

# **Vocational education in the agri-food complex in the European Union**

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In this contribution the field of agricultural education in the European Union is described. Agricultural education is an old part of vocational education. Some may think this field is dusty and dull, but it is not. Agricultural education, or as some prefer to call it nowadays, green education, is red hot. Why this is the case will be immediately clear.

The world population currently is 6 billion people, and it is estimated that in the year 2020 there will be 8 billion people.

This creates an enormous pressure on secure food production, food safety, and the environment.

Not only population growth puts this pressure on human and natural resources, the fight against poverty and under- and mal-nutrition does the same.

Agriculture is the largest policy domain of the European Union. European Agricultural Policy making is comprised in the CAP, the Common Agricultural Policy. 'The Common Agricultural Policy has been the biggest, the most contentious and the one with the largest budget of all the Union's policy areas. The EU has more power in agricultural policy than it has in any other policy area and it has passed more legislation on agriculture than in any other single policy area. The future prosperity of the EU's agricultural sector depends on its ability to profit from the domestic and international opportunities that have emerged in recent years. The CAP has already gone a long way and has now the great potential to become a truly European model of agriculture for the 21st century'. (<http://europa.eu.int/scadplus/leg/en/lvb/l04000.htm>; 30-11-2004).

The figures about the agricultural sector in Europe are colossal (see Table 1).

**Table 1. Key figures about agriculture in Europe**

<b>69.000.000.000</b>	US\$ imports into the European Union agricultural and food products sector
<b>51.000.000.000</b>	US\$ exports from the European Union's agricultural and food products sector
<b>14.500.000</b>	people working full or part time on agricultural holdings of the European Union
<b>7.300.000</b>	agricultural holdings with an average size of 17.5 hectares
<b>4.000.000</b>	agricultural holdings are in areas defined as "less favoured" (i.e. having permanent natural handicap - mountainous, hilly, poor soil, arid etc.) covering just over half the agricultural area in the EU
<b>30.000</b>	European agricultural cooperatives employing over 700.000 people and almost always in rural areas

Source: [http://www.copa-cogeca.be/en/copa\\_objectifs.asp](http://www.copa-cogeca.be/en/copa_objectifs.asp) (retrieval date: 30-11-2004).

Agricultural education has to educate the future generation of leaders, researchers, professionals, technicians and last but not least, innovative farmers, who collectively can meet the challenges of global food security.

Agricultural education is strongly related to the food sector. 'The food and drink industry is one of the most important industrial sectors, a major employer and exporter in the EU. This sector is characterised by the diversity in its types of activities and in the end products manufactured. The products covered can vary from bakery, pastry, chocolate, confectionary products to modified starches or different food preparations. The European Commission is seeking to ensure the competitiveness of the European food industries in the context of the Common Agricultural policy (CAP) and the EU's obligations in the World Trade Organisation (WTO).' (<http://europa.eu.int/comm/enterprise/food/>, 30-11-2004).

The food sector in Europe counts over 26,000 companies, employing about 2.7 million people. The food industry is the 3rd industrial employer in the EU, with an annual turnover of 600 billion Euro (<http://europa.eu.int/comm/enterprise/food/intro.htm>, 30-11-2004).

More than 70 % of the agricultural goods produced in the EU are used to be transformed into food industry products, many of them Non-Annex I-goods (NA I goods). Main product-groups of the NA I sector are processed dairy products, frozen fruit and vegetables, confectionery industry products, various prepared foods and sauces including pasta, ice-creams, soups, etc., non-alcoholic beverages, alcoholic beverages and spirit drinks, tobacco-products and processed starch products.

The agri-food complex is heavily supported by research. This research is supported by many institutions such as the CGIAR (<http://www.cgiar.org/>) (the Consultative Group on International Agricultural Research), at the World Bank in Washington, D.C.. They support research programs in product groups like Cereals ([Rice](#), [Wheat](#), [Maize](#), [Barley](#), [Sorghum](#), [Millet](#)), Roots, Tubers, Banana and Plantain ([Cassava](#), [Potato](#), [Sweet Potato](#), [Yam](#), [Banana and Plantain](#)), Food Legumes ([Chickpea](#), [Cowpea](#), [Beans](#), [Lentil](#), [Pigeonpea](#), [Soybean](#)), Oil Crops ([Coconut](#), [Groundnut](#)), [Livestock](#), [Forestry and Agroforestry](#), [Fisheries](#) and [Water Management](#).

Other relevant organisations are IFPRI ([ifpri@cgiar.org](mailto:ifpri@cgiar.org)), the International Food Policy Research Institute at CGIAR, and ISNAR (<http://www.ifpri.org/divs/isnar.htm>) (the International Service for National Agricultural Research), which is recently moved to Addis Ababa. The program of ISNAR comprises three major areas: institutional change, organization and management and science policy.

A key organisation in the EU in the food sector is EFSA, the European Food Safety Authority, located in Brussels ([http://www.efsa.eu.int/about\\_efsa/structure/catindex\\_en.html](http://www.efsa.eu.int/about_efsa/structure/catindex_en.html)). The EFSA is the 'keystone of European Union (EU) risk assessment regarding food and feed safety. In close collaboration with national authorities and in open consultation with its stakeholders, EFSA provides independent scientific advice and clear communication on existing and emerging risks.' EFSA has various panels on different field that need control: food additives, flavourings, processing aids and materials in contact with food, additives and products or substances used in animal feed, plant health, plant protection products and their residues, genetically modified organisms, dietetic products, nutrition and allergies, biological hazards, contaminants in the food chain, and animal health and welfare.

### **Agricultural education: what is meant by this?**

The field of agricultural education is very diverse. There are different dimensions by which this diversity can be shown. The first is the domain as such: *agriculture*.

Agriculture is a very wide field, which ranges from plant sciences, animal sciences, food and nutrition sciences, and environmental sciences, to social sciences. All these sciences are differentiated in themselves, like environmental sciences, which consist of fields like geology, meteorology, water management, geo-information systems, and nature conservation. And even these are further specialized. A lot of content driven educational research and theory building is going on in these fields, like in environmental education (Papadaki-Klavdianou, Menkisoglou-Spiroudi & Tsakiridou, 2003; Wals, 2004), sustainability in education (Corcoran et al, 2004), and rural development (Wals, et al, 2004).

