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# THE PUBLIC AND THE AGRICULTURE AND FORESTRY INDUSTRIES

**The role of Higher Education in questioning assumptions and matching expectations**

# Proceedings

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# KEYNOTES PRESENTED IN PLENARY SESSION

# Food Safety: The Perceptions and Expectations of the European Public

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A succession of food related crisis have hit the agriculture and food industry worldwide in the past 20 years. These have included the BSE crisis; repeated salmonella and e-coli outbreaks; the use of genetic modification in food production and processing; Food and Mouth disease and most recently Avian Flu. These crises have resulted in seismic shifts in the way the industry is viewed from both a political and societal perspective.

No longer is it acceptable for the agricultural and food industry to be wholly focused on production efficiency, price and subsidies. At a societal level, the EU public have became much more food safety conscious consumers and have begun to demand higher levels of safety, quality, traceability and accountability within EU food supply chains. Politically, the EU and national governments have responded, in some cases, by transforming their 'old style' inward looking production oriented Agriculture departments. Many have been developed into more 'holistic' outward looking departments with much wider remits, in particular with respect to the interaction between agriculture production and the sustainability of the rural environment. For example, in the UK MAFF, the Ministry of Agriculture Food and Fisheries was transformed in to DEFRA – the Department for Environment, Food and Rural Affairs. In addition, the responsibility for the regulation, management and communication of food safety and risk was transferred to independent food safety regulatory agencies at both an EU (establishment of the European Food Safety Agency) and national level (establishment of the Food Standards Agency, UK). At the core of these regulatory agencies remit is the empowerment and protection of the consumer.

The aim of this paper is to provide an overview of public perceptions of and attitudes to food safety within a European context. To achieve this, a synthesise of the key research in the following areas will be provided: 1. Public perceptions of and attitudes to food safety; 2. Expert reactions to public perceptions of food safety; 3. How the public deals with their concerns about food safety when making food purchasing decisions; and 4. Implications for curriculum design and development and teaching and learning strategies for higher education courses within the Agriculture, Food and Environment field.

Public perceptions of and attitudes to food safety have long been researched both in Europe and worldwide. The dominant paradigm, since the early 1980's, has been the psychometric paradigm, developed by Slovic and colleagues (Slovic, Fischhoff & Lichtenstein, 1980). This paradigm has been extensively used in food risk perception research. The fundamental premise of the paradigm is that every hazard has its own unique pattern of psychologically determined characteristics that are related to perceptions of risk (Miles, Braxton & Frewer, 1999). Such risk characteristics include perceived knowledge and understanding; voluntary exposure; level of personal control; dread; and threat to future generations. Sandman furthered this work with his 'Hazard –Outrage' model, which delineated the quantitative (technical hazard) and qualitative (outrage) characteristics of different risks (Sandman, 1987). By acknowledging the more emotional and qualitative components of risk – as defined by the 'outrage' component, it is clearer why for some risks the public get very upset and worried

while they hardly worry about other risks that are, objectively, much more serious threats (De Boer, Mc Carthy, Brennan, Kelly & Ritson, 2005).

Such findings began to question the long held belief among experts and the scientific community that the public were irrational and emotionally incapable of dealing with risk. This emotional irrationality was attributed to the public's lack of knowledge and understanding of the process of science and risk assessment. What in fact was becoming clear within social science was a recognition that risk is not solely a technical construct, based purely on objective science and risk assessment, but is in fact a social construct where by risk means different things to different people (Slovic & Greory, 1999; Finucane & Holup, 2005). A recent study conducted in Switzerland identified two key dimensions against which the public assess and perceive different food risks: 1) whether the risk is ***well known*** to them and 2) the level of ***dread*** associated with the risk (Siegrist, Keller & Kiers, in press). Figure 1 maps out a variety of biotechnological; lifestyle; microbiological and farm-oriented production hazards across these key dimensions. Such an approach helps to explain the quandary associated with the over and under assessment of risks by the public.

