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Innovative Agricultural Education Curriculum Practices Promote Sustainability in the Balkan Region of South-Eastern Europe

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Abstract

Sustainability is a term that can be found in most documents that relate to agricultural and rural development. As a rule, the phrase “sustainable agriculture” is used to denote a particular set of farming practices and/or agricultural policies. However, in an era of continuous knowledge change it is now clearer that sustainability in agriculture can best be understood and advanced in the form of learning processes. The Dimitris Perrotis College of Agricultural Studies (DPCAS) is a recently established, private international post-secondary educational institute. One of the major concerns of the DPCAS curriculum is to infuse the notion of sustainability in the students through various innovations following a “small steps” model. More specifically, promoting courses that increase the concern for the environment, engaging the students in course activities, which demand multidisciplinary information search, and teaching with direct applications of IT, positively affect the conceptual knowledge of sustainability obtained by the students.

Introduction

Sustainability is a term that can be found in most of the documents that relate to agricultural and rural development. As a rule the term “sustainable agriculture” has been used to describe and advocate a series of farming practices and/or agricultural policies. However, in an era of continuous knowledge change it is now clearer that sustainability in agriculture can best be understood and advanced in the form of learning processes. Given that the role of the education institutions in the creation of a sustainable future in agriculture is still very important, it is clear that the educational practices have to change or to be adjusted to meet the challenges of modern agriculture. One of these challenges is to provide students with the necessary tools to practice and promote sustainable agriculture. A major issue within this challenge is to deliver the complex concept of sustainability as a way of thinking and acting, which through personal cultural transformation will eventually lead to behaviour change.

The purpose of this paper is to present the curriculum practices that are applied by the Dimitris Perrotis College of Agricultural Studies (hereafter DPCAS). DPCAS is part of the American Farm School, a nearly 100-year old institution located in Thessaloniki, Greece. DPCAS is a recently established private international educational institution offering post-secondary education in Management for Agribusiness, Marketing for the Food Industry, and Management of Agricultural Production Systems. The College academic structure follows the US academic format. The specific courses and a number of additional variable for-credit educational activities are continuously updated to follow the changing needs of agricultural business in the primary sector, the food industry, the rapid changes in Information Technology (IT) and its applications to agricultural research. A major goal of the DPCAS curriculum is to infuse the notion of sustainability in students through various innovations following a “small steps” model (to

be elaborated later in this paper). From our point of view, promoting courses that increase the concern for the environment, engaging the students in course activities which demand multidisciplinary inquiry, and teaching with direct applications of IT (such as GPS, crop simulation models, and web applications for e-commerce), positively affect the conceptual knowledge of sustainability obtained by the students. Equally important to the latter is the fact that the graduating students have a comparative advantage for career placement because these skills are currently in demand in the job market.

Sustainability, Agriculture, and Agricultural Education

The negative effects on nature caused by human activities can be traced back to the ancient ages. Ever since humans started to practice agriculture professionally there was always a need for more land and water and thus people were always building dams, draining swamps, diverting the courses of rivers and reclaiming land in their effort to increase their agricultural production and thus improve their living standards (Kourmatzis et al., 2002). Moreover, the agricultural scientists, in their ambition to belie the Malthusian nightmare, encouraged farmers to intensify their farming practices by overusing agricultural inputs, leading to abuses of natural resources. Their ambitions for continuous yield increases were actually achieved to a certain extent. On the other hand, the cost of this “achievement” was a tremendous environmental disaster as it was recognized formally in 1987 by the Brundtland report where it was stated “agricultural practices are both a cause of global degradation and a prime victim of its effects” (Brundtland, 1987). It has been observed that the continuous use of fertilizers, pesticides, insecticides, and the consumption of more and more energy lead to soil erosion, landscape deterioration, loss of biodiversity, and the destruction of the non-renewable energy resources (Greenpeace, 1997, Flogaiti, 1998). As a solution to these problems the concept of sustainability was introduced and together with productivity, stability and equity became one of the key goals of contemporary agricultural production (Conway, 1994).