The second is the *level of education*. This can vary from university level to the level of primary and secondary education, in which science is taught, that relates to life sciences (biology), natural sciences (physics, chemistry), environmental (geography) and social sciences. There are certain educational activities, projects, topics in subjects, whole subjects or courses in the field of agriculture in general, vocational and university education.

The third is related to the *target groups* of agricultural education. They vary considerably. Initial agricultural education is aimed at students who want to have a job in the agri-food complex, as an employee or as an entrepreneur (in for instance dairy farming, horticulture, gardening, equestrian sports, and pet care). Continuing agricultural education is aimed at the graduates of the various initial education programmes.

The age of students in agricultural subjects, courses or programmes can vary from 13-23, but in reality the margins are even wider. Environmental education for instance starts already in elementary education or even in the Kindergarten; furthermore, many students extend their study. If PhD-education is included, the age level can go up to 27; in practice this is also extended quite often with one or more years. If part-time studies are taken into account, mid-career students are included, whose age can range from under 30 to above 45.

Farmers form a natural target group for agricultural education. However, once graduated and started, the extension service was in direct contact with the farmers. There were and are specialized extension agents for pig, cow, and poultry farming, and for horticulture and crop protection to name a few. During the last decade this service is privatizing, which gives new opportunities for establishments of agricultural education. They can use their contacts with alumni for this, provided they treat their students with care, using ideas of attaining customer (alumni) liability through relationship marketing. This depends to a large degree on the philosophy and pedagogical practices the educational establishment uses. Many institutes for agricultural education still have a strong diploma orientation and judgement culture, whereas others have a competence orientation, acknowledging the acquired

competencies of students, assess for development purposes, coach, and help young people to start a career in the field of agriculture, agribusiness, or environmental work.

Farmers also form a special group as learners. They learn a lot from others. There are suppliers (of animal food, seeds, fertilizers, protection materials, health care), customers (traders, whole sale agents, buyers from the processing industry, large retails chains), financing organisations (banks, investment agents), insurance agents (for property, live stock, machinery), colleagues-competitors (in the same niche or in other sectors), research and good practices (through professional journals, information days or evenings), networks (such as growers associations) and specific reports (of research organizations such as benchmark reports that give specific information about the performance of the farmer – like characteristics of milk production – compared with a given reference group), regulating authorities (that require for instance mineral management documentation). The nature of this learning of farmers is informal learning (Lans et. al, 2004).

It is surprising how separated the origins of the support structure for learning of farmers is, but gradually the various disciplines of agricultural education, agricultural extension and human resource development are converging.

Returning to the dimensions by which agricultural education can be displayed, the fourth is the *geographic dimension*: where the agricultural education is taken place. This can be in a western (like North-America, Western Europe), eastern (like Eastern Europe), southern (like Africa and South-East Asia) region. Basically, what is meant here is that agricultural education can vary significantly by region, of which the economy varies by its dependency on the agricultural sector. In the agricultural society this dependency is of course largest, in the industrial society this is less, and in the service and the knowledge society agriculture plays a small to marginal role in the economy. Also the knowledge intensity of agriculture between these societies varies considerably. In western economies, farming has become knowledge work (as for instance is the case in the field of precision farming).

Despite all this diversity, agricultural education is defined here as that part of education that is aimed at preparing students for a profession, either as an employee in a public or private organization or as an entrepreneur in a micro company, in small, medium-size or large enterprises, in the agri-food complex that contributes to the secure supply of safe food and a healthy and attractive environment, by sustainable methods of production, processing, packaging, logistics and delivering services.

### **Agricultural education in the European Union**

Since no data exist from all countries in the European Union on all aspects of agricultural education, the description that follows holds for varying groups of members states in the European Union.

As a consequence of the enlargement of the European Union, the proportion of employment in agriculture has risen from 3.7% to 5.1%. For the industry sector and services these figures are 28.4% and 29%, and 67.9% and 65.9% respectively. So the

proportion employment in industry stayed practically the same, whereas the proportion employment in services slightly decreased.

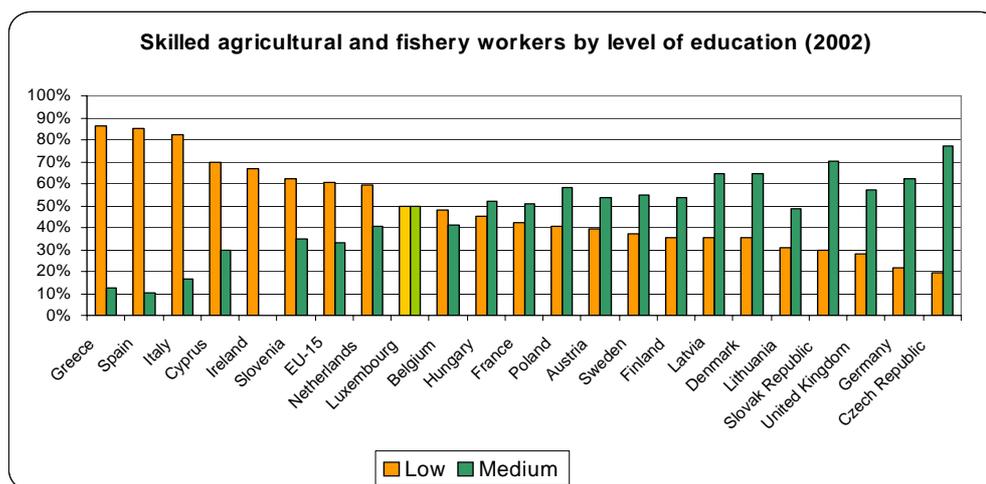
Because of the growth of the proportion employment in agriculture, and the need for fundamental systems innovation in agriculture in the old, but certainly also in many of the new member states, agricultural education receives more attention than some years before. There is a strong belief that agricultural education can serve as a structural lever for innovation in agriculture.

Within the EU, there is much variation in the role and nature of agriculture in the member states, and this is reflected in the national agricultural education systems.

#### *Educational level of workers in agriculture and fisheries in EU*

Also, the level of education of agricultural and fishery workers varies considerably across the EU member states (see Figure 1).