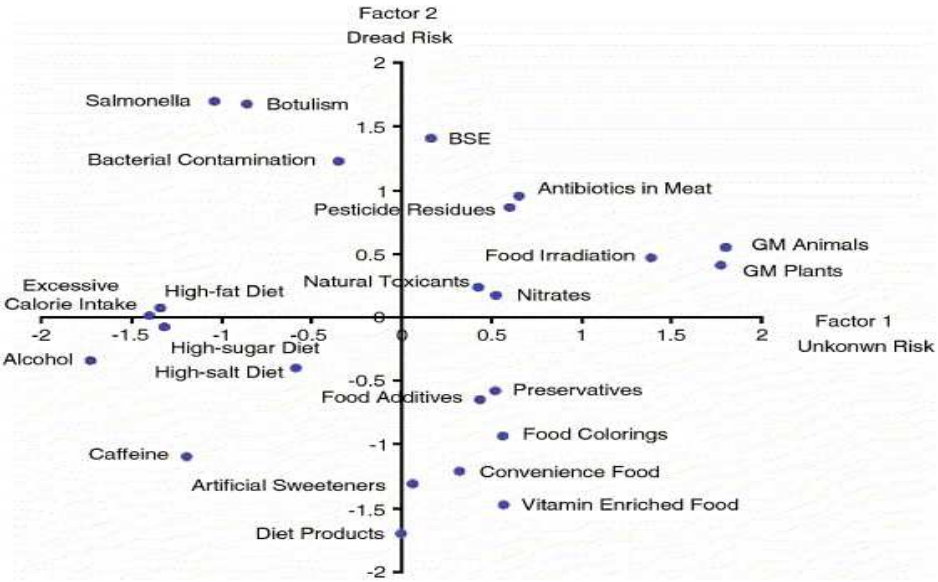


Figure 1: Location of food hazards within a two-component space (Siegrist et al, in press)

These findings are in line with many previous studies conducted in a European context Sparks & Shepherd, 1994; Fife Schaw & Rowe, 1996, 2000; Kirk, Greenwood, Cade & Pearman, 2002; Miles, Brennan, Kuznesof, Ness, Ritson & Frewer, 2004).

The expert risk community have been very slow in reacting to this new understanding of how the general public perceive and deal with different types of food risk. Findings from a recent Irish study indicate that the majority of experts surveyed had little confidence in the publics understanding of food risk issues and their ability to deal with scientific information especially where uncertainty is present and their ability to assess different risks (De Boer et al., 2005). Many experts still ascribe to the so called 'deficit model' when considering how they should communicate with the general public. This model is based on the premise that the perceived gap in knowledge and understanding between experts and the public can be bridged by simply providing more scientific and technical information to the public to

"educate" them so that their perceptions of food risks corresponds more closely to the "correct" view of scientists. This approach has been repeatedly challenged from within the science and risk communication communities. While it is acknowledged that there are circumstances where knowledge transfer and more educative approaches are appropriate, it is widely accepted that a more holistic multi method approach should be used to engage and empower all the relevant stakeholders in the risk assessment, management and communication process. One such project that is trying to address the need for a more integrated risk analysis approach for food is SAFEFOODS – Promoting Food Safety through a new integrated risk analysis approach for foods (www.safefoods.nl), an EU Framework 6 integrated project. Initial findings have identified five key themes as common to the perceptions of both the general public and experts, although these were not represented in the same way by both groups. These are: 1) efforts made by the responsible authorities to manage food risks; 2) responsibility for prevention and management of food risks; 3) how priorities are established within regulatory systems; 4) scientific progress and its implications for food risk management; and 5) media attention and food safety incidents (van Kleef et al, in press). It is vital that these different perspectives are considered in order to reduce the perceptual distance between key stakeholders if a more integrated, socially responsive approach to risk assessment is to be created in which all stakeholders feel engaged and empowered (van Kleef et al, in press).

From an industry perspective, understanding what factors determine how the general public perceive food safety risks is vital. Individuals exhibit various behavioural strategies in response to different food safety risks. These 'risk relieving strategies' mask a number of complex decision-making processes, often based upon incomplete information, and include attempts to eliminate the risk or make modifications to purchases to reduce or eradicate the hazard (Frewer, L.J., Hunt, S., Miles, S., Brennan, M, Kuznesof, S., Ness, M. & Ritson, C, 2001). A recent Irish study highlighted the complexity associated with making food consumption decisions under perceived risk conditions for four distinct categories: 1) (Bio)Technological hazards; 2) Lifestyle hazards; 3) Farm-oriented production hazards; and 4) Microbiological hazard. Figure 2 graphically represents the influences that impact public risk perceptions for ***(bio)technological hazards***; the characteristics associated with the risk posed by these hazards and the risk relieving strategies they use to minimise the risk posed to themselves and others (McCarthy, Brennan, Ritson & DeBoer, in press). In order to prosper within the agriculture and food industry, it is important that producers, processors and retailers acknowledge the validity of public risk perceptions and adapt and develop their product and promotional offerings to facilitate the different risk relieving strategies that the public deploy for different hazard categories.