Of course, to try to define sustainability is a very difficult task. Every science discipline has produced its own definition. Sociologists,

economists, political scientists, agronomists, environmentalists, engineers and many other professionals have managed to create at least 80 definitions for sustainability since the Brundtland Commission’s definition about sustainable development was introduced (Pretty, 1998). And even though there have been efforts to group the different definitions the conceptualisation of sustainability remains elusive (Bawden, 1997).

The apparent lack of a concrete definition (or a sound concept) makes it obvious that sustainability in general, and more specifically in agriculture, can not be easily delivered as a set of practices, or policies, or a package of directions. It is admitted that the vagueness that exists in the concept of sustainability can be a major obstacle to the education and training of stakeholders who so far have been used to working with clear definitions and measurable objectives (Wals & Bawden, 2000). On the other hand if we wish to achieve sustainability in agriculture then we need a radical change in agricultural practices and therefore an essential adjustment is required in the competencies required of future farmers. Hence, the big question is what didactic strategies, what planning methodologies and what curriculum reforms are required to teach sustainability? And moreover, how do we manage to introduce sustainable agricultural practices with as little disruption as possible? These questions have concerned many agricultural education institutions that have recognized their important role in helping with the creation of sustainable futures through education and have included sustainability in their educational practices and research agendas (Wals & Bawden, 2000).

An answer to the above questions may be found in the suggestion to view sustainable agriculture as a series of small steps that never reach the final goal. More specifically, Pretty (1998) suggests three steps that may be followed towards introducing sustainability: a) introduce methods that improve economic and environmental efficiency, b) promote the integration of regenerative technologies and c) redesign with communities. This approach has been infused through curriculum revision at the Dimitris Perrotis College of Agricultural Studies in our effort to promote sustainability through an innovative curriculum for our students, who originate from almost every country of the

Balkan Region of South-eastern Europe. Before describing several innovations launched by the College, a description of the existing agricultural education system in Greece will help to place DPCAS within the national educational and regional context.

Agricultural Education System in Greece

The description of the system that provides agricultural education in Greece is rather complicated. This is partly due to the fact that there are many decision-making bodies in the existing system with no coordinated interaction among them. Today three different ministries (namely the Ministry of Education and Religious Affairs, the Ministry of Agriculture, and the Ministry of Labour and Social Affairs) plan, develop, supervise and evaluate agricultural education through their own educational organizations, institutions, and institutes (Koulaouzides, 2001). For the purposes of this paper we will briefly present the existing agricultural education structures.

The Ministry of Education and Religious Affairs (www.ypepth.gr), offers secondary agricultural education through the newly established Technical Educational Schools. These schools have two study cycles. The first cycle is two years and the second cycle is one year. After the first cycle there is an exit point and graduates of the first cycle may enter the labour market with defined professional rights. Post-secondary agricultural education is offered by the Institutes of Vocational Training that are supervised by the Organisation for Vocational Education and Training (www.oEEK.gr). Of course, agricultural education is also provided at the tertiary level by the Technical Educational Institutes that offer 3-year degree courses, and by the Public Universities that offer 5-year degree courses.

The Ministry of Agriculture (www.minagric.gr) through its own Technical Educational Schools that belong to the recently established Organization for Agricultural Vocational Education Training and Employment (www.oGeeka-dimitra.org.gr) also offers secondary agricultural education. The same Organization offers adult continuing agricultural education through its Centres of Agricultural Education. However recent studies have shown that the education provided by the latter is rather insufficient and does not fulfil the training needs of farmers (Koutsouris, 1997; Koutsouris &

Papadopoulos, 1998). Finally, the Ministry of Labour (www.labor-ministry.gr) also offers agricultural education, since the Ministry supervises the Greek Manpower Employment Organization (www.oaed.gr) that offers among other specialties, agricultural vocational training through its extensive net of Vocational Training Centres throughout the country. Moreover, the same Ministry is responsible for the organization, supervision and evaluation of the Centres of Professional Training which operate throughout the country and offer short term adult training courses in subjects that relate to agriculture, like organic farming and agro tourism.

