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I - Different types of training programs

University education in agronomic and veterinarian sciences takes place through:

- Senior Technical Schools for Agronomic Engineers (ETSIA)

- Faculties for Veterinarian Science (FV)

- University Schools for Agricultural Technical Engineers (EUITA)

The number of academic centers, as well as the number of professors, students and graduates per profession (**Table 1**) shows:

a) a large number of students throughout the country, and

b) a rather low proportion of graduates as compared with the number of students; in other words, a high rate of academic failure.

The geographic distribution of these centers, as well as the number of professors and students per center is presented in **Figure 1** and **Table 2**.

The number of years of study after the Baccalaureate and the corresponding titles are listed below:

ETSIA (6 years) Agronomic Engineer (IA)

EUITA (3 years) Agricultural Technical Engineer (ITA)

FV (6 years) Licence in Veterinarian Science (LV)

The only existing program is for Agricultural Technical Engineers, who may obtain the title of Agronomic Engineer. To do this, they must successfully complete an adaptation course and the program, with two or three complementary courses.

Crossing over into other streams (for example, biological sciences or engineering in forestry and waterways) is only possible if there is an equivalence in disciplines, and if the interested student makes a request. Specialization, generally speaking, exists only in the following main areas:

ETSIA:
Agronomy and plant production
Animal production
Agro-food industries
Rural engineering
Agrarian economy

EVITA:
Farming
Agricultural machinery and rural construction
Agrarian industry
Horticulture and landscaping

FV:
Medicine and animal health
Animal production and economy
Bromatology and food technology

A Doctorate is obtained after two years of study beyond the degree (IA or LV) plus a thesis.

II - Administrative, financial and pedagogical organization

1. Educational Programs

Higher education in Spain is the responsibility of different universities. Since 1983, the LRU (Law of University Autonomy) has structured the university into departments (administrative and operational education and research units in related disciplines). At the present time, all the universities have been organized into departments. Various criteria have emerged in the different universities. On the average, the departments number twelve to fourteen professors.

Under the LRU, the FACs, the ETSs (Senior Technical Schools) and the EU (University Schools) are administrative units serving the organization of programs leading to an academic title.

In order for these titles to have professional value throughout the country, the curricula must correspond to the prescriptions of the National University Board. However, the universities will be able to set up new curricula, the value of which will depend on the university's prestige.

The State keeps the right to control via the Ministry of Education and Science or via the autonomous government of each community.

2. Research

a. Centers for Agrarian Research and Development belonging to the institutions in charge of administering agriculture at the state level (Ministry of Agriculture) or the CA level (Autonomous Community).

b. A few specialized Experimental Centers and Stations of the Higher Board for Scientific Research (CSIC), the latter being an autonomous body attached to the Ministry of Education and Science.

c. University departments responsible for teaching basic or applied disciplines related to agriculture, in particular in the ETSIAs, FVs, Biology FACs and a few EUITAs.

Liaison between university departments and the other research institutions is erratic, because it mainly depends on personal relationships. However, the new law on science attempts to establish institutes, departments and other joint research units, with the aim of combining staff of different institutions and coordinating their research programs.

d. There are also specialized bodies of teachers-researchers at universities and of researchers at the CSIC. An academic and scientific course of training has been set up in these institutions. On the other hand, in centers attached to the Ministry of Agriculture and to the CA's agronomic research institutions, no scientific programs have been set up.

e. Financing for research at the university stems basically from the annual presentation of research projects at public competitions. The latter are managed by the CAICYT (Scientific and Technical Research Support Commission), and by other public institutions of the central and autonomous administrations. The normal duration of a project is three years. Until now, most of these competitions dealt with priority topics. At the present time, a national five-year program of agronomic research is being written up, with instrumental objectives and priority research topics.

3. Status of teaching personnel

Most of the teaching staff belongs to the body of permanent civil servants present in each university (*Catedraticos and Professores*

Titulares). They enjoy the same status as other members of the higher education system. There are also temporary teachers who are being trained (*ayudantes*), hired on annual contracts that are renewed at the most five times. The LRU also establishes the possibility of hiring associate and visiting professors. So far, this possibility has hardly been developed.