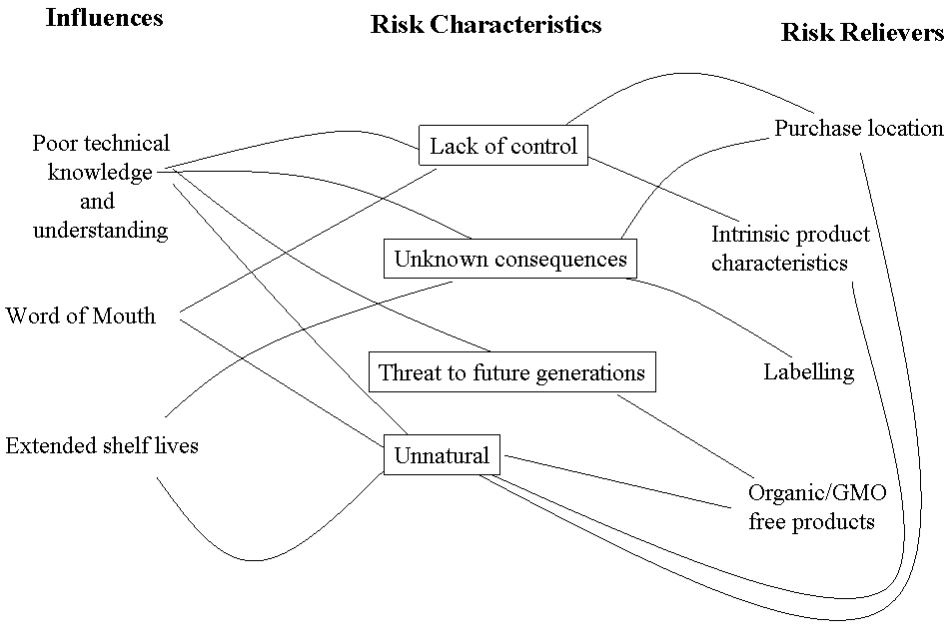


Figure 2: (Bio)technological Hazards – The relevant risk characteristics and risk relievers (McCarthy et al, in press)

There are significant implications associated with all this for curriculum design and development and the selection of appropriate teaching and learning strategies for higher education courses within Agriculture and Food. In order to reflect the steps taken at a political level, it is advisable that students undertaking agriculture and food related degree courses are provided with core courses examining how different stakeholders perceive and cope with different food safety risks. It is important that graduates develop a full and comprehensive appreciation of how the public perceives and reacts to different food safety risks and how differences in perceptions are not solely based on a lack of knowledge and understanding but are due to a range of risk characteristics associated with different hazards. Graduates should be entering the industry technically, politically and socially competent of the demands associated with operating in such a consumer driven industry.

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# When students faced rural realities: A rural tourist area to assess the agriculture's evolution and its becoming in "Drôme Provençale" (France)

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*Abstract*

This pedagogic experiment is carried out with students of the Ecole Nationale Supérieure d'Agronomie et des Industries Alimentaires on the last year of their formation. This is organized to form them to be confronted with local stakeholders about rural and agricultural development. This case-study is divided in two formation sessions : a first session to learn methodological tools and technical data and a second intensive session (one week) taking place away from the class-room in a rural area in Drôme Provençale (France). This particular case-study takes place at the end of the formation because i) at this time the students will have acquired technical knowledge and ii) would be more relevant to build answers to public's expectations for the local agriculture. The exercise can be described with two types of objectives : a pedagogic objective and a learning objective. The pedagogic objective is to increase their ability to build a method in answer to local expectations and to motivate students to become the actors of the project, teaching in a completely different environment. We use several teaching tools (lectures, collaborative learning groups, oral presentations) before and during the week. The original part of this exercise is the collective work that students need to provide together for a single result: a restitution in front of local stakeholders (institutions, farmers, politicians…). To be relevant on this realistic aspect of the restitution we have a learning objective: the students need to learn rapidly new themes that they did not study yet in their formation or training period. The originality of the chosen area is that it presents new agricultural models and the students must react when confronted with productions difficulties and ask themselves many questions to make propositions of actions to local people. They build a presentation which summarizes their local's interviews and diagnostic of the area. They need particular knowledge on the strength and weakness of the local production organization to be able to present a solid diagnostic and proposals for development. At the end of this case-study we assess the pedagogic objectives with the students who tell us what are their perceptions of the exercise : what part of the learning are they able to use again, do they feel more acute in front of local expectations. The assessment of the students was achieved by using different criteria to measure their participation and motivation and the graduation was based on the group work and individual initiative (students have discussed and accepted the criteria before).

*Key words*

collaborative learning group, rural area, diversified agricultural productions, methodological tools.