**Figure 1. Skilled agricultural and fishery workers by level of education (2002)** (From: Løvås, 2004).



Note:

Source: LFS, Eurostat. Workers classified according to ISCO

Low: Isced 0-2 at best lower secondary education

Medium: ISCED 3-4 upper secondary and post secondary (non-tertiary) education

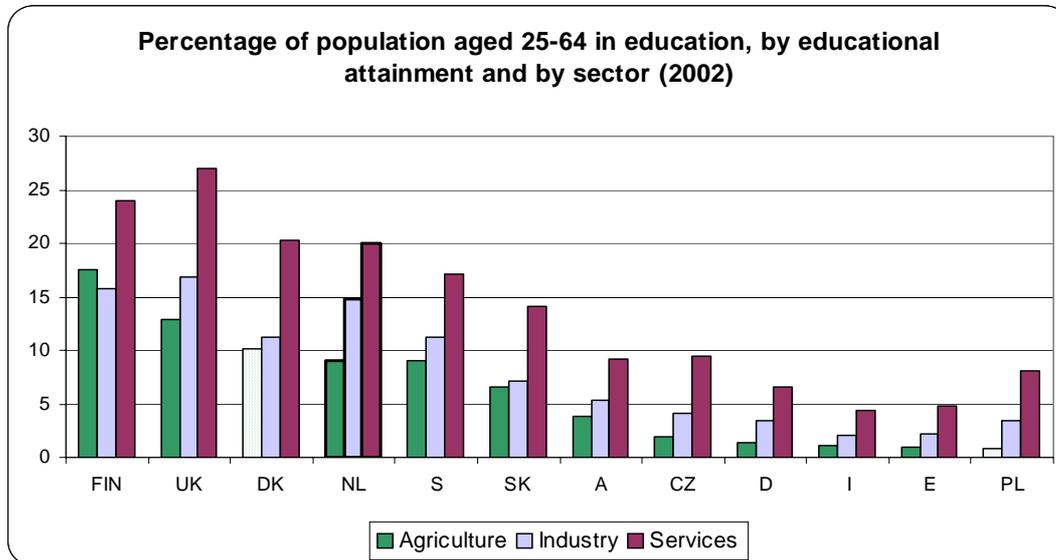
It is remarkable that the proportion low skilled workers in the fields mentioned is lowest in Greece, Spain and Italy (over 80%), where as the proportion medium level skilled is highest in the Czech Republic, Slovak Republic, Denmark, Latvia and Germany (over 60%). As can be seen from the figure, the EU-15 average for low skilled workers is 60%, and for medium skilled workers over 30% (not all ISCED levels are included in these figures, so the total does not reach 100%).

#### *Participation in continuing education and training*

It is interesting to have a look at the variation in the participation in life long learning

in agriculture compared to other sectors (industry and services) (see Figure 2).

**Figure 2. Percentage of population aged 25-65 in education by sector of economy (2002)** (From: Løvås, 2004).



Source: LFS, Eurostat.

Participation in education and training in the four weeks preceding the survey

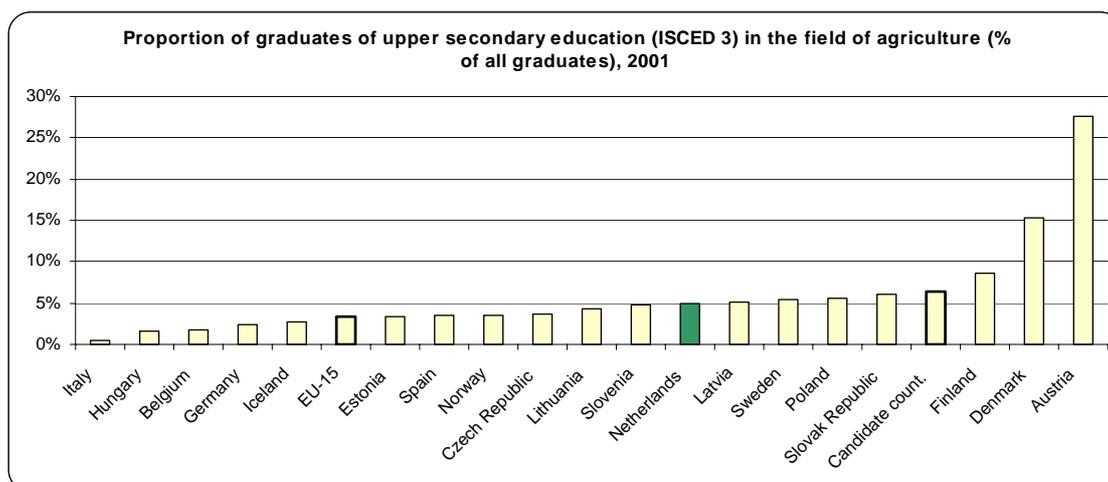
DK and PL: limited reliability of data for the agricultural sector. Other countries not shown because non-reliable data

What strikes most is the enormous difference in participation levels as such throughout the member states included in this overview. Finland, the United Kingdom, Denmark and the Netherlands are countries in which participation in life long learning in the service sector is at least 20%, whereas in Italy and Spain participation in life long learning in the service sector is below 5%. Finland and the United Kingdom also score highest (over 10%) as to the participation in life long learning in the agricultural sector. In the Netherlands, Sweden and the Slovak Republic, this participation is between 5% and 10%.

### *Graduates in the field of agriculture*

The percentage of graduates from upper secondary education (ISCED 3) in the field of agriculture of all graduates at this level of education (see Figure 3) varies from practically zero (Italy) to over 25% (Austria).

**Figure 3. Proportion of graduates of upper secondary education (ISCED 3) in the field of agriculture (% of all graduates) in 2001** (From: Løvås, 2004).



Note:

Italy, Finland, Denmark: 2000

Candidate countries: BG, CY, CZ, EE, HU, LV, LT, MT, PL, RO, SK, SI, TR

Source: UOE questionnaire, Eurostat

Denmark also peaks with about 15%. In the EU-15 the average is around 3%, in the 13 former candidate countries (of which 3 still are candidate countries) this percentage is about 6%.

### *Governmental responsibility for agricultural education*

Governmental responsibility for agricultural education within the EU is very differently allocated. The monographs on vocational education and training in the members states from the EU (e.g. Christopher, 1999; Circé, 2000; Twining, 2000) are not all explicit on the place of agricultural education within the structure of education in the respective countries. The question of which Department in the government is responsible for agricultural education is not a simple question either, since the structure of governments in EU member states varies considerably. From an ongoing survey some examples can be given. For the total distribution of the responsibilities for agricultural education see Table 2.

