the use of its physical and human resources.

Major initiatives have also been taken for the implementation of a student training plan (in the last years of the licence and licencis program) as follows:

- career preparation courses, open to potential candidates of the specialized sectors of the Institute;

- short and medium term training activities consisting of courses and specialized or retraining internships designed for the general labour market;

- regular training courses for both specialist and generalist extension workers, aimed at the Regional Agricultural Directorates and the private sector. These courses are included in the Special Program for the Development of Portuguese Agriculture (PEDAP) of the EEC.

- regular post-graduate courses of medium (masters) and long term (doctorate) duration. For example, the Master of Animal Production program (inaugurated in the 1985/86 academic year by the Advanced School of Veterinary Medicine of the University of Lisbon with courses also offered at the National Zootechnology Station of INIA).

For the implementation of these activities, INIA has undertaken to define throughout the current year the location of Professional Training Centres responsible for the organization of courses of a regional and disciplinary character. These decisions will be made in collaboration with the Directorate General of Agriculture, the Regional Agricultural Directorates and the universities.

At the moment, the research programming of the Institute emphasizes the following aspects through both large disciplinary fields and product areas:

* Inventory of renewable natural resources and their problems: soils, phytosystematics, plant physiology, cytogenetics, phytopathology, entomology, etc.
* Econometrics and statistics.
* Rainfed production of cereals, (rye, triticale, wheat, barley, oats) corn, sorghum and rice.
* Production of forage and pasture feeds and animal production (bovins, ovins, caprins, pigs and poultry).
* Annual oil plant crops (sunflower and safflower).
* Protein and oil protein crops.
* New crops (sugarbeets, tobacco, subtropical fruits).
* Greenhouse crops and potatoes.
* Vine growing.
* Fruit trees (fruit with nuts and pits, citrus fruits, dried fruit).
* Silviculture and forest grazing.
* Transformation of agricultural products (plant, animal and forest origin) and alternative energy sources.

The revised programming of the Institute has led to the intensification of its research activities in the most sensitive sectors that are priorities of the fields in question.

The conclusion of juries (made up of researchers and professors from the Institute and universities) asked to examine the research proposals, led to the approval and preferential financing of priority projects and studies. These are related to the activities or the products to develop for domestic consumption or exports to the EEC. There are also those which guarantee better use of natural resources or which, by their nature or position in the production cycle, contribute to the elimination of limiting factors to overall agricultural development.

These projects and studies correspond to the major priority objectives of development. They have been decided on by considering external directives and the options approved by the Institute. These objectives are as follows:

- Agrarian management of the continental territory.

- National production of grains and plants.

- Liming, improvement and development of browsing and grazing areas.

- Development of zones with a potential for intensification given diversification, notably small and large irrigation systems.

- Better use of critical areas, soils that are degraded, light or friable, notably in inland regions, in order to valorize our natural resources, forests or silvo-pastures. The results of this, having significant economic and social bearing, could contribute to reducing the strong regional disparities that currently exist in Portugal.

- Better use of natural resources for the diversification of energy supplies, notably through the use of sub-products and wastes, and research on solutions likely to reduce energy consumption for the production and transformation of raw materials and food products.

- Better extension work on useful knowledge and usable materials.

- Professional training.

For the rigorous application of this activity programming effort, the Institute benefited from a wide selection of choices that enabled it to better match its means with its fixed objectives. The Institute's 1987 programming, approved by the Scientific Council, includes the following programs and projects:

A. Sector: Technological research and development

Agricultural production

- Rainfed and irrigated cereal crops (maize, sorghum/rice);
- Browsing and pasturing;
- Arboriculture and oil plants;
- Vine growing: clone and massal selection;
- Horticulture, ornamental plants, aromatic and medicinal plants;
- Industrial crops (saccharines, tobacco);
- Protein and oil protein crops.

Forest production

- Forest production: pines, eucalyptus and other forest species;
- Mediterranean silviculture, reforestation of cork-oaks, green oaks and other species;
- Multiple use of forests.

Animal production

- Ruminants and monogastrics;
- Nutrition, genetics and improvement, reproduction.

Agro-industrial production

- Post-harvest technologies for horticultural and fruit products; forest product technology;
- Milk and milk products, meat technology;
- Biotechnology, use of agricultural and agro-industrial wastes, renewable energy.