## Introduction

This case study is organized for the third year students of the Ecole Nationale Superieure d'Agronomie et des Industries Alimentaires, the last year before their final training and

gradation. The group is composed of students who have had, since the beginning of their scholarship, partly the same lectures organized in classical distinct disciplines. At the end of this last year they will have to work and answer to questions which are complicated, characterized by links between public 's expectations, agricultural uses, rural area and food products. To be efficient on this kind of problem solving a multidisciplinary approach is required. If this multidisciplinary approach is not proceeded it will remain a gap between the classical disciplinary lectures distinctly taught and the global answer the students will have to find in their future job. The students being in their last year before their gradation, our objective is to reduce this gap and develop a multidisciplinary approach with an original way of teaching. The aim of this communication is to present the chosen methods and the teaching tools to prepare our students to answer to complicated agronomic question linking society and agriculture.

Part 1: The conception of our teaching

To prepare our students to answer to these complicated questions, they need to acquire a method of work which cannot be taught only with classical lectures in classrooms. Furthermore, to reach our objectives of teaching we think that the students must become actors of their formation (Ericksen, 1978), and we need their implication in the project of case study. This implication and motivation are stimulated by letting them build, firstly the complicated question and secondly the method to answer it (Gross Davis, 1993). The complicated question is on a subject linking society and agriculture for which they feel concerned. After a period of preparation at the school (30h), the final step of the exercise is carried out in a pre-professional way : one week to answer to the chosen question, teaching taking place in a rural area (Drôme Provençale) far away from the school with several meetings with local stakeholders to work on their project of local development.

The complicated question we want to work on with the students is about the relations between agriculture and public through its impact on a rural area. The choice of the rural area is of great concern for the success of our pedagogic project. This area must provide an agriculture

- producing amenities (positive externalities) like landscape, jobs, tourism economy, quality products…) and
- under strong natural constraints whose survival is not sure in the context of the CAP

This model of agriculture seems economically threatened but corresponds to the public's expectations and the question is : how this agriculture can have a benefit from these expectations? The answer to this question cannot be only an accumulation of technical solutions but must be built with a multidisciplinary approach (agronomy, agricultural productions, landscape, quality…). Using these criteria, the teacher team chooses each year a different rural area. Before the beginning of the exercise, the local stakeholders are contacted to test their potential implication in the formation of the students through the answer to a question involving their area.

This case study with our students is possible because they have already acquired different knowledge in various disciplines like : agronomical techniques, agriculture and its impact on the environment, global approach of the farming system, quality procedures, economy (organization of production, CAP…) and data analyses.

Part 2: Course of the exercise

In this case-study, the chosen pedagogic tools are used to make the students autonomous. We do not afford them to be passive but we stimulate them by these forms of teaching to react and tell something on the points they are working on. For this case-study we use firstly lectures to

teach students the different methods they will need to work on the chosen site. The interest of this classical teaching is that the whole group has the same layer of knowledge (table 1).

| | Lectures | Collaborative learning groups | Oral presentations | Interviews with local stakeholders | Animation | Deliverable |
|---|---|---|---|---|---|---|
| Preparation months at school | ✓ | ✓ | ✓ | | | Complicated question |
| Intensive week in "Drôme Provençale" | | ✓ | ✓ | ✓ | ✓ | Diagnostic and debate |

Table 1: planning of the use of the teaching tools according to the evolution of the exercise

We use then collaborative learning groups (Gross Davis, 1993) to make them actors of the project and to collect data. This tool will help them to formalize with their own words what they need and why do they need it. By this form of pedagogic tools they learn how to work together and how to listen each other and assume common objectives. In our exercise, the collaborative learning groups are the best tools to make the students acquired knowledge on productions and agricultural organizations of the chosen studied area. They are also the best tool to implicate them in the process of the building of method to answer to local's expectations (table 1).

To complete the work in collaborative groups they have to prepare oral presentations. The students regularly practice oral presentations but in this case it can be described as a dynamic one : other groups are asked to react and complete the results (Tiberius, 1990). It is the beginning of their work and not only an exercise to perform in front of teachers : they see rapidly the interest of the oral presentations.

The lectures, the work in collaborative learning groups and the oral presentations are built to make the students formalize the complicated question. Their perception of the strength and weakness of each kind of organization of agricultural productions has to lead them to ask a question about the link between the rural local development and the agriculture. In our case study the students 'conclusion on their first bibliographic diagnostic was that the area was characterized by several agricultural products more or less valorised by signs of quality. Their question, guided by the teachers, was based on the real economical link between the inhabitants 'expectations about development and the richness provided by the agricultural activity : are the agricultural productions the motor of the local development?