**Table 2. Responsible Ministries for Agricultural Education**

States	Education	Agriculture	Economy
<i>EU Member states</i>			
Austria	●	●	
Belgium	●	●	
Cyprus	●		
Czech Republic	●		
Denmark	●		
Estonia	●		

Finland	●		
France		●	
Germany	●	●	●
Greece		●	
Hungary		●	
Ireland	●	●	
Italy	●		
Latvia	●		
Lithuania	●	●	
Luxemburg	●		
Malta	●		
Netherlands		●	
Poland	●		
Portugal	●	●	
Slovakia	●	●	
Slovenia	●		
Spain	●		
Sweden	●	●	
United Kingdom/England	●		
<i>Candidate countries</i>			
Bulgaria		●	
Romania	●		
Turkey		●	

In France, the ministry of Agriculture (Ministère de l'Agriculture, de l'alimentation, de la pêche et des affaires rurales) is responsible for agricultural education since the start of agricultural education in 1848 (Circé, 2000). There have been efforts to harmonise agricultural education with the educational sector that falls under the responsibility of the Ministry of Education. In the field of agriculture, there are 858 secondary schools all over the national territory (overseas territories included) that teach agriculture. In higher education there are 25 schools (engineering schools, four veterinarian schools, one institute for teacher education and one school specialized in teaching landscape). In higher education, the Ministry of Education is also in charge of three schools of engineers in Toulouse, Dijon and Nancy.

In Germany the situation is more complex than in France because of the composition of the nation in Länder. That makes that the responsibilities for vocational education and training are at different levels, the state (Bund), and the Länder. Food safety, public health and agriculture in general are part of the responsibilities of the Federal Ministry of Consumer Protection, Food and Agriculture. This ministry is also responsible for some initial and further vocational training regulations as for farmers or dairy masters. Responsible for occupation regulations in the field of food-production is the Federal Minister of Economics and Labour. And the Ministries of Culture (Kultusministerium) in the Länder are responsible for the school-based and company-based agricultural education.

In the United Kingdom the situation is complex too. Structures in education and educational administration differ for England, Scotland, Wales and Northern Ireland.

Each has devolved responsibility for setting their own policy in these areas. However, the issues regarding education are the same throughout the UK. England will be taken as an example. In England, education in all areas up to 16 is the responsibility of the Department for Education and Skills (DfES). Beyond 16, the responsibility for funding and appraising of the quality of provision for publicly funded providers of agricultural education is again the responsibility of DfES, but a number of other bodies are involved in defining employer's needs and setting detailed curricula. Setting the detail of the curriculum is the responsibility of the learning providers themselves and various public bodies with responsibility for setting standards for the quality of provision, of which the key one is the Qualifications and Curriculum Authority (the QCA). The agricultural and land-based colleges collectively have an umbrella organisation - NAPAEO. The Department for the Environment, Food and Rural Affairs (Defra) also has some input in terms of influencing what information and skills need to be learned, particularly by land-managers and farmers, as indeed does the UK's Food Standards Agency in the area of food. Two Sector Skills Councils (SSCs) within the UK also have a role here in setting the skills agenda for specific sectors. These are 'Lantra', for land-based businesses including agriculture, horticulture and related areas, and 'Improve' for the food and drink industry.

## **The development of vocational education in the agri-food sector**

### *The EU vocational education policy development context*

The development of vocational education in the agri-food complex is largely embedded in the EU-policy domain of vocational education. Largely, since as is shown above, in a number of Member States the ministries of education are not responsible for agricultural education. Nevertheless, the vast majority of Member States are participating in and contributing to the EU vocational education policy making process, including the field of agricultural education. At present, the vocational education policy making trend is dominated by the Lisbon declaration and the Copenhagen process.

#### **Lisbon Declaration:**

'The Union must become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion'  
(European Council, Lisbon, March 2000)

#### **Copenhagen Declaration**

'Over the years co-operation at European level within education and training has come to play a decisive role in creating the future European society... Strategies for lifelong learning and mobility are essential to promote employability, active citizenship, social inclusion and personal development. Developing a knowledge based Europe and ensuring that the European labour market is open to all is a major challenge to the vocational educational and training systems in Europe and to all actors involved. The same is true of the need for these systems to continuously adapt to new developments and changing demands of society. An enhanced cooperation in vocational education and training will be an important contribution towards ensuring a successful enlargement of the European Union and fulfilling the objectives identified by the European Council in Lisbon' (The Copenhagen Declaration, 30 November 2002).

The Lisbon Declaration has set key targets for the socio-economic development of the European Union. The Copenhagen Declaration has called for enhanced cooperation in

vocational education to support the process of reaching the Lisbon goals, and to contribute to the successful enlargement of the Union. More precisely, it calls for strengthening the European dimension in vocational education, improving transparency, information and guidance systems, recognising competences and qualifications, and promoting quality assurance.

The European Commission commissioned a study to assess the progress of achieving the Lisbon goals, and the role of initial and continuous vocational education, more and more referred to as Life-Long Learning or human resource development, in that process. Leney (2004) in his executive summary of the study argues that much has been done, but more also still needs to be done. 'Member states and the social partners should consider how they could encourage greater participation in European collaboration for VET in pursuit of the Lisbon goal, involving wider communities of policy makers, researchers and in particular practitioners and learners' (op cit, 24). In their synthesis report, Tessaring & Wannan (2004) give an overview of what has been achieved in the field of vocational education and training that supports the achievement of the Lisbon goals. They conclude with 'The focus of future action at European level will be to consolidate the work begun on developing common tools and frameworks and the development of a European Qualifications Framework. This will provide a common reference to facilitate the recognition and transferability of VET, general and higher education qualifications, based on competences and learning outcomes. It will improve permeability in education and training systems, provide a reference for validating informally acquired competences and support effective functioning of the European, national and sectoral labour markets.'

#### *The sectoral approach to training solutions*

Achieving the Lisbon goals is not possible without the concerted contribution of the social partners. The work on a European Competence and Qualifications Framework requires the agreement of social partners. More important still is the interactive contribution of the social partners in the process of developing such a framework. Since it will serve as a (voluntary) reference framework for the (re-)development or maintenance of the national competence and qualification frameworks, social partners at national level should (and in many cases they already are) be involved in their development. The commitment of social partners in this process is essential for the mutual trust of competences and qualifications acquired by inhabitants of the European Union within formal and non-formal learning environments.

