

University Studies of Agricultural Engineering in Europe; a Thematic Network

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**TOOLS FOR QUALITY ASSURANCE AND ASSESSMENT OF
AGRICULTURAL ENGINEERING PROGRAMMES, TUNING SUBJECT-AREA
LINES AND DISAPPEARING / RARE KNOWLEDGE
IN ITALY**

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Abstract

The quality assurance process applied by Italian State University institutions, in order to achieve some level of internal quality control or assessment for the offered study programmes, is established in the funding criteria of the Ordinary Financing Fund (FFO), decided by the National Committee for the Evaluation of the University System (CNVSU).

In most Italian Universities the quality assurance and assessment procedure of the study programmes starts with a report, written by a specific committee, that carries out an internal assessment, by which the strong and weak points of the study programme and the related causes are focused. The quality assurance and assessment procedure appoints three autonomous and independent assessors, who have the task of carrying out an external assessment of the degree study programmes and publishing an evaluation report.

In Italian Universities the Faculty Assembly holds the tasks of: setting the education and research objectives and evaluating the success in satisfying them; providing, monitoring and enhancing the intellectual and material resources; demonstrating high standards to external assessors and taking into account their reports; co-operating with representatives of professional bodies for carrying out the examination for accessing the professional activity; planning new programme specifications; monitoring student career progression. The Degree Study Programme Assembly holds the task of approving the study programmes of individual students. Moreover, in Italy the Ministry of Education, University and Research, the region administration and the University academic bodies hold the responsibility of: overseeing academic quality and standards; managing the University education and research strategy; overseeing the development and management of quality assurance procedures; approving Faculty recommendations related to the proposal of new study programmes and/or the discontinuation of existing ones.

In Italy the Standard Assessment procedure for students is based on the following principles: students can take an examination for a specific course as many times as they wish; examiners and assessors are appointed by the Faculty Dean, while a specific committee is responsible for University examinations; students are finally examined for their thesis by a Faculty committee.

Italian Universities offer a Code of Practice for education and research, which is included in several laws and decrees, which set out the guidelines which must be followed in managing a study programme and designing the related courses.

In Italy the typical degree profiles in Agricultural/Biosystems Engineering, for the three study levels, are offered by five University Faculties of Agriculture.

As regards the status of rare/disappearing knowledge in Agricultural/Biosystems Engineering studies in Italy, it is needed to focus especially on the following subjects: historical farm

buildings and new purposes; agritourism; agricultural museums. In Italy several actions try to protect and revitalise the historical farm buildings and, therefore, create jobs and profit for the local community. The destiny of Italian old buildings mainly depends on the implementation of integrated rural development plans, taking into account the landscaping and environmental functions of farms. Converting historical farm buildings or houses into B&B lodges, farm hotels and restaurants generates a new farm activity called agritourism. In Italy, where more than 1600 farm resorts are available, incentives provided for agritourism have been successful in preventing the depopulation of the countryside. A historical farm building can be converted into an agricultural museum. More than 500 agricultural museums are available throughout Italy.

1. The quality assurance process of the Italian University institutions

In the European Union the quality assurance process of higher education is a policy instrument, organised on a national basis and aimed at ensuring the quality of University degree study programmes.

The quality assurance process applied by Italian State University institutions, in order to achieve some level of internal quality control or assessment for the offered study programmes, is established in the funding criteria of the Ordinary Financing Fund (FFO), decided by the National Committee for the Evaluation of the University System (CNVSU).

In fact, according to the decree of the Italian Minister of Education, University and Research of the 28th July 2004, the criteria, whose structure is summarised in Table 1, are the following:

- a) 30% of the total Ordinary Fund is based on the demand to be satisfied, in terms of the total amount of students regularly attending the study programmes;
- b) 30% of the total Ordinary Fund is based on the education process outcomes, in terms of University credits achieved by the students (the total student yearly workload is 60 ECTS) and amount of graduates [1];
- c) 30% of the total Ordinary Fund is based on scientific research parameters, such as amount of research staff, national research funds, amount of papers and patents;
- d) 10% of the total Ordinary Fund is based on specific incentives, such as those for promoting young researchers and academic innovations.