Disciplinary research

- Irrigation and agricultural engineering;
- Climate and soils sciences, soil mapping;
- Environment, natural and biological resources;
- Fertility and soil supplements;
- Agrarian economics and sociology: small farms, farming systems and agro-food;
- Phytopharmacology, herbology, seed production and quality control, quarantine regulations of the EEC.

B. Sector: Agriculture, silviculture and livestock

- Production of high quality seeds and plants, national catalogue of varieties;

- Infrastructure.

C. Priority structural action programs (PAPE)

- Construction and equipment of the National Agronomy Station (EEC-60 775);
- Equipment and infrastructure of laboratories assisting animal production (EEC-1250);
- Agricultural products technology (EEC-7605).

D. Integrated regional development programs

- PIDR Bas-Mondege, Cova de Beira, north of Alentejo, critical zone of Alentejo, northeast of Algarve.

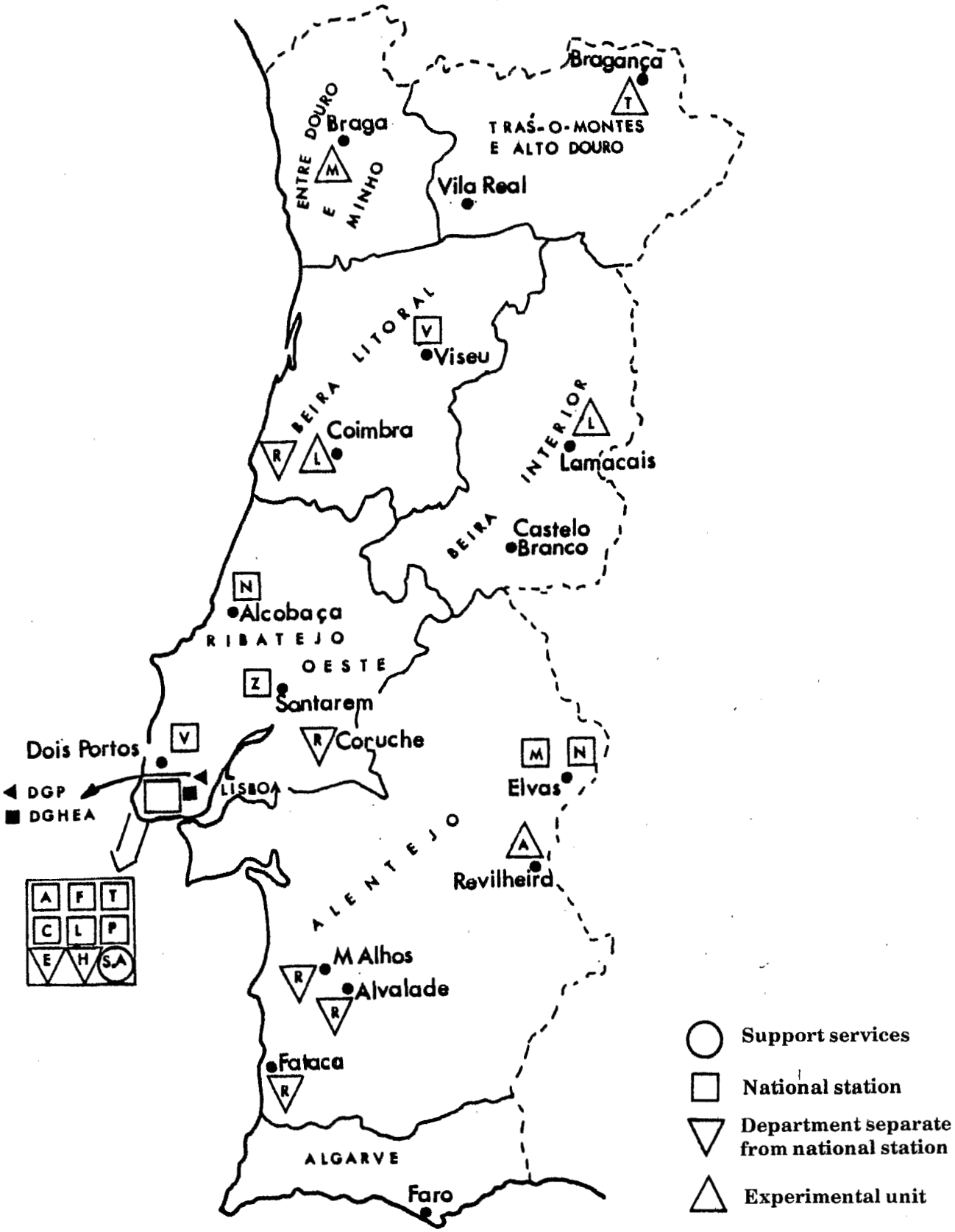
The classification of researchers belonging to the Ministry of Agriculture, Fisheries and Food can be summarized according to the following major themes:

