Higher education in agriculture in Italy

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Higher Education in Agriculture in Italy

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The national policy of agricultural education in Italy is under the direction of the Ministry of Public Instruction which manages it in coordination with the policies of the other production sectors.

There are three types of institutions:

1) Professional Institutes of Agriculture,

2) Technical Institutes of Agriculture and

3) University Faculties of Agriculture.

They have the responsibility of preparing students in the basic, intermediate and higher levels of education in agriculture. General culture and training is emphasized in the first two types of schools and graduates are free to enter any university faculty.

The Professional Institutes of Agriculture have a difficult task as the preparation for university entrance differs greatly from the preparation needed for preparing workers. In other words, the students are under-prepared for a university program but over- prepared as workers.

The Technical Institutes of Agriculture have a long tradition and, despite modern tendencies in instruction, they tend to deprofessionalize and prepare good intermediate technicians.

University Faculties of Agriculture prepare the professional men and women needed for public and private agriculture as scientific staff for research in agriculture.

Professional updating of farmers, for new varieties, equipment, techniques, etc., is the responsibility of the region.

I. Higher education

1. In Italy, higher education in agriculture only takes place at universities.

Requirements for university entrance are:

5 years of elementary school,
3 years of middle school, and
5 years of high school.

Elementary and middle school are the same throughout the nation. After middle school the following courses of study are available for a high school degree:

Classics, science, art, languages, education (at an educational institute for four years); Technical education at Technical Institutes for: agriculture, commerce, industry, navigation, drafting, etc.; *Professional at the Professional Institutes for:* agriculture, commerce, industry and artisans, etc.

Since mandatory education begins at six years of age, the student that follows a regular program should graduate with a diploma at 19. Anyone who has a diploma is able to enrol, without limitation, in any university faculty (Agriculture, Engineering, Law, Letters, Medicine, Veterinary Science, Political Science, Economics, Business, etc.).

Degree programs within the Faculty of Agriculture are:

a) Agricultural Science (Degree of the President of the Republic, D.P.R., 28/4/82, N.299).

b) Forestry (D.P.R. 11/10/84, N.936).

c) Animal Production (D.P.R. 2/2/68, n.204).

d) Food Science (D.P.R. 13/8/64, N.1220).

e) Tropical and Sub-tropical Agriculture (D.P.R. 24/2/79, N.309).

The Faculty of Agriculture does not include veterinary science and fisheries and fish production. Veterinary Science is an autonomous faculty.

No intermediate titles exist for any degree program in the Faculty of Agriculture. At the end of the program of study the diploma is given with the title of Doctor in one of the following areas:

a) Agricultural science

b) Forestry

c) Animal production

d) Food science

e) Tropical and sub-tropical agriculture.

2. The number of diplomas awarded for 1980-1983 is as follows:

	1980	1981	1982	1983	Average
1) Agr. science	1 063	1 316	1 496	1721	1 399
2) Forestery	112	91	117	148	117
3) Animal. prod.	57	59	65	78	65
4) Food science	58	55	58	53	56
5) Trop. and sub. tropical agric.	-	-	-	-	-

An average of 1 637 per year.

The program in Tropical and Sub-tropical Agriculture has not completed the first cycle; therefore no data is available. The average number of degrees in Veterinary Science between 1980/1983 was 759 per year.

3. In all degree programs, basic courses (chemistry, physics, botany, zoology, etc.) are taught and professional teaching characterizes each course in relation to its particular goals. The degree program in **Agricultural Science** (five years, 31 exams) gives a two-fold preparation in the agricultural field: technical- scientific and economics-management. The important subjects come from agronomy and field crops, plant protection, animal husbandry, economics, *agricultural engineering and conversion of* agricultural products (food processing).

The degree program in **Forestry** consists of five years of study with 31 exams. Key concepts include: the role of the woodlot in soil protection and forest hydrology; management, evaluation, reorganization and clean-up in woodlot economics and productivity; utilization and conversion of wood and its use; livestock and range management.

The **Animal Production** degree is four years in length with 29 exams. This program of study prepares professionals in intensive animal production with an integrated competency in the animal field that extends from the means of production and raising and breeding to product conversion. The main subjects come from the fields of agronomy, animal husbandry, health care, economic management, planning and product conversion technology.