As refers to the criteria a) it is also considered the amount of study programmes for which during the year 2004 the University Assessment Groups have declared the existence of a system for assessing the quality of their activities. This assessment system is based on the following principles:

- inclusion of specific and detailed information about the study programme in the University web-site;
- definition of a stable teaching staff for each degree study programme (a minimum of 10 professors);
- existence of a system for assessing the quality of the degree study programme.

In order to implement an efficient system for assessing the quality of education processes, the following factors should be taken into account:

- the reputation of the University, which depends on the capacity of attracting high quality students;
- the existence of systems for quality self-assessment, the regularity of education processes, the resources per student, the ratio of students who are attending or have attended studies abroad;

- the student average satisfaction, also with reference to offered utilities;
- the existence of University systems/organisations promoting and monitoring graduate employment;
- the percentage of graduates who find a job within a certain time after achieving their degree and their average satisfaction about their current job [2].

The indicators are information about students, whose collection is organised and managed by the Student Secretariat and processed by the University Information Service Centre (CSI).

Moreover, at the end of each semester questionnaires for assessing teaching activities are prepared by the Self-Assessment Group (GAV) and given by the Teaching Manager (MD) to students, who have to anonymously fill them every year for any course of the semester of the study programme. Each of these questionnaires is divided into four sections:

1. questions about personal data and the percentage of lesson attendance of the considered course;
2. questions about the satisfaction level concerning the course specifications (course objectives and content, clarity of teaching, attraction of lessons, study methods, teaching materials and equipment, etc.);
3. questions about the satisfaction level concerning the lecture halls and the rooms and equipment for practical experiences;
4. questions about the satisfaction level concerning the support services (provided by the Student Secretariat, Faculty Secretariat and Faculty Library).

In the answers the student must use a score from 1 (not satisfied) to 5 (fully satisfied). The questionnaires are analysed by the Teaching Manager and the President of the Degree Study Programme Assembly and summarised in tables and graphics [3]. Each professor will receive the results for his courses in an anonymous form.

In the case of the University of Bari similar questionnaires are distributed to the students also after examinations.

The Italian system is well suited to identify compliance with the Standards and Guidelines for Quality Assurance in the European Higher Education Area [4].

Table 1. The funding criteria of the Ordinary Financing Fund for the Italian Universities (FFO).

Model component	Factor	Variables
Demand	Attending students	Amount of students attending study programmes with minimum requirements
Results of education processes	Regularity	Obtained credits / established credits Amount of graduates
	Competences	Accreditation / valorisation of human resources
Research	Research resources	Amount of research staff
	Research funds	National funds Other funds (industries, EU, etc.)
		Research outputs
	Specific incentives	Academic organisation projects

2. Quality assurance and assessment procedure in the Higher Education Area

Most Italian Universities (including Bari and Palermo Universities), under the leadership of the Conference of Italian University Rectors (CRUI), participate to CampusOne EU project, aimed at evaluating and, therefore, improving the quality of study programmes.

According to this project, the quality assurance and assessment procedure of the Italian University study programmes starts with a report, written by a specific committee, constituted by three or four members.

Then, the same committee carries out an internal (self-reflective) assessment, by which the strong and weak points of the study programme and the related causes are focused. The quality assurance process applied by the Universities of Bari and Palermo are similar to each other and are published in a self-assessment report, which is written every year by a self-assessment group.

For example the self-assessment report written in the year 2004 for the study programme group “Agricultural, Food and Forestry Sciences and Technologies” by the Agriculture Faculty of the University of Bari includes the processes identified for the management of these study programmes. These processes, summarised in the diagram reported in Figure 1, are mainly concerned with:

- resources, in order to improve and optimise the management processes of staff, structures and utilities;
- financing, through specific control systems and actions undertaken in order to improve the service;
- Context Services, through the increase of the relationships with the job market and stakeholders (SH in Figure 1) and the stipulation of conventions, contracts with industries, etc.