- Plant production: 153
- Animal production: 94
- Forest: 39

- Agricultural industries: 30
- Irrigation: 2

Through the Saragossa Mediterranean Agronomic Institute (S-MAI), INIA and ICAMAS prepared an agreement for scientific and technical collaboration designed to make better use of their joint potential. The activities to be implemented will be subject to subsequent agreements between S-MAI and the research units of INIA following the example of the agreement already proposed between S-MAI and the National Zootechnology Station.

Map 1a: Location of agencies of the Ministry of Agriculture, Fisheries and Food



Map 1b : Details of agencies of the Ministry of Agriculture, Fisheries and Food

Instituto Nacional de Investigação Agrária (INIA) - Main Office (Rua das Janelas Verdes, 92 - 1200 L)

Support services

(SA)

Gabinete de Planeamento (Rua D. Francisco Manuel de Melo, 1-2° Dt° - 1000 L)
Direcção de Serviços de Administração (Rua das Janelas Verdes, 92 - 1200 L)
Direcção de Serviços de Informação Científica e Técnica (Rua das Janelas Verdes, 92 - 1200 L)

Operational services

[A] *Estação Agronómica Nacional* (Quinta do Marqués - 2780 O)

[Z] *Estação Zootécnica* (Fonte Boa, Vale de Santarém - 2000 S)

[F] *Estação Florestal Nacional* (Tapada das Necessidades, Rua do Borja - 1300 L)

[M] *Estação Nacional de Melhoramento de Plantas* (Apart.6 - 7351 E)

[V] *Estação Vitivinícola Nacional* (Dois Portos, Torres Vedras - 2575 R)

[N] *Estação Nacional de Fruticultura Vieira Natividade* (Estrada de Leiria - 2460 A)

[T] *Estação Nacional de Tecnologia dos Produtos Agrários* (Quinta do Marqués - 2780 O)

[C] *Centro Nacional de Reconhecimento e Ordenamento Agrário* (Rua Castilno, 69-1° Esq. - 1200 L)

[P] *Centro Nacional de Protecção da Produção Agrícola* (Quinta do Marqués - 2780 O)

[L] *Laboratório Agrícola Rebelo da Silva* (Tapada da Ajuda - 1300 L)

▽H *Departamento de Horticultura* (Quinta do Marqués - 2780 O)

▽R *Departamento de Regadio* (Rua 5 de Outubro, 24 - 2100 C)

▽E *Departamento de Estudos de Economia e Sociologia Agrárias* (Rua d. Francisco Manuel de Melo,1-2° dt° - 1000 L

Expérimental units

△M M *Quinta dos Peões* (Gualtar - 4700 B)

△F F *Viveiro de Castanheiros e Viveiro de S. Julião* (Parque Florestal - 5300 B)

[A] A *Quinta do Canal, Campo de Taveiro e Campo de Foja* (Av. Fernão de Magalhaes, 87-2° Dt° - 3000 C)

(SA) SA *Quinta dos Lamacais* (Caria - 6250 B)

(SA) SA *Herdade da Revilheira* (S. Pedro do Corval - 7200 R M)