To the above educational mosaic we have to add two more cases: a) the Mediterranean Agronomic Institute of Chania (MAICH), which is supervised by the International Centre for Advanced Mediterranean Agronomic Studies. MAICH offers post-graduate specialist studies, leading to the degree of Master of Science. Courses are conducted in the English language and research work is carried out under the supervision and guidance of University professors and researchers (www.maich.gr), and b) The Dimitris Perrotis College of Agricultural Studies at the American Farm School, which is described below in more details.

The agricultural education systems in the other Balkan countries have more or less the same major characteristics. An extensive description of the provision for agricultural education in each of the Balkan countries is beyond the scope of this paper. However, most of the countries of Central and Eastern Europe experience similar radical and vigorous socio-economic changes, which influence the agricultural economy and thus the agricultural education system. Several studies indicate that in countries such as Albania, Bulgaria, Romania, FYROM, and Serbia the agricultural education and its objectives need to be reconsidered and in many cases radically transformed since the existing education models are poorly suited to the needs of the times (Daku, 1997; Ruffio & Barloy, 1995; Popova, 1992). In general it is agreed that the system inherited from the communist regimes is out of date, static and conservative, with inflexible forms and structures and it does not meet the requirements of modern agriculture.

The Dimitris Perrotis College of Agricultural Studies at the American Farm School

An independent, non-profit educational institution, the American Farm School (hereafter AFS), has provided formal agricultural education as well as technical and professional training in Greece since 1904. According to the AFS mission statement, the School aims to prepare its students for leadership roles in community life, and to do so in an environment that fosters individual initiative, a spirit of enterprise, an appreciation of excellence, a lasting attitude of inquiry, and the ability to work cooperatively. In pursuing this mission the School teaches and demonstrates farming practices that are economically viable, ecologically sound, and socially responsible.

The founder of the School, Dr. John Henry House, developed in 1910 the following well-known American Farm School Creed:

I believe in a permanent agriculture, a soil that grows richer, rather than poorer from year to year. I believe in living not for self but for others so that future generations may not suffer on account of my farming methods. I believe that tillers of the soil are stewards of the land and will be held accountable for the faithful performance of their trust. I am proud to be a farmer and will try to be worthy of the name. (Marder, 1979)

The creed, which has been the cornerstone of every educational practice applied at the AFS, demonstrates the determination of the School to promote sustainable agricultural practices. The AFS educational environment is unique since the various educational programs address audiences at the secondary, post-secondary and adult education levels. This is unique since there is no comparable institution in Greece serving three educational levels simultaneously (Koulaouzides, 1998).

After 90 years of operation at the secondary level the AFS administration decided to launch a post-secondary program. Prior to the final decision to launch the post secondary program, the AFS conducted a survey to verify the needs of today's labour market, to specify the specialties and skills needed in contemporary agricultural business, and to identify the interest of the agricultural entrepreneurs in providing

internship positions and in hiring graduates of the new program (Koulaouzides et al., 1998). After the encouraging results of the survey the College program was launched in 1996.

Today, the Dimitris Perrotis College offers a two-year third level education program addressed to individuals who aspire to have successful careers in the field of agriculture. Three options are available: Management for Agribusiness, Marketing for the Food Industry, and Management of Agricultural Production Systems. Primary emphasis is on the application of hands-on learning for a career in the agricultural industry. Classroom learning highlights environmental awareness, communication skills, entrepreneurship, marketing, and a general education in the science of agriculture. Laboratories and demonstration farms provide practical experience with crops, livestock and commercial aspects of agriculture. All instruction is in English, the language of international business and science. A formal paid work Internship Program introduces each student to the needs and demands of private sector agricultural suppliers, producers and processors.