A five year program of study with 23 exams comprises the degree in **Food Science**. This program is designed to prepare a biotechnologist with competency in the following areas: a) raw materials, partially prepared materials and food formulations, b) food processing and distribution, c) quality control methodology, d) food requirements, resource location and the structure of the food market.

The program of study for a degree in **Tropical and Sub-tropical Agriculture** consists of 31 exams in four years of study. This degree gives a type of preparation similar to that of Agricultural Science. It addresses topics particular to tropical and sub-tropical environments such as: climate, soils, flora and fauna and economics and social factors.

Students in faculties of agriculture are able to transfer from one university to another at the beginning of any academic year with full recognition of exams taken. It is also possible to move from one degree program to another with recognition of the exams common to both programs, even if the courses are known under differing titles and have slightly different content.

Post-graduate courses of specialization are available that last one or more years. (See **Annex**).

Those who have earned the title of Doctor can enrol in a program for **Doctor of Research**. This degree will be granted after a minimum of three years of study and the defense of a doctoral thesis. The number of programs is determined at the national level and persons applying for the Doctor of Research program are selected by means of competition. Those admitted receive a scholarship of L.10 000 000 per year. If public or private entities contribute to the scholarship fund, the number of students can be increased. Foreign students can be admitted to the doctoral program, but the number cannot exceed 50%. The faculty members determine if the degree held by the foreign student is valid for admission. No grants will be given to foreign students unless a bilateral agreement exists between Italy and the country of origin.

No data are available for the number of students completing the Doctor of Research program because the first cycle will only end at the beginning of 1987.

II - Educational objectives

1. Perspectives

Professional occupations of graduates in agricultural science are given below for the period 1975/76 - 1979/80.

Public sector: **63.7%**

- Schools: 32,7%
- Public offices (regional and national): 23,5%
- Professional Organizations and Unions: 7.5%

Economic sector: **31.4%**

- Free-lance Professionals: 3.2%
- Farm Director: 10.0%
- Commercial business of agricult. products : 4.6%
- Businesses which convert agric. products: 3.5%
- Businesses which produce agric.equip.: 6.4%
- Credit offices (Banks): 3.6%

Extraneous agricultural activities: **4.9%**

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100 %

Few graduates are employed in foreign enterprises either within or outside of Italy. Additionally, few graduates are employed in international organizations (FAO, ICARDA, etc.).

At the present time, most students are leaning towards the public sector (government offices and schools). The best students aspire toward university or research organizations.

2. Programs

Animal Production, Food Science and Tropical and Sub-tropical Agriculture each have just one "section" of study, whereas for Agricultural Science, after the first two years of general study the student can select one of the following three "sections": 1) Plant Production, 2) Economics or 3) Animal Husbandry.

These "sections", even though they do not give a higher specialization, allow the student to pursue his or her own interests and inclinations. This

division of study is rather recent and no definite statistics are available. However, data gathered from a limited sample show that about 60% of the students chose Plant Production, about 30% Economics and about 10%, or less, Animal Husbandry. Few students chose Animal Husbandry because of the crisis within Italian animal husbandry and because animals are now raised in feedlots which have more need for veterinarians than for agronomists. Regardless of the "section" of study, all students must take 20.5 common courses. Within each "section" of study, there are five required courses. During the fourth and fifth year the students take 5.5 other courses which represent a further characterization of the chosen section, called "orientation" (Seed Production, Crop Protection, Agriculture and Environment, Regional Planning, Biotechnology, or Technology of Animal Products, etc.). For example, the "packet" courses for the Seed Production orientation are Seed Biology, Production and Technology; Nursery Technology; Genetics of Seed Production; Genetic Resources; Weed Control; Experimental Methodology in Agriculture, and Ecology.

The Forestry program has a similar organization. There are two "sections":

a) **Forestry Management Techniques** and

b) **Environmental Protection and Soil Conservation.**

Each "section" has "orientations" which are chosen in the fourth or fifth year.