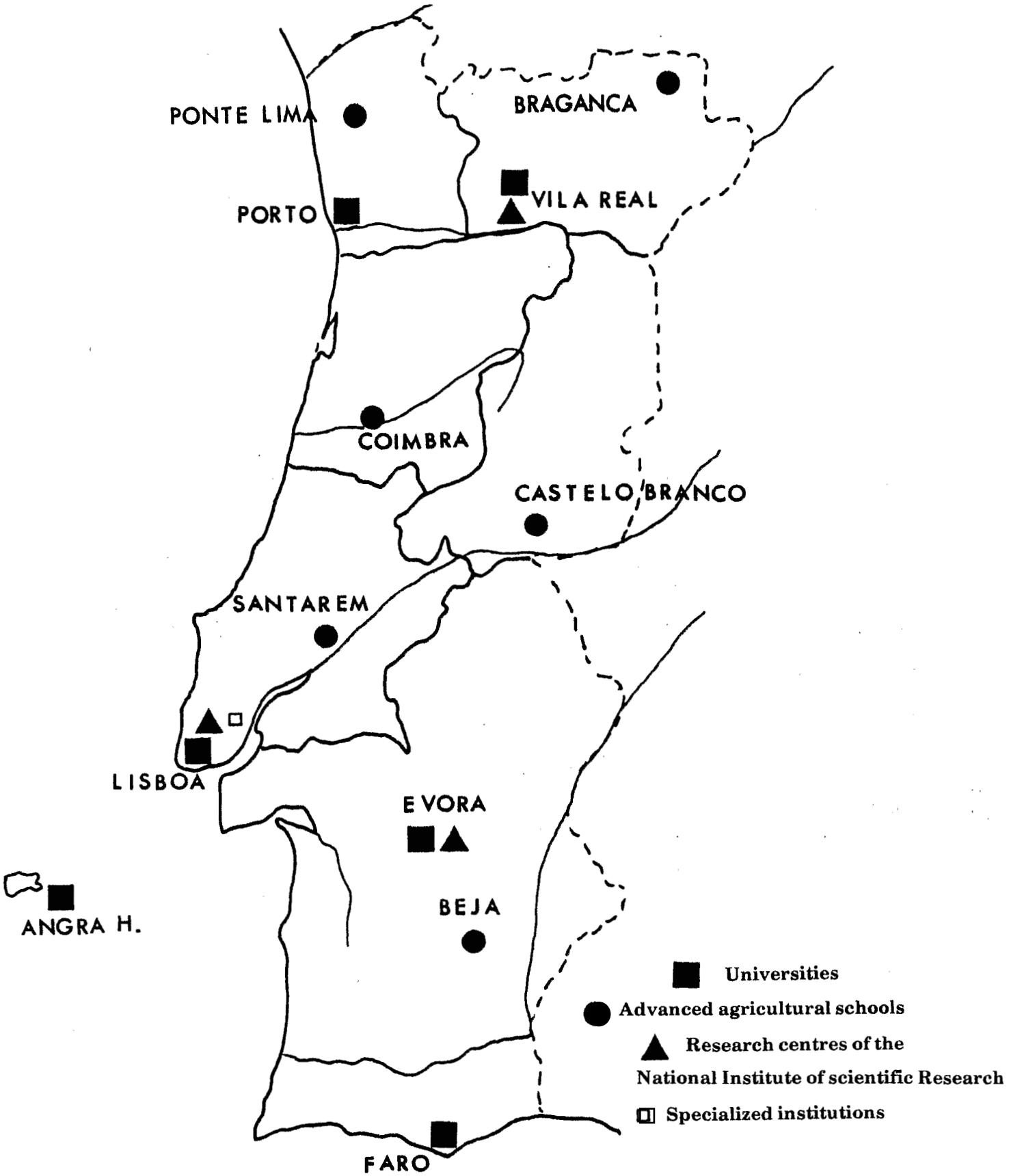
* *Direcção-Geral de Pecuária* (DGP)

Laboratório Nacional de Investigação Veterinária (Estrada de Benfica, 701 - 1500 L)

Estação Nacional de Selecção e Reprodução Animal (Rua Elias Garcia, 38, Venda Nova - 2700 A)

* *Direcção-Geral de Hidráulica e Engenharia Agrícola* (DGHEA) (Av. Afonso Costa, 3 - 1900 L)