But there are many other possibilities for sectoral approaches to training solutions. Various examples of these were presented at a EU seminar on this topic, that were also related to the development of European Qualification and Competence frameworks, but also to international certification and validation, and creating a European training policy at sector level. The cases were the following:

- the development of qualifications and competence standards set by the international IT-industry, and the effort to develop a European ICT-skills meta framework;
- the development of a common European competence framework in the field of logistics;
- the development of a European reference level for operator training in the

chemical industry, setting an example for the European Credit Transfer System in Vocational Education and Training;

- accreditation of prior learning to maximise cost-effective employee development;
- sustainable professionalisation for a number of vocational diplomas;
- establishing and implementing European qualification standards and certificates in the field of marketing;
- the formulation of training requirements and development of assessment procedures in the cleaning industry;
- the development of a standard European programme for further training and the development of a European certification system making cross border recognition possible in the field of hairdressing;
- the development of entrepreneurship in the automotive and confectionary sector.

It is apparent that employers and employees in the respective sectors, are all stakeholders in the processes described in these cases. So, their representing organisations should be active in the field of sectoral training solutions. Which sectoral employers organisation would not be interested in raising the cost-effectiveness of learning and training in its sector? And which sectoral employee organisation would not be interested in setting standards for training in the sector concerned? For, training standards relate to workers duties, and may touch upon their rights. All this is directly translatable to human resource development for the agri-foodsector.

### *The social dialogue*

It is not only for technical and development-strategic reasons social partners should be involved in sectoral training solutions. It is also a matter of social dialogue. The framework for European social dialogue is laid down in Articles 138 and 139 of the Treaty establishing the European Community. Cross-sectoral participants in the social dialogue at European level are ETUC (<http://www.etuc.org/EN/>), the European Trade Union Confederation representing employees, UNICE (<http://www.unice.org/Content/Default.asp?>), the Union of Industrial and Employers' Confederations of Europe representing 36 employers' organisations in 22 member states, UEAPME (<http://www.ueapme.com/EN/index.shtml>), the employer's organisation representing the interests, at European level, of crafts, trades and SMEs throughout Europe, and CEEP (<http://www.ceep.org/>), the European Centre of Enterprises with Public Participation and of Enterprises of General Economic Interest, which is an international association of enterprises and organisations with public participation or carrying out activities of general interest, whatever their legal or ownership statute. The European social dialogue knows three modes: consultation (which is done for instance by the ACVT, the Advisory Committee on Vocational Training), bipartite dialogue (which takes place in the Social Dialogue Committee and the Sectoral Committees) and tripartite concertation (for instance within the Tripartite Social Summit for Growth and employment, which is called 'the troika'). In the field of agriculture the European social partners who are part of the social dialogue are the EFFAT ([www.fffat.org](http://www.fffat.org)) from the employees side, and Geopa-Copa ([www.copa-cogeca.be](http://www.copa-cogeca.be)), from the employers side. These social partners in the field of agriculture

have come to several opinions and agreements on vocational training and employment in agriculture, such as the European Agreement on Vocational Training in Agriculture (on 05-12-2003), the Joint Declaration by EFA/CES-GEOPA/COPA on employment in agriculture (on 30.03.1995), the Opinion concerning training in agriculture (on 18.11.1993), the Opinion with regard to training for agricultural workers (on 26.11.1982), and the Opinion concerning the vocational training of and cessation of farming by agricultural workers in the context of the sociostructural measures proposed by the Commission (on 23.05.1979). In 2004 GEOPA has held a conference in which the implementation of the European Agreement on Vocational Training in Agriculture was reviewed. The report of this conference will be available soon from the GEOPA secretariat Brussels.

What is interesting for agricultural education is the new attention for sectoral vocational education policy (Warmerdam, 2000) and sectoral qualifications (<http://cedefop.communityzero.com/sq>).

### **A Case Study: Agricultural education in the Netherlands**

Dutch agriculture is often brought forward as the success story of innovation, production, processing and trading in agriculture world wide. It is a fact that the Netherlands belongs to the top exporters of agricultural goods worldwide, although the country is very small (Berkhout & Van Bruchem, 2003; Silvis & Van Bruchem, 2000). The success is often attributed to the tight alignment and efficient organisation of research, education and extension. This knowledge system was known as the 'OVO triptych', (OVO = Onderzoek, Voorlichting, Onderwijs – Research, Extension, Education). Findings in research could effectively be passed on to farmers and agricultural students, which is of course not a unique phenomenon; see for instance (Swaminathan, 1985) for the way in which rice research findings were transferred in training in other regions already years ago. The expenses that incurred from the OVO triptych were paid by the Ministry of Agriculture. Sicco Mansholt, one of the former EU commissioners for agriculture, was for a large extent responsible for the policy focus on scale enlargement and efficiency improvement in farming in the EU, a way of farming that had brought success in the Netherlands. However, the same agricultural approach resulted in enormous overproduction, with Butter Mountains and Milk Lakes. Intensive farming was faced with crisis after crisis in livestock (hormone scandals, pig pest, BSE, foot-and-mouth disease, bird pest) as well as in horticulture (toxine scandals of olive oil and wine; the Dutch water bomb, or the 'Wasserbombe' as the Germans called it: the tomato from the greenhouse that did not taste to tomato's anymore because of the production process). Concerns about animal welfare grew, and environmental activists (or terrorists as some of them are referred to) protested against cloning and genetically modified organisms (GMOs, like maize, soy, rice). Global nutrition became an issue, and still is, either because there is too little or too much (overweight is currently a serious cause of decreasing life expectation of Western populations). On the other hand, the food industry is making and marketing functional foods, foods produced with the help of biotechnology, of which for instance the genetic structure is modified as to control cholesterol or break down body fat. All this creates enormous tensions between farmers, farmer's organisations, producers, the public, and the government. Also within these stakeholder groups conflicts rose, such as the conflict between the engaged citizen

(who is critical and in favour of maintained landscape and nature for recreation) and the calculating consumer (who is in most instances looking for the best trade-off between quality and price of products). The market for sustainable biological food still is marginal unfortunately, as a consequence of this conflict.

For initial agricultural education these developments have been detrimental. The image of agriculture grew bad. Furthermore, national and European regulations on farming became stricter, which made it harder for farmers to stay in business. In many cases there was no successor for the farm, since the capital investment needed was too high, and the expected profit was too low. Margins got smaller, income of many farmers lower; there even is much hidden poverty amongst farmers. All this caused people to 'Escape from Agritraz'. In the Netherlands the annual decrease of the amount of farmers is about 3% for a series of years already. It is not expected this decrease will stop in the near future. It also resulted in decreasing numbers of students in agricultural education.