All Italian faculties have the same structure and teach the same common courses and the same courses for each "section" when they are present. The intent of the legislature was to allow each faculty to express its originality by initiating one of the above mentioned "sections" of study. However, in reality, each faculty initiated all "sections" of study. Originality is also possible through the use of courses that characterize each "orientation" and in this case, the choice of the faculty is generally linked to the peculiarities of the region.

Teaching is primarily traditional (60 hours of academic lessons for each annual course and field and/or laboratory exercices for appropriate courses).

There is a *practicum* of at least three months on one or more farms chosen by the faculty, to give a practical-applied apprenticeship. It can only be done after finishing all common courses and those of the chosen "section". Therefore it can be done between the fourth and fifth years. The student's education is complemented by the farm visits and seminars.

Audiovisual materials are normally used only to supplement academic lessons. The student must have completed a bibliographic or original research thesis in order to take the final exam. At the time of thesis selection, the student must demonstrate competency in a foreign language.

In Italy the law stipulates the number and type of subjects that should be taught, while the content is determined by the teacher who has complete freedom to teach as he or she desires. This freedom is only limited by the necessity to coordinate the material with the rest of the faculty; a coordination meeting takes place each year before the beginning of the academic year. The conclusions of the faculty are, however, only a recommendation. The norm that regulates this matter is, in fact, also valid for the humanistic faculties where the faculty members, for fear of undergoing an ideological type of conditioning, do not tolerate any threat to the principle of total teaching freedom.

The basic courses (chemistry, physics, zoology, botany, etc.) have a two-fold purpose:

1) education and

2) knowledge. The second aspect is emphasized when the subject matter of the course is considered preparatory for the professional disciplines.

For this reason, it is generally preferred that these basic courses be taught by teachers from within the faculty institutes or departments.

III - Organization

1. Faculties

As already stated, higher studies in agriculture are given in the university environment by different faculties (Faculty of Agriculture of the

University of Turin, of Milan, of Florence, etc.). There are 17 faculties of agriculture in Italy (see **map** and **annex**).

Faculties only have teaching and research responsibilities, for which they are fully autonomous. The aspects common to all faculties of a particular university are coordinated by the Academic Senate which is made up of all Deans and is presided over by the President (Rector) of the University.

The faculties are made up of teaching and research units or institutes. The institutes differ in number from place to place (Institute of Agricultural Chemistry, of General Agronomy and Field Crops, of Genetics and Crop Breeding, of Economics and Agrarian Policy, etc.). Greater cohesion is being created by means of departments, which exist by law but are still few in number.

Faculties have no administrative responsibility. Administrative matters are confined to the institutes which feed them directly into the main university administration. It is here that the most important decisions are made by the Administrative Council presided over by the University President. All faculties of Italian universities are dependent upon the Ministry of Public Instruction.

2. Programs

The content of the program of studies is decided upon by the teachers. The faculties, as already stated, are responsible for coordination and have full power to decide which courses they are able to initiate beyond those required by law. They also decide what level of teacher should be employed (Full Professor or Associate Professor).

3. Teaching and Research

In Italy the university is the primary instrument of scientific research (DPR 382/80 Art.63). An approximate breakdown of a teacher's time would be about 70% dedicated to research and 30% to teaching.

The career of university personnel depends more on research than on teaching. One could say that university professors are paid to teach but that their career depends upon research.

Given the nature of the university, research is primarily basic, but a great deal of applied research is conducted in the field of agriculture.

University research has the primary purpose of improving the quality of teaching through continuous updating. This greatly distinguishes it from other types of schools.

Students preparing theses and graduates in the Doctor of Research Program also contribute to on-going research projects. The primary work of Doctor of Research candidates is the preparation of a doctoral thesis. This prepares them to become the researchers and professors of the future.

Research conducted at universities is financed almost totally by public funds, primarily national but also regional. The funds are granted by the Ministry of Public Instruction, the Ministry of Agriculture and Forestry, the National Research Council or by multinational organizations (CGIAR, EEC). The Ministry of Public Instruction distributes 40% of the funds that are destined for research on the basis of large research projects of national interest. Groups of teachers or institutes or departments autonomously propose large research projects. Among them a special Ministry Committee decides to finance those which are the most relevant to the national interest.