Map 2a: Location of higher education establishments and specialized institutions



Map 2b: Details of higher education establishments and specialized institutions

Universities - Study Centres of the National Institute of Scientific Research

Universidade de Trás-os-Montes e Alto Douro (Vila Real)*

■ *Centro de Agroclimatologia*

▲ *Universidade Católica Portuguesa*

■ *Escola Superior de Biotecnologia* (Porto)*

Universidade Técnica de Lisboa
*Instituto Superior de Agronomia***

Centro de Pedologia

▲ *Centro de Estudos Florestais*

▲ *Centro de Botânica Aplicada à Agricultura*

▲ *Centro de Microbiologia e Indústrias Agrícolas*

▲ *Centro de Produção Agrícola*

▲ *Centro de Estudos de Engenharia Rural*

▲ *Centro de Economia Agrária e Sociologia Rural*

*Escola Superior de Medicina Veterinária***

Centro de Produção Animal

▲ *Centro de Farmacologia e Toxicologia Veterinária*

▲ *Universidade Nova de Lisboa**

■ *Universidade de Évora**

■ *Centro de Ecologia Aplicada*

▲ *Universidade do Algarve* (Faro)*

■ *Universidade dos Açores* (Angra do Heroísmo)*

■ **Polytechnical teaching**

*Escola Superior Agrária de Bragança****
● *Escola Superior Agrária de Ponte de Lima****
● *Escola Superior Agrária de Coimbra****
● *Escola Superior Agrária de Castelo Branco****
● Escola Superior Agrária de Santarém***
● *Escola Superior Agrária de Beja****

● **Specialized institution**
Instituto Nacional de Investigação Científica Tropical (Lisbonne)

✻

Future programs:
* Bachelor's - 5 years
** Bachelor's and Master's - 7 years
*** *Baccalauréat* - 3 years