Curriculum Innovations at DPCAS

The College curriculum was built on the two-year College curriculum philosophy, longstanding in the US, which leads to an Associate Degree (Koulaouzides, et al., 1998). The courses offered were chosen having in mind that a success parameter for a vocational and technical curriculum is its ability to assist students to enter and succeed in work (Finch & Crunkilton, 1999). Although a four-semester curriculum does not offer much time for specialization, the following innovations have been introduced and applied in accordance to the three-step model for sustainability that was mentioned above.

Step 1- Introduction of methods that improve economic and environmental efficiency: This is achieved through courses such as the recently developed: Principles of Precision Agriculture. The overall idea is to introduce methods that both reduce utilization of agricultural inputs (and their undesirable environmental impacts) and optimize yield (Gertsis, et al, 2002). This course together with all the other courses that relate to agricultural production such as Introduction to Agricultural Systems, Soil Science, Plant Propagation and

Breeding, Field Crop Production, Greenhouse Production and Management, and Animal Husbandry are taught using technologies such as Global Positioning Systems, Geographical Information Systems, Crop Simulation Models, Yield Monitors, Soil Mapping software, aerial-photography, and Variable Rate Technology. An evaluation that was submitted by the students showed that the use of these modern technologies is desirable and is more effective in understanding concepts of management and decision making (Gertsis, et al., 1999). This approach does not challenge fundamentally the existing production values and it maintains in general the farming goals (Pretty, 1998).

Step 2 - Promote the integration of regenerative technologies: Three courses were included in the DPCAS curriculum to promote regenerative technologies. The objective of these courses is to incorporate the use of alternative pesticides; introduce the release of natural enemies; introduce the integration of animals into the production system; promote the integration of crops and trees that fix nitrogen; and technologies that preserve water and soil. The courses Ecological Agriculture I, Ecological Agriculture II and Innovative Technologies in Agriculture serve the above objective. Moreover, this step is supported by the operation on the College campus of a substation of the European Biological Control Laboratory (EBCL). The EBCL, based in Montpellier, France, is a program of the Agricultural Research Service (U.S. Department of Agriculture). EBCL works on the biological control of arthropod pests and weeds. The staffs of DPCAS-based EBCL are working closely with College faculty in research projects and also students of the College are implementing their required internship employed by the laboratory for field and lab work (Koulouzides, et al., 2000).

All the courses of Step-1 and Step-2 are also supported by a general curriculum that includes courses such as Biology, Mathematics, Information Systems, and Food Science. Moreover, students are also taught courses like Human Resource Management, Farm Business Management, Real Estate Management, Entrepreneurship, Consumer Behavior, E-Commerce, Marketing Management,

Agricultural Finance and a course about Agriculture in the EU and other international organizations. As a result the students acquire knowledge from a wide spectrum of disciplines. This is an asset since future farmers who will manage complex agro-ecosystems and businesses in competitive markets, will need to be experts instead of users, receivers or adopters of other specialists' wisdom (Roling and Wagemakers, 1998).

Step 3 - Redesign with communities:

This step requires people in local communities to work together and plan, experiment, solve problems and interact with other communities to spread innovations and solutions. And this requires communications skills. Our College is the first agricultural educational institute in Greece that has accepted students from almost all the Balkan countries. This objective led us during the development phase of our program to select English as the language of instruction. Having English as the common language, we engage students in a series of independent studies and field studies that requires them to work together, think together, apply together, and present together. This approach was applied in the implementation of the AGROWEB project (Anastasiou, et al., 2001).