The Ministry of Agriculture and Forestry (MAF) and the National Research Council (NRC) have their own research programs that can involve researchers that work at universities. The researcher is free to use funds given by different bodies after receiving approval from the council of the institute where he works. The MAF and NRC decide the orientation of agricultural research after consulting the working sector (unions, agricultural organizations, regions, etc.).

In Italy, universities are responsible for both teaching and research, but other public organizations exist which only conduct research.

For example, the Ministry of Agriculture and Forestry has a network of 23 Institutes of Agricultural Research, each with its own staff which has no teaching responsibilities. The NRC also has its research bodies, some totally autonomous (NRC Institutes) and others integrated into the university structure (NRC

Centers of Study). NRC researchers, even when integrated into university structures, have no teaching responsibility as do the MAF researchers.

The careers of MAF and NRC researchers and those of university personnel are at different levels and are subject to change. This is the source of many problems. No type of link exists at the institutional level between university research and the research conducted by MAF and NRC institutes.

4. Teaching Personnel

Italian universities are staffed almost exclusively with permanent teachers (tenured). If the faculty does not have tenured teachers for a particular discipline, the course can be taught by tenured teachers from a related discipline. This can last one year and can be renewed.

Teachers with temporary contracts do not exist, except for contracts for brief periods. These are primarily for integrative activities within the official course. This can also involve foreign teachers. Visiting professors and foreign professors do not play a significant role.

Italian university professors are divided into two classifications:

a) Full Professor and

b) Associate Professor.

The actual number of full professors in the Italian faculties of agriculture is 339 while there are 430 associate professors. The legal status of professors from the Faculty of Agriculture is the same as those of other faculties.

University professors are economically comparable to executives from other public sectors. They have no mandatory work hours. The university professor can choose full or part time work. Full time requires at least 350 teaching or tutoring hours per year in the faculty and part time requires 250 hours per year. Other than receiving a lower salary, the part time choice is incompatible with certain academic responsibilities such as President of the University or Dean of the Faculty.

University professors leave teaching at the age of 65 years but remain in the university with full academic privileges until reaching 70 years of age, at which time they retire..

In the university institutes, researchers work alongside full and associate professors and assist them in teaching activities, but they primarily conduct research. There are 395 researchers in all of the Italian faculties of agriculture.

Researchers, like professors, have a stable position. One is able to get a position as a researcher by means of a competition. Candidates must possess a diploma in the relevant discipline for a particular position. In the future, researchers will be selected almost exclusively from those with a Doctor of Research degree, even if the title of Doctor of Research is not officially requested. The positions of associate and full professor are also achieved by means of a competition which is conducted by a competition commission.

The competition for associate professor has three parts:

1) evaluation of scientific publications,

2) discussion of publications, and

3) teaching skills.

The competition for full professor is based on an evaluation of publications and of teaching activities.

It is normal to proceed from researcher to associate professor to full professor, but one is able to enter as an associate or full professor without having been a researcher or associate professor, or both. This means that a person coming from a research career outside the university can become an associate or full professor. This weighs heavily upon the newer scientific sectors as they lack university schools capable of forming young scientists.

Education received outside of Italy has great importance and is given much consideration in evaluating a candidate's credentials.

5. Students

There are no restrictions placed on university enrolment in Italy. All students who have com-

pleted a high school diploma are able to enter any faculty without restriction. Needy students can obtain assistance in the form of money, room and board, books, etc. The percentage of students receiving these benefits is modest (about 20%).

6. Education costs

No official statistics exist on education costs of study that take into account the situations of the different faculties. The Institute of Central Statistics has given an average amount regarding university students. For the 1983/1984 academic year, 2,500,000 lire were spent per student. The cost for a student in a scientific faculty, such as agriculture, is at least double this amount because of the nature of the studies and because of the lower student/teacher ratio with respect to the humanities (the ratio is about 15.8 for agriculture and 61.3 for law).

The cost of study in Italy is almost totally assumed by the State. This includes:

1) direct payment of stipends and salaries of university personnel;

2) supplies

3) the construction and maintenance of buildings;

4) the purchase of instruments and laboratory apparatus necessary for teaching; and

5) utilities (lighting, gas, water heating, telephone, etc.).