Map 3: Professional training centres

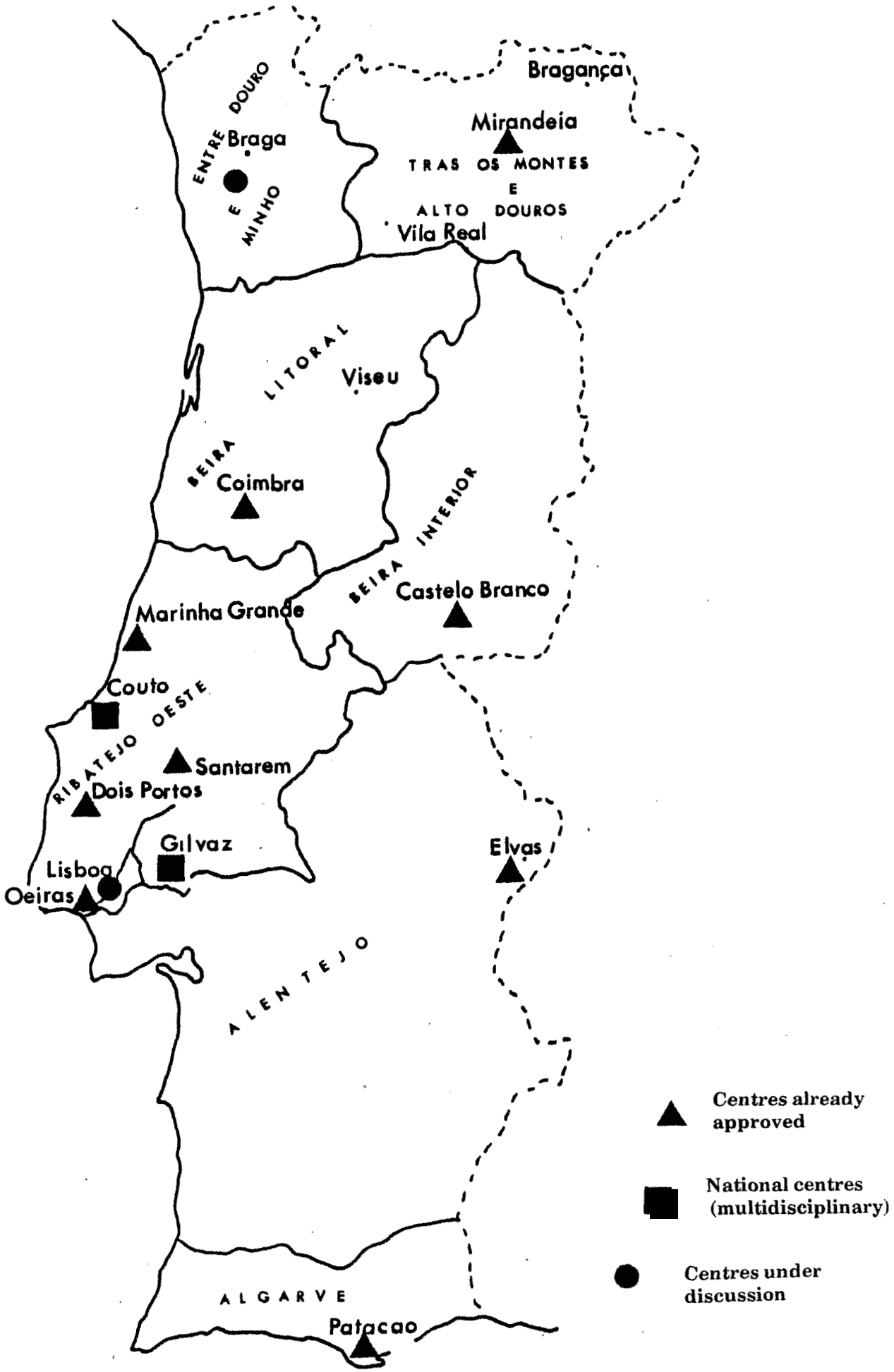


Table1: Number of researchers (equivalent in full-time researchers = ETP)

Sector	Number of researchers (ETP) (indicative)	% of Total	Observations (Number of researchers)
Ministry of Agriculture	354	72	INIA (314) DGP (40)
Ministry of Education	110	21	Universities (teachers) : Inst. Sup. Agron. (150), U. Vila Real (80), U. Evora (70), U. Faro (50), U. Açores (20), INIC (20)
Private organizations	40	7	Ecole Sup. Biotech. (5), Galucho, Bayer, Quimigal, ICI Valagro, etc. (35)
Total	504	100	

Table 2: Professional researchers of INIA according to operatoinal service

Personnel	EAN	EZN	EFN	ENMP	ENTPA	EVN	ENFRVN	CNROA	CNPPA	LQARS	DEESA	DR	DHF	SC	Revilheira	T
Coord. Researcher	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	5
Main Researcher	21	4	2	2	4	0	1	3	2	0	0	0	2	0	0	41
Assistant Researcher	14	13	10	4	4	3	3	2	0	0	10	2	0	0	0	56
Specialists	21	6	7	4	4	5	1	5	0	0	7	0	0	3	1	64
Assistants	15	6	9	6	7	0	1	0	0	0	8	0	0	2	0	56
Trainees	2	23	10	5	11	3	4	1	2	1	1	10	20	0	0	92
Totals	100	54	39	21	30	11	10	11	4	1	17	3	7	5	1	314

Table 3 : Other INIA personnel

Personnel	SC	EAN	EZN	EFN	ENMP	EVN	ENTPA	ENF	CNROA	DR	DEESA	DHF	CNPPA	CQARS	CDN	CTM	CBL	CBI	CA	Total	Functions
Senior technicians	3	17	2	12	-	1	1	10	7	1	2	2	67	17	-		-	-	-	142	Research support activities
Technicians	14	81	161	39	78	25	39	71	38	81	2	8	141	37	12	3	3	9	25	867	Application of methods and technical support: data gathering and complementary activities for research projects
Administrators	26	46	20	8	18	6	8	10	7	7	1	2	53	10	-	2	-	-	1	227	Administration of personnel, financial and fixed assets, current and archival data, typing, etc.
Labourers	7	91	117	16	57	14	10	44	3	70	1	2	66	12	8	3	2	8	24	555	Machinery operation, reproduction, cleaning, agricultural work, etc.
Total	50	235	300	75	153	46	58	135	55	159	6	14	327	76	22	6	7	17	50	1791	