The cycle “Plan-Do-Check-Act” (PDCA) ends with the management of the re-examination process: the processes of assessment, control, monitoring and analysis of results return to the stage of re-patterning, re-planning and re-scheduling of the education process, relying on the modified needs and objectives of the stakeholders.

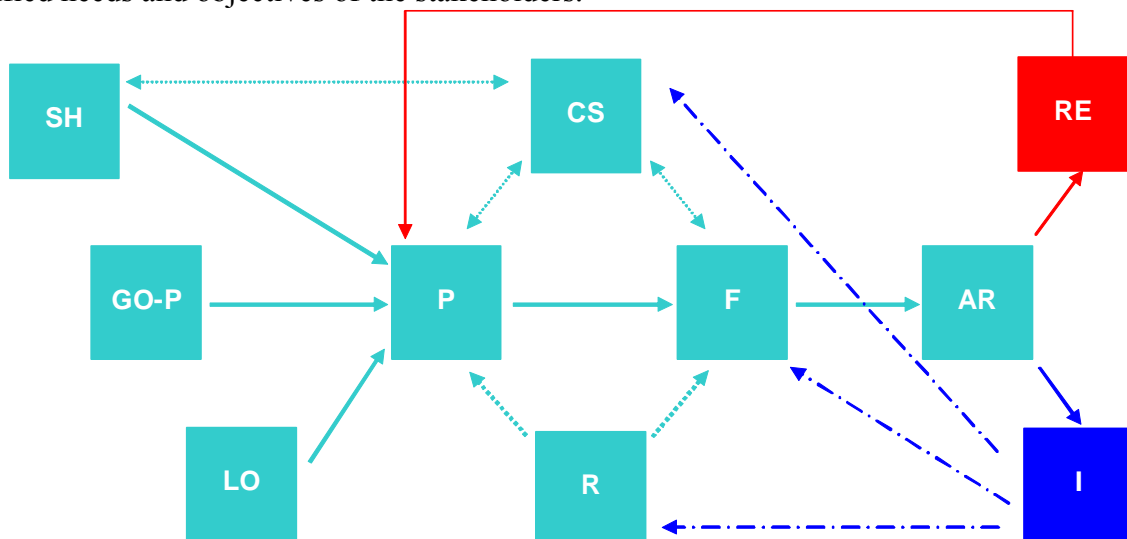


Figure 1. Cycle “Plan-Do-Check-Act” (PDCA) for the management of the study programmes, within the quality assurance process applied by the Agriculture Faculty of the University of Bari.

Legend:

SH: Needs of Stakeholders	R: Resources
GO-P: General Objectives and Policies	F: Financing
LO: Learning Objectives	AR: Analysis of Results
P: Planning	RE: Re-examination
CS: Context Services	I: Improvement

Moreover, a quality assurance and assessment procedure is established by the Conference of Italian University Rectors (CRUI), which appoints three autonomous and independent assessors; they have the task of carrying out an external assessment of the degree study programmes, by means of visits and/or technical analysis of curricula and/or interview of students. The three assessors publish an evaluation report, which is sent to the University offering the study programmes, in order that the academic bodies can discuss about it.

Thus, it is possible to improve the quality of teaching activity and to assure its reliability for students, families, funding country, sponsors, employers, professions, etc. [5].

3. University responsibility for Quality Assurance in education and research

In Italian Universities the Faculty Assembly, among its responsibilities, holds the tasks of:

- setting appropriate objectives in education and research (amount of examinations to be passed per semester, results of questionnaires, percentage of study abandonment, amount of regular graduates, average degree score, percentage of graduates employed after a certain time) and evaluating the success in satisfying them;
- providing the intellectual and material resources (amount of full time teaching staff, rooms and equipment for teaching) and annually monitoring and enhancing these resources;
- demonstrating high standards to external assessors and taking into account their reports;
- co-operating with representatives of professional bodies for carrying out the examination for accessing the professional activity;
- planning new programme specifications and any subsequent amendment;
- monitoring student career progression.