Public and private bodies outside of the university are able to supply funds to conduct research, but in general, do not enter into the teaching sector.

The students pay the university through tuition and laboratory fees. The amount varies according to the year.

The average amount is currently 300,000 lire per student per year in the Faculty of Agriculture.

IV - Problems

As already stated, higher education in agriculture only takes place within the university structure. Faculties of agriculture have the same scientific organization as all other faculties. As different titles of study do not exist, the faculties give the students both technical and scientific preparation.

The Italian degree in Agricultural Science therefore has a technical preparation, with basic scientific studies. After passing a particular state exam, the graduate is qualified to work in any professional activity in the field of agriculture. The scientific preparation, on the other hand, gives the graduate the possibility of an academic and research career. In fact, the scientific preparation is reinforced in the Doctor of Research program.

The number of graduates in agriculture working in Italy has increased from 7,500 in 1951 to 20,700 in 1981. Unfortunately, only 13% work full time in the agricultural field.

The graduate in agriculture is facing competition from biologists in the environmental science area, engineers in regional planning, and landscape architects in the management of recreational areas. Unfortunately, faculties of agriculture have not given an adequate response to the emerging needs in these areas.

A particular problem often debated regards the equality of titles of study given by the various countries in the European Economic Community. The meetings of experts held under the auspices of CEPFAR (European Center for Promotion and Education in Agricultural Environments) have shown major differences in the structure of the curricula and of the diplomas given, but also the need and the willingness to overcome them.

At the institutional level, no working relationship exists between international organizations and Italian faculties of agriculture, as a whole.

However, single institutes or individuals do collaborate with these organizations under the from of bilateral agreements.

Some institutes develop research programs in cooperation with international organizations such as ICARDA, ILCA, IRRI, etc. Frequently, new graduates are able to find employment in these joint programs which offer the possibility for further training and experience within a highly stimulating environment.

Some faculties work with the Ministry of Foreign Affairs in assisting the development of new faculties of agriculture in developing countries such as Somalia and Mozambique.

However, before these activities can be fully realized, gaps in information must be filled. Faculties do not always know about the potential support available to them for developing such cooperation.

The ICAMAS seminar on the problems of education in agriculture in the Mediterranean countries certainly addresses this important issue, even if the need exists to address educational problems within a larger sphere. In fact, when addressing educational problems, the Mediterranean countries of Europe should not just look at other Mediterranean countries, but also need to consider the non-Mediterranean countries of the EEC, which also share the same problems of equality of titles of study, uniformity of educational curricula and the mobility of people educated in different countries.