AGROWEB-an innovative approach to the usage of Internet in an interdisciplinary framework, involved 15 educational institutes (not all related to agricultural education) from all over Europe. The objectives of the project were to help students: a) acquire knowledge and skills on subjects such as language, culture, history, geography, mathematics and economics, b) learn about new products, how they are produced and the cultural elements associated with the specific products, c) get familiar with e-commerce, and d) become entrepreneurs using e-commerce in marketing and selling agricultural products. One of the most impressive outcomes of this collective work is the e-shop that can be found at www2.ellinogermaniki.gr/ep/agroweb/htmls/uk/contens.html. Through this kind of projects we are trying to inspire our students to become leaders in their communities and work together for the future of agriculture not only on a national but also on an international level.

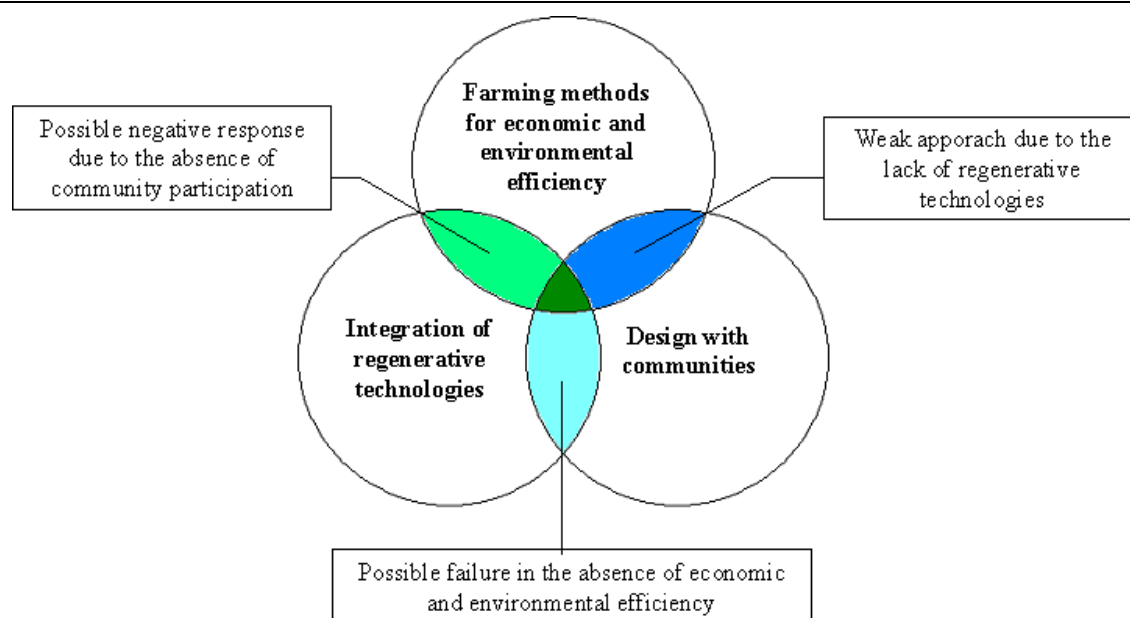


Figure 1. A three-step learning approach for Sustainable Agricultural Development.

Summary

The ambiguous concept of sustainability leads to confusion in agricultural educators as they begin to develop learning objectives, which give direction for the development of curriculum content and teaching strategies. Nevertheless, in an era of environmental uncertainty the topic of sustainability has great potential for agricultural education (Wals & Bawden, 2000). Sustainable agricultural development cannot be disregarded and agriculture educators and students should realize that their current and future practices in agriculture have an impact on the health of the planet. Definitely there is no specific formula for a curriculum reform to deliver sustainability. Each institution should follow a strategy that could be best facilitated by its resources. The Dimitris Perrotis College of Agricultural Studies has chosen a curriculum strategy and started a learning process that will eventually manage to embed the concept of sustainability to its Pan-Balkan students. As the College conducts formative evaluation of the curriculum as it is implemented, clearer directions for successful teaching and learning strategies as applied to the teaching of sustainability will logically emerge.

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