The Degree Study Programme Assembly, among its responsibilities, holds the task of approving the study programmes of individual students.

Moreover, in Italy the Ministry of Education, University and Research, the region administration and the University academic bodies hold, in different ways, the responsibility of:

- overseeing academic quality and standards;
- managing the University education and research strategy;
- overseeing the development and management of quality assurance procedures;
- approving Faculty recommendations related to the proposal of new study programmes and/or the discontinuation of existing ones.

4. Standard Assessment procedure for students

In Italy the Standard Assessment procedure for students, for both the 1st and 2nd cycles, is based on the following principles:

- the rating system for course (module) assessment is included in the range 18/30 - 30/30 and generally there are two examination periods, namely January-February and June-July-September;
- students can register and take an examination for a specific course as many times as they wish; examiners and assessors are appointed by the Faculty Dean, while the body responsible

for University examinations is a specific committee, constituted by three teaching staff members;

- students are finally examined for their thesis by a Faculty committee, constituted by 11 teaching staff members; the rating system for degree assessment is included in the range 66/110 - 110/110;
- there aren't special assessment arrangements for students with disabilities and/or additional support needs;
- there aren't special examinations for exchange students who have registered for one or more semesters.

5. Code of Practice for education and research

In the majority of European Universities, including all Italian ones, the academic staff has a considerable autonomy in determining the content of each taught course (module). The course content usually allows sufficient flexibility to accept the introduction of new knowledge, opinions or analyses, so that the interest of the teacher for the subject can be transferred to its students.

The study programmes, the courses (modules) of which they are constituted, and the applied education and research methods are clearly explained to the students.

Italian Universities offer a Code of Practice for education and research, which is included in several laws and decrees, that set out the guidelines which must be followed in managing a study programme and designing the courses (modules) included in the programme itself.

6. TUNING Template

One of the USAEE activities for the dissemination year is the preliminary mapping of the first two subject-area lines of the TUNING template:

1. introduction to the subject area;
2. degree profile.

The subject area Agricultural/Biosystems Engineering is concerned with the production, processing, storage and distribution of agricultural (food and fibre) products (i.e. plant and animal production, livestock buildings, animal health and welfare, agricultural, forestry and food machines and plants, post-harvest technology, process engineering, ergonomics and safety, safe food production, etc.), the protection of the natural environment and the preservation of the natural resources (i.e. land planning, soil conservation, rational water management, air pollution control, waste management, preservation of natural habitats, etc.).

The graduates in Agricultural/Biosystems Engineering have to develop new technologies for agricultural systems, materials and products, aimed at improving the quality and affordability of agricultural products.

The typical degree profiles in this subject area offered by the Italian University Faculties of Agriculture, for the three study levels, are reported in Table 2 [6].

In Italy, even if the reform of Agricultural Engineering study programmes is in effect since 2003, the sample of the related graduates is too much small to be significant. Therefore, reliable data about the typical occupations of the Italian graduates in the subject area of Agricultural/Biosystems Engineering are missing.

Moreover, the following Applied Agricultural Engineering courses, apart from being structural part of Agricultural/Biosystems Engineering study programmes, could be also offered to support other degree programmes, such as:

- Plant Science (e.g. Engineering Surveying and Cartography, Buildings for Protected Production and Food Processing, Ergonomics and Safety, Irrigation and Drainage Systems, Agricultural Machines and Plants);
- Animal Science (e.g. Farm Buildings);
- Food Science (e.g. Machines and Plants for Post-harvest and Food Processing, Buildings for Protected Production and Food Processing, Work Safety, Integrated Food Manufacturing Systems);
- Environmental Engineering (e.g. Engineering Surveying and Cartography, Hydraulic Forestry Land Protection and Soil-Water Conservation, Landscape Architecture, Environmental Applied Thermodynamics, Environment and Land Planning, Settling of Agricultural and Forestry Land, Agro-Forestry Engineering, Integrated Management of Water Resources, Integrated Management of Water Basins; Green Planning and Management, Use of Renewable Energy Sources; Ecological Planning of Territory).