Agricultural education in the Netherlands encompasses preparatory secondary vocational education (VMBO – voorbereidend beroeponderwijs), for students of about 13-16 years of age, senior secondary agricultural education (MAO – Middelbaar Agrarisch Onderwijs) for students of about 16 to 20 years of age with a dual Vocational Coaching (Beroepsbegeleidende) and mainly school-based Vocational Training (Beroepsopleidende) learning trajectory (leerweg), agricultural teacher training (at the so-called second grade level; the first grade level prepares for teaching jobs at the upper level of general secondary education), higher agricultural education (HAO – Hoger Agrarisch Onderwijs) for students of about 17 to 21 years of age, Wageningen University, so-called course education (short courses provided by private training bodies related to state-financed agricultural education institutions), and the innovation and practical training centers (IPCs).

Growth in the education demand can be observed in the green sector of preparatory vocational education (VMBO green), which the year 1995/1996 enrolled 23.276 students and in the year 1999/2000 27.956, an increase of 20% in four years.

Participation in the dual Vocational Coaching learning trajectory (Beroepsbegeleidende leerweg) decreased with 1% in that period, and equalled 8,101 participants in the year 1999/2000 (which is more than in the year 1996/1997, when that number was 7,633 students). Participation in the school-based Vocational Training learning trajectory (Beroepsopleidende leerweg) decreased with 3% in the same period, and enrolled 16,372 students in the year 1999/2000.

Enrollment in agricultural teacher education has been growing from 1995/1996 to 1999/2000 with 25% to 540 students.

Enrollment in higher agricultural education in this period decreased with 10% to 8.000. The decrease in total enrollment in Wageningen University was 16% during this period, but the students numbers are now stabilising and a slight upward trend can be observed, although the total enrollment is still low (for a Dutch university): total enrollment in 1999/2000 was 3740 students. The decreasing number of students in Wageningen University is partly compensated by a growing stream of students from abroad in MSc-programs, which is the result of an intensive internationalization campaign. Wageningen University is steadily developing as the most international university in the Netherlands.

Enrollment in course education increased during the years 1995/1996 to 1998/1999

with 14% to 21,222 participants. The number of trainee weeks at the innovation- and practical training centers decreased with 8% to 51,323.

To give a bit of contextual information about enrollment in initial and continuing vocational education and training in the Netherlands, enrollment (in 2002) in senior secondary vocational education (MBO – middelbaar beroepsonderwijs) is 451,990, in higher vocational education (HBO – hoger beroepsonderwijs) 323,590, in university education 174,220, and in corporate training (in 1999) 1,559,000 (Mulder & Tjepkema, 1999; Mulder, 2003).

These figures show that secondary agricultural education with a total of about 50.000 students still is a considerable sector of Dutch vocational education, that higher agricultural education (including Wageningen University) has about 12.000 students, that course education is growing, and that the participation in training programs of the innovation and practice centers is decreasing.

Trends that influence agricultural education apart from the changing numbers of enrolment, are that financing is more demand driven, generalization of the curriculum took place (towards the so-called green curriculum), life long learning (which needs to start in initial education), the notion of the learning organisation (the institute for agricultural education is or should be a learning organisation), knowledge circulation (between research, education and the agri-food complex), the tendency towards competence and performance management (which necessitates agricultural educators to be involved in this themselves), and entrepreneurship (in fact most vocational education prepares for jobs on the labour market, not for entrepreneurship in the economy, although agricultural education historically is strongly attached to independent entrepreneurship).

How the Netherlands has coped with all these developments requires a separate contribution, but basically, agricultural education institutions chose either one of the following scenarios: *evaporization* (closing down, vanishing), *dissolving* (in much bigger colleges that have programs in non-agricultural domains) and *chrystallizing* (seeking intrasectoral cooperation).

<b>Evaporizing</b>	<b>Dissolving</b>	<b>Chrystallizing</b>
De-institutionalizing	Lost in larger institutions	Independent institution
Desintegration	Intersectoral mergers	Sectoral mergers
Decreasing labour market demand	Low market demand	Sufficient labour market demand
No link with stakeholders	Weak link with stakeholders	Strong link with stakeholders
Isolation	Generalization	Specialization
Isolation	Horizontalization	Verticalization
No visibility	Lower visibility	High visibility
Independent business termination	Shelter	Independent entrepreneurship
Low cohesion	High adhesion	High cohesion
Low-no student demand	Easy transfer	Tracking

To give an example of the crystallizing scenario: Wageningen University merged with Van Hall/Larenstein, two colleges for agricultural education who merged before. Another college of agricultural education merged with an institution for secondary agricultural education.

Many institutions of agricultural education have dramatically changed their course syllabus. Participation in traditional agricultural courses that prepare students for farming has marginalized. In this respect, the developments in the curriculum are comparable to what has taken place in the USA. There is much more emphasis on biotechnology, geo-information systems, environmental studies, management, and marketing. Again, Wageningen University has re-profiled itself completely, after having merged with the research institutes that were under the umbrella of the Ministry of Agriculture, having reshuffled all BSc and MSc programs, and, as said, having merged with the two former colleges of agricultural education. To give a short example of the drastic interventions: in 1998 the Board of Wageningen University dissolved 25 from the 125 chairs and chair groups that existed at that time, a dramatic cut that is unparalleled. Pressure on the agricultural education system caused a lot creativity and led to changes and mergers that were unthinkable before.

The OVO triptych that has been abolished, makes place for new arrangements of cooperation between research, education, extension (under the privatized conditions this could probably better be referred to as consultancy), and the agri-food sector. At the moment relatively large research programs are being implemented about the flow of knowledge between the different stakeholders, in the context of the networked knowledge economy, in which the notion of knowledge trading will soon emerge (stakeholders have to buy and sell knowledge). The government is searching for new ways of research and ways of managing research that serves individual entrepreneurs, without damaging the collective interests, and by which all stakeholders involved are learning. In a sense it is tried to create a new tapestry to support informal learning. This however leads to three paradoxes. 1. the emphasis on social learning is inherently limited in innovative capacity (because the knowledge from the 'social partner' who knows more or who is smarter in getting new knowledge, is the limit of innovation, whereas other educational sources may be more innovative, or secure); 2. supporting and organising informal learning will make it more formal; 3. stimulating incidental learning will make it more pre-planned and therefore more intentional.