Table 4: Distribution of INIA's experimental fields

National research and development stations	Area (ha)
Estação Agronómica Nacional	133
Estação Zootécnica Nacional	586
Estação Florestal Nacional	6
Estação Nacional de Melhoramento de Plantas	568.5
Estação Vitivinícola Nacional	26
Estação Nacional de Fruticultura Vieira Natividade	124.5
Departments of central services	
Departamento de Regadio	278.3
Experimental units	
Herdade da Fataca	53
Quinta dos Peões	17.1
Viveiro de Castanheiros e Viveiro de S. Julião	13.7
Quinta da Foja, Quinta do Canal e Campo de Taveiro	35.3
Quinta dos Lamaçais	317
Herdade da Revilheira	1 157
Other units	
Centro Nacional de Protecção da Produção Agrícola	130
Total	2,395.9

Table 5: Periodic publications of INIA

Titles	Publisher	Year started	Periodicity	Print run
Informacão	INIA	1985	Trimestrial	750 ex.
Ciências e Tecnica Vitivinicola	EVN	1982	Annual	1 000 ex.
Melhoramento	ENMP	1948	Variable	1 000 ex
Agronomia Lusitana	EAN	1939	Annual	1 300 ex.
Index Seminum	EANP - *Departamento de Fitossistemática*	1939	Annual	750 ex.
Pedologia	EAN - *Departamento de Pedologia*	1966	Variable	200 ex.
Catálogo Nacional de Variedades	CNPPA		Annual	
Lista dos Viveiristas Autorizados e Material Existente nos Viveiros - Material Frutícola	CNPPA			
Lista dos Viveiristas Autozizados e Material Existente nos Viveiros - Mateirl Vitícola	CNPPA			
Guia dos Produtos Fitofarmecêuticos	CNPPA		Every 2nd yr	15 000 ex.
Proteccão das Plantas	CNPPA		Irregular	1 300 ex.
Rede Nacional de Ensaios - Especies Forrageiras e Pratenses. Comportamento Regional das Varieddas Admitidas ao Catalogo Nacional das Variedades	CNPPA			380 ex.
Rede Nacional de Ensaisos - Milho Hibrido	CNPPA			900 ex.
Semente Certificada de Milho Hibrido. Lista de "Variedades" para Comercializacão	CNPPA		Annual	12 500 ex.

Table 6: INIA's 1986 and 1987 budget (1,000 escudos) (1)

	1986	1987
Operating budget (OF) Ordering budget (CO) PIDDAC budget	1,766,075 A	1,980,458 B 452,00 B' 396,500 B"
Total	2,549,453 A'	2,828,958
PAPE (Structural Priority Actions Program, with EEC involvement)	152,789 A"	57,130

(1) 100 escudos = 4.3 FF = 0.72 US $

Salaries and benefits of personnel

A	1 575 960	B	1 705 389
A'	76 505	B'	76 935

Equipment, buildings and construction

A	53 282	B	59 502
A'	110 167	B'	109 849
A"	161 590	B"	110 632

Table 7: MAPA and ME agricultural research expenditures (1984)

Sub-sector	Expenditures (10^6 Esc.)	% of total budget
Ministry of Agriculture, Fisheries and Food	1,064.5	22.8
Ministry of Education	211.0	4.5

Annex: Law creating the *Instituto Nacional de Investigação Agrária e de Extensão Rural*

Por despacho de 7-8-85 do Secretário de Estado da Produção Agrícola, por delegação de competencia do Ministro da Agricultura, é criado o Conselho Consultiva da Estação Agronómica Nacional, com a seguinte composição :

a) Movimento associativo dos agricultores a nivel nacional :

1 representante da Confederação dos Agricultores de Portugal (CAP) ;
1 representante da Associação Central de Agricultura de Portugal (ACAP) ;
1 representante da Confederação Nacional de Agricultura (CNA) (no caso de ser reconhecida a nivel governamental) ;
1 representante da Federação Nacional das Adegas Cooparativas (FENADEGAS) ;
1 representante da Federação Nacional das Cooperativas Leiteiras (FENALAC) ;
1 representante da Federação Nacional das Caixas de Crédito Agrícola Mútuo (FENACAM) ;

b) Sociedades cientifica :
1 representante da Sociedade de Ciencias Agrárias de Potugal (SCAP) :

c) Organismos universitários :
1 representante deo ISA ;
1 representante do IUTAD ;
1 representante da Universidade de Évora ;
1 representante das escolas superiores agrárias ;
1 representante do INIC ;
1 representante do IICT ;
1 representante da Universidade dos Açores ;
1 representante da Universidade do Algarve ;

d) Ministério da Agricultura :
Director do Gabinete de Plancamento do MA ;
7 directores regionais do continente ;
2 directores regionais das Regiões Autónomas dos Açores e da Madeira ;

e) Individualidades :
2 a 5 individualidades do sector agrícola de reconhecida competencia nas áreas de I-DE praticadas na EAN, propostas pelo director, ouvido o CI.