Table 2. The typical 1st, 2nd and 3rd cycle degree profiles in the subject area of Agricultural/Biosystems Engineering offered by the Italian University Faculties of Agriculture.

Study level	Degree name (University institution)	Specific parts (Applied Agricultural Engineering courses)
1 st cycle	Agricultural Engineering (University of Palermo)	Engineering Surveying and Cartography, Farm Buildings and Rural Land Planning, Agro-Industrial Mechanics and Mechanisation, Ergonomics and Safety, Irrigation and Drainage Systems
1 st cycle	Food Processing Engineering (University of Molise)	Heat Transfer in Food Industries, Heat Transfer
1 st cycle	Planning of Rural Environment (University of Sassari)	Farm Buildings and Rural Land Planning, Hydraulic Forestry Land Protection and Soil-Water Conservation, Agricultural Machines and Plants
1 st cycle	Rural and Environmental Planning Sciences (University of Viterbo)	Landscape Architecture, Environmental Applied Thermodynamics, Farm Buildings, Hydraulic Forestry Land Protection and Soil-Water Conservation
2 nd cycle	Agricultural Engineering Sciences (University of Bari)	Cartography and GIS, Engineering Design – CAD, Integrated Management of Water Resources, Mechanisation and Automation in Agriculture, Machines and Plants for Post-harvest and Food Processing, Buildings for Protected Production and Food Processing, Work Safety
2 nd cycle	Food Processing Engineering (University of Molise)	Integrated Food Manufacturing Systems
2 nd cycle	Planning and Management of Rural Environment (University of Sassari)	Energy Supply and Management in Agriculture, Soil Protection, Environment and Land Planning
2 nd cycle	Rural Land and Environment Planning Sciences (University of Viterbo)	Computer Aided Technical Design for Land Mapping, GIS, Settling of Agricultural and Forestry Land, Planning of Water Resources and Hydrology
3 rd cycle	Engineering of Territory and Agro-Forestry Environment (University of Bari)	Agro-Forestry Engineering, Integrated Management of Water Basins; Green Planning and Management, Use of Agricultural and Forestry Biomasses, Use of Renewable Energy Sources; Ecological Planning of Territory (interest research areas)

7. The status of rare/disappearing knowledge in Italy

In the Italian “Codice dei Beni Culturali e del Paesaggio” (Cultural Heritage and Landscape Law) it is stated that “protecting and enhancing the value of our cultural heritage contributes to preserve the memory of the national community and its territory and to promote the culture development”.

As regards the status of rare/disappearing knowledge in Agricultural/Biosystems Engineering studies in Italy, it is needed to focus especially on the following subjects:

- historical farm buildings and new purposes;
- agritourism;
- agricultural museums.

7.1. Historical farm buildings and new purposes

In Italy different forms of accommodation on the farm, such as rural cottages, B&B and guest rooms, are marketed by Agriturismo network.

In the small historical town of Specchia (Lecce) the Local Action Group (LAG) of Capo Santa Maria di Leuca, funded by EU Leader programme, reached an agreement with the owners of a dozen of houses. This LAG rents these houses for ten years, restored them by equipping them with every modern comfort and markets them as tourist accommodation. The profits are distributed to the owners, who recover their property at the end of the lease.

Heritage sites are also a pretext for a number of tourist activities. On the other end some tourist initiatives use heritage sites for anything generating profit, so that the original heritage is betrayed and distorted. Between these two extremes fortunately several actions try to protect and revitalise the historical farm buildings and, therefore, create jobs and profit for the local community.

Good examples of these actions are the exceptional "trulli" houses with cone-shaped stone roofs in the town of Alberobello (Bari).

The abandon of the countryside, after the 19th century, and the mechanisation and automation of farming have made a remarkable number of rural residential and working buildings useless, causing them to be abandoned and, therefore, subject to a progressive deterioration and ruin. The changes in the social organisation of the countryside can be inferred from the different building types which succeeded one to another.