Recruitment of teachers takes place through public competition, at which preference is given to evaluating teaching activity in the same university. The age of retirement has been set at 65 years, nevertheless it is possible to prolong one's activity as professor emeritus in exceptional cases.

4. Recruitment of students

Students are recruited by different procedures according to the center. At the present time, there are two modalities:

a. Direct access after the Baccalaureate, with no so-called "selective" exam (EUITA);

b. Access after the Baccalaureate and a selective exam (ETSIA and FV).

In both cases, the number of students admitted into the first year may be limited to space available at the Center. This number is proposed by the center, and must be fixed by the corresponding university. Selection criteria, in this case, are determined by the average BAC qualifications, and where applicable, by an examination. For EUITA graduates, the possibility also exists to be directly admitted into the ETSIAs. For persons over 25 years of age, access is possible after a general examination.

5. Cost of studies

As far as we know, there are no comprehensive reports on the cost of agronomic studies. However we do have estimates. Thus the cost per student per year is in the area of 200/250.000 Pesetas. The students' contribution constitutes about 20-25% of the educational costs, or 50.000 Pesetas per year. The rest is financed by the public administration (State and/or autonomous): a) directly via the ordinary annual university budget (in most cases), and b) by the financing of research projects obtained through public competition.

III - Training objectives: the programs

Training programs in agronomic and veterinary sciences have been developed so far by the respective centers (ETSIA, EUITA, FV), and by the university to which the center belongs. They are set by decree of the MEC, after a favorable report by the National University Board. It therefore appears that the presence of sectors other than the academic ones has been negligible in the past.

At the present time there is an excessive homogeneity in these centers' study programs, bearing on the following points:

a. training objective

b. rigidity of educational programs

c. lack of influence of the center's geographic location

d. an excessive number of hours of courses (usually more than 30 hours per week) and an excessive amount of traditional classes and book learning

e. insufficient contact with the reality of the economic sector (agriculture, industry, commerce, etc.)

f. little participation in research during the first and second cycles (in this regard, the absence of experimental plots and practical applications in most agricultural education establishments, as well as of organized libraries, is significant)

g. absence of specific programs for continuing education.

Nevertheless, there are some periodic but dispersed initiatives for retraining graduates.

At the present time, a general renovation of university education in Spain is under study. It is planned to establish a cyclical general education program (**Figure 2**), as well as to increase the number of new specializations. After the Baccalaureate, a first cycle (3/4 years) will lead to the title or degree of application engineer. Admission into the second cycle will be automatic after certain complementary courses, depending

on the curriculum of the first cycle. Changes in training streams have even been planned for (in this case, complementary courses would play an essential role). The second cycle will last two years and lead to the title of senior or licenced engineer.

The programs must include:

- obligatory subjects (academic and professional), that would be required by all the State universities. This common core constitutes about 50% of the programs;

- subjects to be determined by each university, and that must represent at the most 40% of the programs. These would be obligatory or optional for the student, depending on the criteria established by each university;

- subjects that are left up to the student's choice, with no restrictions. These must make up at least 10% of the programs.

In order to obtain the titles of ITA or IA, a student must also carry out some form of professional work or project.

Study programs may be modified by:

a. each university if subjects of the common core are not modified, and

b. by the National University Board in case the modifications involve the common core disciplines.

After obtaining the IA or LV titles, students aiming for research or higher education, and graduates who wish to pursue their academic training, will have to work for a doctorate. The new programs, established since October 1986 (**Figure 1**) arrange for these studies to take place in departments which will have to offer a two-year program. During this period, graduates must accumulate 32 credits (a credit represents one hour/week over ten weeks), including the following elements:

- methodology

- basic subjects of the department (minimum twelve credits)

- in the fields concerning the department (maximum three credits)

- optional (maximum five credits)

A maximum of nine credits may be obtained by research. Writing a thesis is also obligatory. During doctoral studies, each student is guided by a professor of the department.