Public opinion about agriculture is gradually changing. The notion of the rural value of agriculture, and farming as a historical part of the landscape is growing. A nice example of this is that there have been proposals to counteract recent European regulations on farming, which act as an incentive for keeping cows in stables all year long, by giving farmers a financial bonus from the national budget when they put their cows in the meadows.

### **Agricultural education research**

Agricultural education research is a small although interesting sector-specialisation of educational research. It gets its legitimacy by the very nature of agricultural education. Lots of discussions have been held about the uniqueness of agricultural education research. Whilst much research that could be done in the field is mere

educational research applied to the field, the content-related research is specific, that means research that is related to the innovation of the agri-food complex.

Research in the field of agricultural education is reported in different journals, the Journal of Agricultural Education and Extension (JAEE), the Journal of International Agricultural and Extension Education (JIAEE), and the Journal of Agricultural Education Online (JAE). But of course every now and then agricultural education research appears in one of the journals in the field of education, training, and human resource development.

There are several national and regional associations of agricultural educators, such as the National Association of Agricultural Educators (NAEE) in the USA, the Asia Pacific Association of Educators in Agriculture and Environment (APEAEN), and the Agricultural Education Division of the Association for Career and Technical Education (ACTE). At the annual National Agricultural Education Research Conference, the latest research is presented. The Association of International Agricultural and Extension Education (AIAEE) is an active association that has regular conferences. The European Seminar on Agricultural Extension and Education (ESEE) is a bi-annual conference of researchers in this field, although the extension part clearly dominates, which is sometimes reflected in the variations of the title of the Seminar, being on Agricultural Extension *and* Education or just on Agricultural Extension Education.

Since the Netherlands was presented as an example country, this contribution will be concluded by giving a short description of agricultural research in the Netherlands. The chair group ECS conducts a research program in the field of agricultural education. In 2003 a five year program was finished. Part on it was on computer-supported collaborative learning and work in agricultural education (Lutgens et al, 2002), Verburch et al (2002) and Van Oene et al 2003, Veldhuis-Diermanse et al, 2003). During then course of the program, the focus was changed towards content-related competence development, which lead to publications on competence-based human resource management in green education (Mulder et al, 2003), competence-based green education (Wesselink et al, 2003), and learning questions, opportunities and motives for workers in the agri-food (Lans et al, 2003). A lot of effort is invested in studying the opportunity of developing longer-lasting educational trajectories for graduates from senior-secondary agricultural education (Lans, 2003; Lans et al, 2004). Now the emphasis is on competence-based green education, related to change in the agri-food complex (Mulder, 2002; Mulder et al 2003) and sustainable development (Biemans et al, 2003).

It is the deliberate intention of the Dutch Ministry of Agriculture to put emphasis on content-related issues when it comes to financing agricultural education research. The context in which this research is financed may change due to the re-arrangement of the funds to stimulate innovation of agricultural education.

To conclude this contribution, it can be said that agricultural education builds competence for innovation of the agri-food complex, innovation that is badly needed for food security, food safety and sustainable development, goals that are essential for the world population.

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## Web addresses of the Responsible Ministries for Agricultural Education

	EDU	AGR	
<i>EU Member States</i>			
Austria	•		<a href="http://www.bmbwk.gv.at/">http://www.bmbwk.gv.at/</a>
Austria		•	<a href="http://www.lebensministerium.at/en/">http://www.lebensministerium.at/en/</a>
Belgium	•		<a href="http://www.ond.vlaanderen.be/">http://www.ond.vlaanderen.be/</a> <a href="http://www.cfwb.be/default2.asp">http://www.cfwb.be/default2.asp</a> <a href="http://www.dglive.be/DesktopDefault.aspx">http://www.dglive.be/DesktopDefault.aspx</a>
Belgium		•	<a href="http://www2.vlaanderen.be/ned/sites/landbouw/">http://www2.vlaanderen.be/ned/sites/landbouw/</a>
Cyprus	•		<a href="http://www.moec.gov.cy/">http://www.moec.gov.cy/</a>
Czech Republic	•		<a href="http://www.msmt.cz/_DOMEK/?CAI=2887">http://www.msmt.cz/_DOMEK/?CAI=2887</a>
Denmark	•		<a href="http://eng.uvm.dk/education/">http://eng.uvm.dk/education/</a>
Estonia	•		<a href="http://www.hm.ee/">http://www.hm.ee/</a>
Finland	•		<a href="http://www.minedu.fi/">http://www.minedu.fi/</a>
France		•	<a href="http://www.agriculture.gouv.fr/spip/">http://www.agriculture.gouv.fr/spip/</a>
Germany	•		<a href="http://www.bmbf.de/de/569.php">http://www.bmbf.de/de/569.php</a>
Germany		•	<a href="http://www.verbraucherministerium.de/index-00073B3867951EDBB60A6520C0A8E066.html">http://www.verbraucherministerium.de/index-00073B3867951EDBB60A6520C0A8E066.html</a>
Germany *			<a href="http://www.bmwa.bund.de/Navigation/Service/english.html">http://www.bmwa.bund.de/Navigation/Service/english.html</a>
Greece		•	<a href="http://www.minagric.gr/en/">http://www.minagric.gr/en/</a>
Hungary		•	<a href="http://www.gak.hu/fm/">http://www.gak.hu/fm/</a>
Ireland	•		<a href="http://www.education.ie/home/home.jsp?pcategory=27173&amp;ecategory=27173&amp;language=EN">http://www.education.ie/home/home.jsp?pcategory=27173&amp;ecategory=27173&amp;language=EN</a>
Ireland		•	<a href="http://www.agriculture.gov.ie/home.jsp">http://www.agriculture.gov.ie/home.jsp</a>
Italy	•		<a href="http://www.istruzione.it/">http://www.istruzione.it/</a>
Latvia	•		<a href="http://www.izm.lv/frontpage.aspx?lang=5">http://www.izm.lv/frontpage.aspx?lang=5</a>
Lithuania	•		<a href="http://www.smm.lt/en/edu_in_lit.htm">http://www.smm.lt/en/edu_in_lit.htm</a>
Lithuania		•	<a href="http://terra.zum.lt/min/">http://terra.zum.lt/min/</a>
Luxemburg	•		<a href="http://www.men.lu/edu/fre/ministere/administration/">http://www.men.lu/edu/fre/ministere/administration/</a>
Malta	•		<a href="http://www.education.gov.mt/default.asp">http://www.education.gov.mt/default.asp</a>
Netherlands		•	<a href="http://www9.minlnv.nl/servlet/page?_pageid=163&amp;_dad=pportal30&amp;_schema=PORTAL30">http://www9.minlnv.nl/servlet/page?_pageid=163&amp;_dad=pportal30&amp;_schema=PORTAL30</a>
Poland	•		<a href="http://www.poland.pl/education/index.htm">http://www.poland.pl/education/index.htm</a>
Portugal	•		<a href="http://www.min-edu.pt/">http://www.min-edu.pt/</a>
Portugal		•	<a href="http://www.min-agricultura.pt/servlet/page?_pageid=159,161&amp;_dad=extent&amp;_schema=PORTAL30">http://www.min-agricultura.pt/servlet/page?_pageid=159,161&amp;_dad=extent&amp;_schema=PORTAL30</a>
Slovakia	•		<a href="http://www.education.gov.sk/">http://www.education.gov.sk/</a>
Slovakia		•	<a href="http://www.mpsr.sk/english/index.htm">http://www.mpsr.sk/english/index.htm</a>
Slovenia	•		<a href="http://www.mszs.si/eng/">http://www.mszs.si/eng/</a>
Spain	•		<a href="http://www.sispain.org/english/edusci.html">http://www.sispain.org/english/edusci.html</a>
Sweden	•		<a href="http://www.sweden.gov.se/sb/d/2063">http://www.sweden.gov.se/sb/d/2063</a>
Sweden		•	<a href="http://www.sweden.gov.se/sb/d/2064">http://www.sweden.gov.se/sb/d/2064</a>
United Kingdom	•		<a href="http://www.dfes.gov.uk/">http://www.dfes.gov.uk/</a>
<i>Candidate countries</i>			
Bulgaria		•	<a href="http://www.mzgar.government.bg/mz_eng/default.asp">http://www.mzgar.government.bg/mz_eng/default.asp</a>
Romania	•		<a href="http://www.edu.ro/engl.htm">http://www.edu.ro/engl.htm</a>
Turkey		•	<a href="http://www.tarim.gov.tr/arayuz/9/menu.as">http://www.tarim.gov.tr/arayuz/9/menu.as</a>