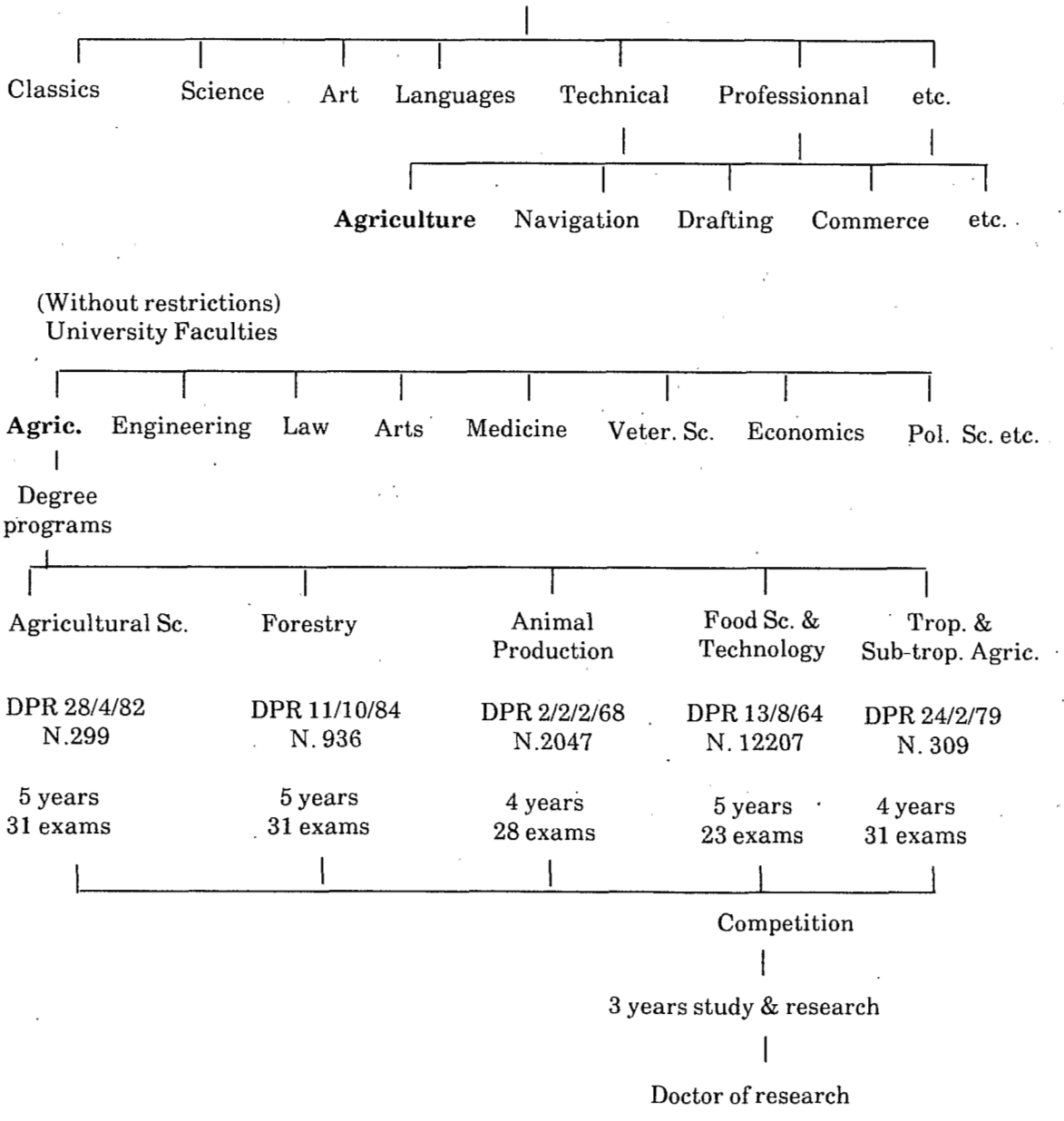
Mediterranean countries, however, have peculiar agricultural characteristics that must determine the content of the educational and research programs. Within this framework, ICAMASis able to play the irreplaceable role of catalyzer.

Map: Faculties of agronomy in Italy

Annex

Figure and table

Figure 1
Education in agriculture in Italy



Seats	Degree programs	Post-graduate courses of specialization
Ancona	AS	
Bari	AS, F	Animal Husbandry, Plant Pathology
Bologna	AS, AP	Plant Pathology, Industrial Horticulture
Campobasso	FS	
Catania	AS	
Firenze	AS, F, T and STA	Tropical and Sub-tropical Agriculture
Milano	AS, FS	Irrigated Crops, Animal Husbandry
Napoli	AS	Tropical and Sub-tropical Agriculture, Soil Conservation, Tobacco, Economic Research in Mediterranean Agriculture
Padova	AS, F	Mountain Agriculture of the "Venezia" region
Palermo	AS	Viticulture and Enology
Perugia	AS	Farm Management
Piacenza	AS	
Pisa	AS	Agricultural Assistance and Extension, Cooperation in Agriculture, Plant Pathology, Officinal Herbs
Potenza	AS, F, FS	
Reggio Calabria	AS, F	
Sassari	AS	Soil Conservation, Economic and Technical Problems of Sardinian Agriculture
Torino	F	Viticulture and Enology
Udine	AP, AS, F, FS	
Viterbo	AS, F	

Table 1: Faculties of Agriculture in Italy

Legend:
AS = Agricultural Science, F = Forestry, AP = Animal production, FS = Food Science, T and STA = Tropical and Sub-tropical Agriculture