Deve referir-se que só foram escolhidos os organismos associativos dos agricultores de âmbito nacional. Logo que as três federações nacionais de cooperativas constituam a respectiva confederação, deverá ser esta a estar preferivelmente representada.

Por despacho de 7-8-85 do Secretário de Estado da Produção Agrícola, por delegação de competência do Ministro da Agricultura, é criado o Conselho Consultivo da Estação Vitinicola Nacional :

1 - É criado o Conselho Consultivo Interprofissional, adiante referido por Conselho, da Estação Vitivinícola Nacional, adiante referida por EVN, que funcionará nesta Estação, a qual tambèm lhe fornecerá apoio logístico.

2 - O Conselho terá as seguintes atribuições :

Apresentação e discussão dos problemas vitivinícolas e listagem ponderada dos mais carenciados de estudo para a resolução;

Apreciação das perspectivas de financiamento de projectos ou programas ;
Análise anual dos programas em curso e pareccer sobre os novos programes ;
Avaliação da actividade anual do organismo.

3 - São competências do Conselho :

Estar informado sobre os objectivos e prazos de execução dos programas e projectos em curso ou em programação, bem como dos objectivos que vão sendo atingidos ;

Dar parecer anuel sobre os programas em execução e a actividade do organismo ;

Propor estudos para a resolução dos problemas sentidos pela actividade ligada ao sector vitivinícola.

4 - Este Conselho e formado pelos seguintes membros :

1 representante de cada direcção regional de agricultura ;
1 representante da Casa do Douro ;
1 representante da Comissão de Viticultura da Região dos Vinhos Verdes (CVRVV) ;
1 representante da Federação de Viticultores do Dão (FVD) ;
1 representante da Junta Nacional do Vinho (JNV) ;
1 representante da Associação Portuguesa de Enologia ;
1 represnetante da Federação Nacional das Adegas Cooperativas (FEDADEGAS) ;
1 representante da Associação para o Desenvolvimento da Viticultura Duriense (ADVID) ;
1 representante da Associação Técnica de Viticultores do Alentejo (ATEVA) ;
1 representante da Confraria dos Enófilos da Bairrada ;
1 representante da Associaçao de Comerciantes e Industriais de Bebidas Espirituosas e Vinhos ;
1 representante da Federação das cooperativas Agro-Silvícolas das Beiras ;
1 representante da associação Nacional de Viveiristas Viticolas Produtores de Material Certificado (VITICERT) ;
1 representante dos Industriais de Material Vinícola ;
O director da EVN.

4.1 - O director da EVN tomará as iniciativas necessárias à escolha dos representantes das entidades representadas.

5 - O mandato dos membros do Conselho é de 4 anos, renovável por mais 2.

6 - O Conselho poderá convidar, para participar nos trabalhos, individualidades reconhecidas pelos seus conhecimentos nas áreas cientifico-técnicas do sector.
7 - Conselho será presidido pelo director da EVN, que orientará os trabalhos, secretariado por um elemento da carreira administrativa.

8 - O Conselho reunirá ordinariamente 2 vezes por ano, por convocação do presidente, e extraordinariamente, a pedido, pelo menos, de um terço dos seus membros.

9 - A agenda de cada reunião é enviada, com a necessária documentação, pela presidência do Conselho, com antecedência minima de 1 mês e máxima de 2 meses em relação à data da respectiva reunião.

10 - Os pareceres e propostas resultantes de cada reunião constarão da acta da mesma, que será aprovada no final e da qual será enviada cópia ao presidente do INIAER, aos chèfes de departamento e aos coordenadores dos programas da EVN.

11 - O director da EVN terá a iniciativa de substituir qualquer membro que faltar a 2 reuniões ordinárias sucessivas sem motivo justificado.

12 - As dúvidas surgidas no funcionamento deste Conselho serão resolvidas pelo presidente do INIAER.