\* In Germany the Ministry of Economy and Labour also holds responsibility for agricultural education.

## **European Employee and Employer Organisations In the Agri-Food Complex**

### *Employees organisations*

EFFAT  
European Federation of Food, Agriculture and Tourism Workers  
Rue Fossé-aux-Loups 38  
Boîte 3  
1000 Brussels  
Belgium  
Tel. :0032/22187730  
Fax :0032/22183018  
E-mail :[effat@effat.org](mailto:effat@effat.org)  
[www.effat.org](http://www.effat.org)

FEPEDICA  
Fédération Européenne du Personnel d'Encadrement des Productions, des Industries, des Commerces et  
des Organismes Agroalimentaires  
European Federation of Managers in the Food Manufacturing Industry  
Rue du Rocher 59-63  
75008 Paris  
France  
tel0033/155301330  
fax.: 0033/155301331  
[www.cec-managers.org/fepedica/index.htm](http://www.cec-managers.org/fepedica/index.htm)

### *Employers organisations*

GEOPA / COPA-COGECA  
Employers' Group of Agricultural Organisations in the European Union  
Confederation of Agricultural Organisation in the European Union  
Rue de la Science 23-25  
1040 Bruxelles  
Belgium  
Tel : 0032/022872711  
Fax 0032/022872700  
[www.copa-cogeca.be](http://www.copa-cogeca.be)

CIAA  
Confederation of the Food and Drink Industries in the EU  
Avenue des Arts 43  
1040 Brussels  
Belgium  
tel : 0032/25141111  
fax :0032/25112905  
E-mail : [ciaa@ciaa.be](mailto:ciaa@ciaa.be)  
[www.ciaa.be](http://www.ciaa.be)

## **Copa**

Rue de la Science 23-25  
1040 Bruxelles

<http://www.cogeca.be/en/contactus.asp>

Tel +32 (0)2/287.27.11  
Fax +32 (0)2/287.27.00

COPA: Defence and development of the European Model of Agricultural

COPA has a number of objectives, such as:

- to examine any matters related to the development of the Community's agricultural policy;
- to represent the interests of the agricultural sector as a whole;
- to seek solutions which are of common interest, and

to maintain and develop relations with the Community authorities and with any other representative organisations or social partner established at European level. COPA has a number of objectives, such as:

- to examine any matters related to the development of the Community's agricultural policy;
- to represent the interests of the agricultural sector as a whole;
- to seek solutions which are of common interest, and
- to maintain and develop relations with the Community authorities and with any other representative organisations or social partner established at European level.

## **COGECA**

[http://www.cogeca.be/en/cogeca\\_membres.asp](http://www.cogeca.be/en/cogeca_membres.asp)

General Confederation of Agricultural Co-operatives in the European Union  
Rue de la Science 23-25  
1040 Bruxelles

Tel +32 (0)2/287.27.11  
Fax +32 (0)2/287.27.00

How important agricultural co-operatives are today for agriculture, the supply area and the food industry of the EU is illustrated by following figures:

- About 30 000 co-operative enterprises
- Almost 9 million members
- Over 600 000 persons employed
- About 210 billion EURO turnover
- Over 50% of shares in the supply of agricultural inputs

- Over 60% of shares in the collection, processing and marketing of agricultural products

## **EFFAT**

<http://www.effat.org/English/index.htm>

Secretariat of EFFAT

Rue Fossé-aux-Loups 38 Boîte 3

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Phone: + 32 2 209 62 63

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EFFAT is the European Federation of Trade Unions in the Food, Agriculture and Tourism sectors resulting from the merger concluded between two European trade union federations, the ECF-IUF and EFA, on 11 December 2000. As a European Federation representing 120 national trade unions from 35 European countries, EFFAT defends the interests of more than 2 600 000 members towards the European Institutions, European industrial federations and enterprise management.

In recent years EFFAT has set up European Works Councils in more than 90 transnational groups and it has a successful social dialogue under way in, among others, the agriculture, hotel & restaurant, contract catering, sugar and tobacco sectors.

EFFAT supports its member organisations in Central and Eastern Europe in building up free and strong trade unions.

For quite a time EFFAT has given its support to a sustainable development of the agrofood- and tourism policy in which ethnical, social and ecological aspects are considered. Only safe and high quality food can also guarantee safe jobs and working conditions.