The different building types, related to the specific farming systems, are: “cascina lombarda” with enclosed courtyards (from 15th/16th to 19th century), descendant of the 14th century viscount’s castle; the “barchesse”, in Veneto region; the “casoni”, on the lagoon, in Northern Italy, in addition to castles built for defending the local population; “casa poderale”, in Central Italy; “masseria”, “masseria regia”, of Swabian (German) and Angevin (French) tradition, and “bagli siciliani”, in Southern Italy. The “bagli”, which were fortified over the centuries in order to defend them from pirate raids, housed whole families, self-sufficient for any need.

The Italian Act of Law 378/2003 enables actions for safeguarding and enhancing the value of historical buildings built from the 13th to the 19th century and bearing witness to traditional rural economy. The opportunities offered by the above Act of Law should include space, for example, not only for holiday farms but also for niche agriculture and food production.

As regards the possible restore of historical buildings, on one hand there are the supporters of inflexible protection of pre-existing structures, who want to transform them into open-air museums. On the other hand there are also the supporters of the irreversible alteration of the buildings, changing their structures and functions, in order to maximise the profit and meet the needs of the current society. Possible methods of an intelligent rehabilitation of historical buildings could be activities such as tourism, sports, commerce and recreation (farm holidays,

agritourism, riding schools, services connected with the creation of greenways, catering services and direct sale of local products, crafts, environmental education, etc.), able to maintain the specificity of local contexts and, at the same time, ensure their continuous maintenance.

The destiny of Italian old buildings mainly depends on the implementation of integrated rural development plans, taking into account the landscaping and environmental functions of farms. In this perspective the writing of guidelines for interpreting the cultural landscape could constitute an useful contribution to the rehabilitation of historical farm buildings [7].

7.2. Agrotourism

Converting historical farm buildings or houses into B&B lodges, farm hotels and restaurants seems to be the preferred solution for farmers who cannot find any alternative for the upkeep of their farm or historical rural buildings; this new farm activity is called agritourism or rural tourism.

Agritourism is a form of sustainable tourist development in rural areas, through which visitors have the opportunity to become familiar with agricultural areas and jobs, the daily life of the local population and the cultural elements and the authentic features of the area, while they can show respect for the environment and tradition. Moreover, this activity brings visitors closer to nature and rural life to which they can participate, be entertained and feel the pleasure of touring, learning and discovering. Further, staying in a farm often includes the opportunity of appraising local and traditional agricultural and food products.

In Italy, as elsewhere in Europe, incentives provided for agritourism have been successful in keeping the residents of rural areas at home and, therefore, preventing the depopulation of the countryside; at the same time, the architectural heritage is preserved through the renovation of buildings and the regional cultural heritage is promoted, while the profit of farmers increases. When carefully planned and well organised this kind of sustainable tourism has proved to be one of the most effective tools for preserving the proper identity of an area over the years.

Agritourism represents the link between the production of agricultural and animal husbandry goods with the provision of services and tourism. It allows the growth of local communities, assisting their economies to flourish and prosper, and facilitates the production of traditional products (e.g. fruit preserves and jams, embroidery, aromatic herbs, pasta). Moreover, agritourism assists in the preservation of crafts, preserves human memory through the revival of customs and traditional festivities, offers a communication channel between regions isolated from the large population centres and provides local youth with life-long opportunities. More than 1600 farm resorts are available throughout Italy.

Farm houses, B&B, ecological farm holidays, farm holidays - Bio & Health, wine farm holidays are only a few of many ways of opening farms to tourism [8, 9, 10, 11].

7.3. Agricultural Museums

A historical farm building can be converted into an agricultural museum.

Normally an agricultural museum is useful to preserve local agricultural history and rural heritage. It can show collections and exhibits, depicting agricultural tools and machinery, technology, crops and livestock, and examining human experiences, institutions and cultures, which were developed in specific rural landscapes and environments.

More than 500 agricultural museums are available throughout Italy.

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