IV - Problems

In our opinion, the problems listed below limit the capacity and quality of agrarian training in Spain:

1. The structure of higher education centers. The traditional conflict between agronomic engineers and veterinarians, which is the paradigm of competition between related professions, is due to the structure of the centers which remains confined and is tied to a profession. The absence, in this country, of agrarian campuses, despite the coexistence, in certain locations, of ETSIAs, EUITAs and FVs, is a consequence of this situation.

The development of departments set up by the LRU should correct this situation.

2. An excessive number of isolated centers with insufficient human and material resources.

3. A feeble development of agrarian research at the university, characterized by:

- the absence of research and experimental projects in many educational centers,

- small work teams,

- insufficient ties between research projects and the sector's problems. Lack of programming,

- absence or insufficiency of experimental plots tied to the university,

- a dispersion of bibliographical material and absence of effective libraries and documentation centers.

4. Institutional ties between the universities and agricultural research centers linked to the Agricultural Administration or attached to the CSIC. It seems reasonable to think that the integration of human and material resources,

belonging to the above-mentioned institutions, is the most economical and efficient way to increase, in the short term, the potential of agricultural research, and to diversify the capacity and quality of agricultural education.

5. Excessive rigidity of study programs in the different centers, and lack of ties with agriculture in their respective regions. This rigidity has had a decisive role in the configuration of nominations and teaching positions. This situation has made it possible, for example, for the number of mathematics professors to often be greater in the ETSIAs than the number of teachers in agricultural entomology or horticulture.

Finally, several types of initiatives are expected of ICAMAS:

a) recommendations to the respective governments on the ways by which agricultural education and research in general can be improved.

b) the configuration of international educational and research centers specialized in typically Mediterranean production or agrarian systems.

c) the organization of work groups and the financing of research and development projects on problems particular to Mediterranean agriculture.

Abbreviations

ETSIA: Senior Technical Schools for Agronomic Engineers
FV : Faculties for Veterinarian Science
EUITA : University Schools for Agricultural Technical Engineers
IA : Agronomic Engineer
ITA : Agricultural Technical Engineer
LV : Licence in Veterinarian Science
LRU : Autonomy Law of University
ETS : Senior Technical Schools
EU: University Schools
CA: Autonomous Community
CSIC: Higher Board for Scientific Research
CAICYT: Scientific and Technical Research Support Commission
MEC: Ministry of Education and Science

Annexes

Tables, figure, map

Center	Centers	Professors	Students	Graduates
ETSIA	4	541	4,732	201
Veterinary Faculty	8	683	13,078	852
EUITA	19	665	10,445	1,026

Table 1: Centers, professors, students and graduates in higher education in Spain, 1985/86

Autonomous Community City	Center	Professors	Students	Graduates
Andalucia				
Cordoba	ETSIA	121	810	44
	FV	121	1,765	163
Huelva	EUITA	16	233	6
Sevilla	EUITA(D)	35	1,278	138
	EUITA(L)	35	348	65
Aragon				
La Almunia	EUITA	27	408	46
Zarogoza	FV	112	2,824	285
Canarias				
La Laguna	EUITA	38	285	25

Table 2a: Professors, students and graduates of higher agrarian education centers in Spain (by location), 1985-1986

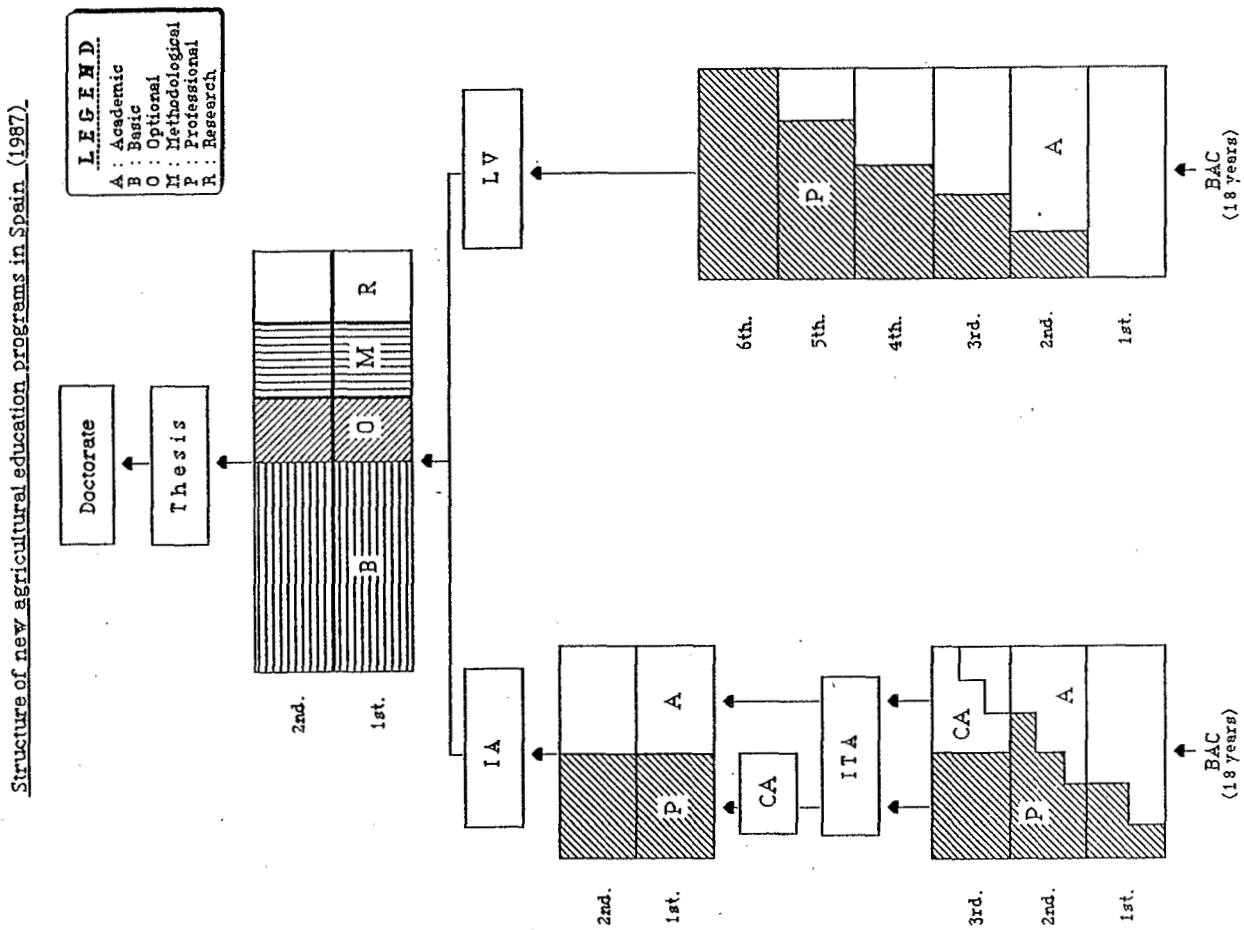
Autonomous Community City	Center	Professors	Students	Graduates
Castilla-Leon				
Leon	EUITA	21	403	76
	FV	87	1,736	66
Palencia	EUITA	26	437	31
Valladolid	EUITA	19	278	39
Castilla-La-Mancha				
Albacete	EUITA	75	840	8
Ciudad Real	EUITA	24	280	24
Cataluna				
Barcelona	EUITA(D)	52	852	146
	FV	64	1,028	X
Gerona	EUITA	22	120	10
Lerida	ETSIA	42	601	33
		40	686	60
Extremadura				
Almendralejo	EUITA	16	41	11
Badajoz	EUITA	22	260	22
Caceres	FV	52	651	X
Galicia				
Lugo	Lugo	22	252	41
	FV	19	590	X
Madrid	ETSIA	237	2,675	88
Madrid	ETSIA	78	1,323	116
	FV	179	4,009	338
Murcia				
Murcia	FV	49	475	X
Navarra				
Pamplona	EUITA	20	467	43
Valencia				
Valencia	ETSIA	141	646	36
Valencia-orihuela	EUITA	77	1,324	119

Table 2b: Professors, students and graduates of higher agrarian education centers in Spain (by location) (1985-1986)

X: these are recently created centers from which students will graduate, for the first time, in a few years

Figure 1 :

Structure of new agricultural education programs in Spain (1987)



Map of higher education centers