The appropriation of the subject was easier because they were no more passive but in the process to build their study in Drôme for whom they feel they were responsible. The teachers are present but only to guide and give direction (Gross Davis, 1993). This less directive way of teaching made the students actors of their project.

The answers to the defined question will be the aims of the case study carried out in Drôme during one week (table 1). Our pedagogic objective at that particular time is to teach them the use of the scientific procedure to answer to local 's expectation. To find scientific and realistic answers the teachers emphasize the importance of the bibliographic synthesis and the hypothesis they have been able to build. This proves to them that the time used for this part of the work is very useful to collect data and to be impregnated of the scope of the local agriculture. This is the first step of the scientific procedure. The second step is then formalized by the importance of the chosen question : this will be their guide for the study.

The hypothesis they described on agricultural productions are characterized as a third step before going on to collect data and before leaving the school for the chosen area.
The fourth step is then rapidly initiated by the students because they feel the lack of information and they directly ask the teachers for other methods of collecting data to confront their hypothesis with local public ‘s expectations. Before the teachers give them advices and other methods they are asked to define what sort of data do they want and why do they need them when confronted with the question. When their thoughts are clear, they are able to understand the fourth step : to collect data from local stakeholders to complete their own perception. The chosen method is a guided interview which is the best way to compare different points of view on the same subject. The students need to understand that when confronted with different people they will need to direct the conversation and discuss with them the same topics to be able to synthesize the perceptions. Our objective is they acquire the fact that it is not useful to meet people without having prepared the interview. That will lead to impossible comparison of points of view. The whole group build a common interview guide and the teachers validate it when all the students agree with it. It is also the students who choose the different stakeholders they want to meet but for each person they must argue to convince the whole group that is an useful stakeholder according to the question.
In terms of methods our aims are they understand that, before trying to answer to local expectations, several type of work is necessary.
In their future job they will have to work in groups on long-term project. The method we propose provide them a scientific procedure, an experience and some realistic ideas on the complicated link between agriculture, rural area and society. The questions on this topic require several meeting with local stakeholders. To be effective it is necessary to define the way the data will be used and why it is collected. We want that the students remember the requirement of a preliminary work, particularly in the case of the relation between agriculture and society, to formulate a well-defined question. This formulation will help them to control their interview of the local stakeholders to collect their perceptions and to facilitate the data analyses. The analyses are completed with the bibliographic preliminary work. The last step of the work is done during the presentation and the debate between the stakeholders and the students. This presentation is a confrontation of the students ‘synthesis and diagnostic and the diversity of the stakeholders’ perceptions. This final result of the case study is completely animated by the students who have prepared the oral presentation but also the debate (they have formulated the points they would like to discuss with the stakeholders) (table 1).
We use the case study to link the students with local stakeholders whose expectations are necessary to implicate the learning process in a rural local development procedure. The work of the students is not only to learn methods but to be able to answer to a define question on which local stakeholders are waiting for answers. The teachers become a tool explainer managed by the students to elaborate their own way of solving the question.
This particular form of teaching lead to different advantages: the relationships between the teachers and the students are changed because they rapidly feel that our methods are useful or their work, they are faced to the complexity of rural development and public ‘s expectations but they still are students from the ENSAIA and not alone to sustain all the complexity. They have the opportunity to assess their ability of using their different knowledge acquired in the previous years at the school to answer the question. This way of teaching allowed us to set up an evaluation of the students based on their motivation measured by their aptitude to work in group, to communicate with the other students and the stakeholders, to synthesize the perceptions they collected and to debate.

Part 3: Students 'Perceptions

To assess our case study in term of pedagogic interest and knowledge acquired by the students, we interviewed them on these aspects of the project, three months later. We have four major aims which can be confronted with student's perceptions of the case study. To obtain their point of view we interviewed 15 of them using the guided interview methods on the following points:

1. The methods to answer to a complicated question on local expectations, the global and multidisciplinary approach:
   Half of the students (7 on 15) have completely acquired the scientific steps for the global and multidisciplinary approach we work with them. They understood it is a quite pertinent way of working to collect objective data and to be able to control the results they present. Nevertheless, 6 students are not able to talk about the multidisciplinary approach.
2. The different tools they are able to use again:
   All the students (15) tell us they are now able to use themselves one of the tools : the guided interview method. They think it was very useful and very interesting to test it in front of local stakeholders. Half of them have already used it in their final training.
3. The different confrontation with the local stakeholders:
   Four students tell that it was a good experience to meet local actors and to confront different points of view. 4 students think it was reassuring to have to answer to local expectations in the context of an exercise directed by the teachers. It makes them realize what are their strength and weakness before they have to present in their future job. For 3 students it was their first experience to be confronted to local stakeholders.
4. The knowledge they have acquired about the link between agriculture, production and public and the local expectations:
   Six students think they have acquired knowledge on the particular link between agriculture and tourism and especially that it was something complex involving the public, the productions and the economic results. 6 students are now aware about the evolution of agriculture that must respond to the public 's expectations to survive in areas like Drôme. 6 students think that this case study was a good exercise to be able to identify the different actors involve in rural development. 5 students have understood that local projects are completely dependant of the local people and their will to create new activities. 7 students have not a clear vision of what knowledge this case study could have brought to them for their future job.

Part 4: Conclusion and discussion

We reach our pedagogic aims homogenously for all the students in terms of acquiring new tools but more heterogeneously for the acquiring of the building of a method to answer to a complicated question. The ability of the students to acquire this multidisciplinary method seems to be function of the professional objectives of each student.

For such a case study, the required conditions for a positive issue are:

- a project taking place away from the school (500 km) which leads to a rich and intense group life and to an enhanced motivation due to the novelty of the context
- a short time (one week) for the final work which must end by a debate on a fixed day
- a preliminary pedagogic work (30h) in collaborative working groups which prepare the students to their appropriation of the question
- a face to face with the local stakeholders and their implication until the final restitution which concretely ends the project

The major problems are the choice of the site (motivated local stakeholders, link between agriculture and public ‘s expectations, the financial cost (journey, food, lodging: 200 €/student). The project requires also a large availability of the teacher team.

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# The rural environment for the delivery of safe drinking water

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*Abstract*

This paper shows the importance of an integrated approach to land and water management based on a hydrological cycle - the flow of water between air - soil - vegetation - water storage environment. Management of this cycle is important not only for ecosystems and for proper land and water use but also for the relation between water quantity and quality and for agreement between upstream and downstream users. The paper emphasizes the basic criteria of "The Integrated Water Resources Management" (IWRM): Economic effectiveness of water use, social justice in distribution and permanent sustainability of life. These criteria form the background of the EU Water Framework Directive (2000) and consequently of the Czech Water Policy (2003). This directive is one of the basic documents of the European Union, that very specifically and carefully consider water as *not a commercial product like any other but rather as a heritage which must be protected, defended and treated as such.* The success of this Directive relies upon close co-operation and coherent action of Member States at local level as well as information and involvement of the public, including the users.

A negative role in water resources management is always played by hydrological extremes (flood and droughts) harmfully impacting on both the quality and quantity of water storage. Some catastrophic flood events in Central Europe are briefly described and learning conclusions are derived. Extreme phenomena have appeared with unusual frequency in the last decade, raising questions by the public about the reasons for it. The answers might include variations in the global climate, mismanagement of catchments, improper land use, etc. The public expects more specific and concrete answers from hydrologists and water resources managers. Questions from the public also touch the issues of agricultural management in water protected areas that supply people with drinking water. In particular, fertilization techniques, water-soil transport properties, nitrogen and phosphorus leaching are more and more connected with eutrophication problems which complicate technologies for drinking water treatment and the use of surface waters for other purposes. This paper tries to provide some answers to these questions. It also provides good experiences with the new forms of water-oriented study programmes where the above mentioned problems are incorporated. These higher education programmes correspond to the Bologna process and they are represented by examples of joint degree MSc courses as well as by short-term life-long courses.

## 1. Introduction

Some of the crucial global issues of the 21$^{st}$ century are food security and environmental quality. Water as a vulnerable and exhaustible resource can be considered as one of the sensitive indicator of environmental quality. Water is vital for the life and health of people as well as ecosystems. It also provides basic requirements for the development of countries and societies. Water resources, and the related ecosystems that are sustained by water, are under threat due to insufficient or low water sources, pollution, unsustainable usage, land use changes, climate change and many other influences. Preserving water quality is one of the

main challenges that we face in our attempt to insure the security of water. It requires a multifunctional care called integrated water resources management. This includes natural, social and economic factors and integrates all water and ecosystems where water flows through. It also recognizes the importance of water and wastewater treatment for water and environmental quality. Renewable fresh water scarcity remains a problem for millions of people around the world, especially those in arid and semiarid regions. In 2000, there were 436 million people living in 29 countries that were considered water stressed (Lal, 2000). It is estimated that by 2050, (for medium populations), there will be about 4 billion people living in 54 countries who will experience some level of water scarcity. The problem of water scarcity is accentuated by water quality. The demand for water is increasing. Already now one fifth of the world's population has no regular access to drinking water and one half has no functioning sewage system. A world-wide IWRM system is therefore necessary to ensure co-ordinated and sustainable development of water resources for all human society. The philosophy of the IWRM has three basic principles:

- Water is an exhaustible and vulnerable resource
- Regular water usage requires the participation of all
- Water is an economic asset

Water resources management is defined as analyses of water demands and ensuring water supply of good quality and adequate quantity. Water sources should be well protected and thus acceptable for drinking and other purposes. Therefore human society must take measures against dangerous impacts on water resulting from natural catastrophes (e.g. floods and drought). The above mentioned problems are becoming more and more acute. Public awareness of issues concerning water management in rural areas is closely connected with the technical and environmental aspects of agriculture and forestry.

## 2. Public expectations

A general view of the world-wide role of agriculture is not simple. In many developing countries the rate of food production is severely lagging behind that of population growth. In addition to social-economic and political constraints, there are three principal biophysical factors contributing to the decline of per capita food production: (1) drought stress, (2) low soil fertility and (3) soil degradation, due mainly to fluctuating water regimes. While drought stress is a common constraint in dry regions, land and water misuse and agricultural/forestry mismanagement can lead to drought stress and to wrong water management even in the humid or mild regions of Europe. The Common Agricultural Policy (CAP) of the EU Member States tends to support year by year more both environmental issues and infrastructural development in rural areas rather than agricultural production. This European policy, in contrast to that practiced by many developing countries in Africa or Asia, has evolved during the last two decades and has been caused by overproduction of main agri-commodities. This phenomenon has lead to a specific attitude of the European public. More stress is given on safety in food and good quality of drinking water, undisturbed environment, including sustainable use of natural renewable resources. Therefore it is logical that the public in European countries pays increased attention to the following issues:

- Good balance between agri-production and the level of protection (against erosion, flooding, over-fertilization) of landscape impact of agriculture on water quality (non-point source pollution);
- Impact of improper land use and agricultural practices on water regime and erosion processes;
- Impact of forest management on runoff processes (clear cut, log transportation, etc.);

- Emissions of gases in the atmosphere due to soil mismanagement ($CO_2$, $CH_4$, $NH_4$, $NO_x$, etc.);
- Decreased permeability of soil due to its compactness caused by heavy farm equipment;
- Large blocks of arable land with the same crop vulnerable to water erosion and land degradation;
- Availability and sustainability of water sources in rural areas;
- Mitigation of harmful impacts of floods and droughts due to improper land use or climate variations; and
- Problems of waste management (including waste water).

These ten issues create the basis for deeper or alternative questions. Undoubtedly there are many more questions that may be raised by the public. The aim of this Conference is to provide answers to the public perceptions of water management in the European context. Therefore, this paper also tries to come up with some concrete proposals on how to solve these difficult problems.

## 3. Water quantity, vulnerability, risks and hazards

The hydrological cycle can easily be described using the simple water balance equation for a catchment, where precipitation (P) equals the sum of actual evapotranspiration (AE), runoff (R) and the changes of subsurface storage (ΔS):

$$P = AE + R + abs\ /\Delta S/ \qquad (1)$$

Runoff can be defined as that portion of the surface water that cannot infiltrate the soil and, therefore, enters the stream via an overland route. Runoff will only occur when the rate of precipitation exceeds the rate at which water may infiltrate the soil. The water in surface storage eventually infiltrates or evaporates. The infiltration rate is effected by:

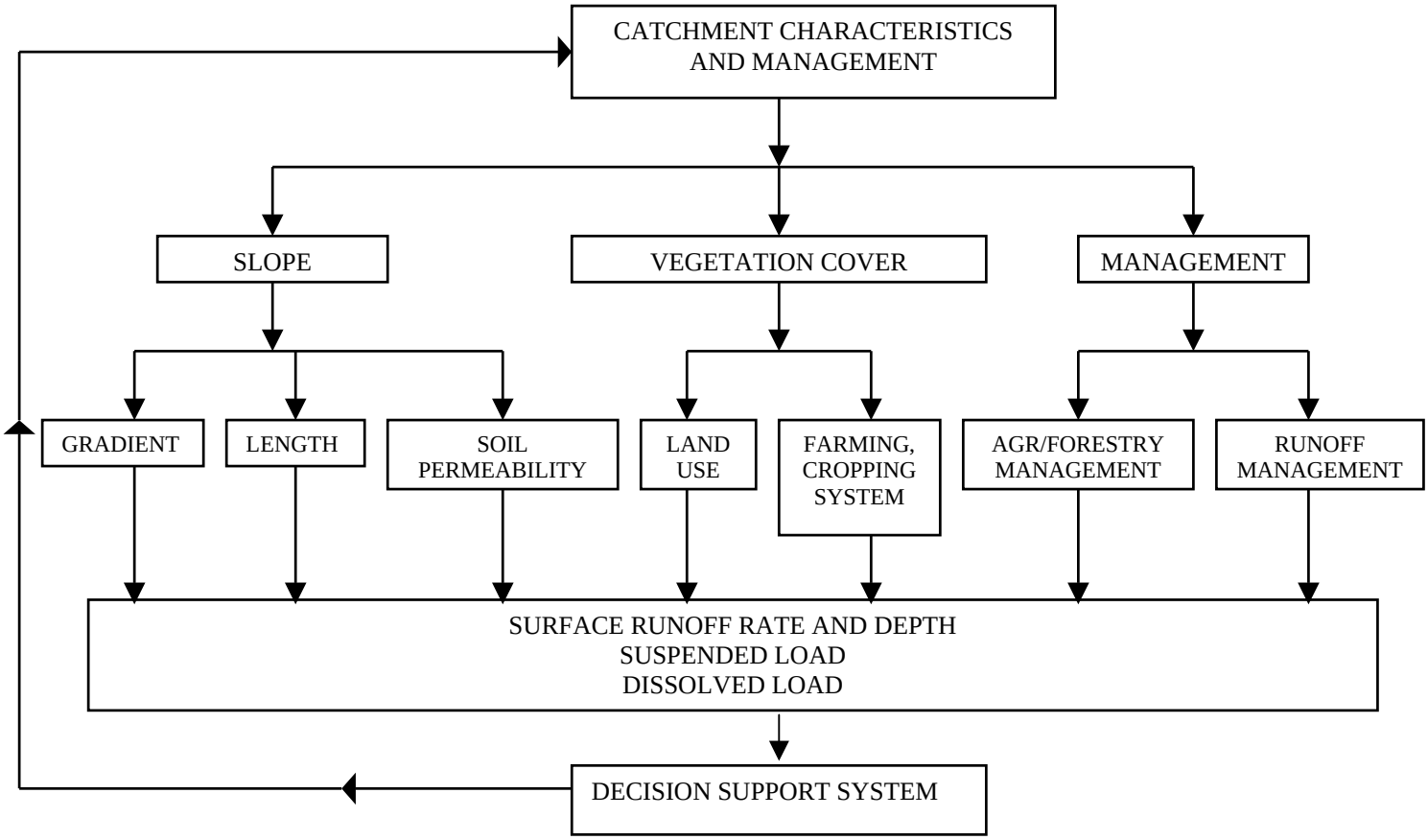
- Type and amount of vegetation and surface cover
- Soil texture and structural conditions
- Moisture status of the soil

It is evident that land management practices can increase the amount of surface storage rate of infiltration and capacity of the soil to store water (Schwab et al, 1993, Godwin and Dresser, 2000). Slowing runoff, or holding it back in the headwaters, is largely dependent upon the vegetative cover and favourable soil conditions. In spite of a wider use of organic farming in Europe, the application of agricultural chemicals for fertilization is still inevitable for intensive production. While enhancing productivity it unfortunately also increases risks of environmental pollution. These risks are especially high for contamination and eutrophication of surface waters as well as pollution of groundwater. The desirable strategy is to identify management systems that minimize the risk of environmental pollution and to properly understand the fate of applied chemicals, as they move through the soil-plant-water-air components of the eco-system.

Surface runoff and the dissolved load in it are influenced by catchment characteristics (Fig.1). Slope, soil properties, vegetation cover and management are of crucial importance. Slope gradients affect runoff and soil erosion through their impact on runoff velocity and its shear stress. Slope length may also affect total runoff depth. Soil properties, such as hydraulic conductivity, sorptivity, porosity and other physical parameters, highly influence surface runoff. Ground cover is an important factor, as runoff and soil erosion decrease exponentially with an increase in ground cover. The latter is determined by land use and farming/cropping system. Soil management affects soil structure, infiltration capacity and root system development. Tillage methods and residue management imply the use of engineering

techniques, e.g. terraces, waterways, drop structures, gabions, etc. Site-specific technologies can be identified and locally validated to enhance agricultural productivity while minimizing the risks of soil and environmental degradation (Lal, 2000). However, the depth of surface runoff and its discharges is the most largely affected by rainfall, its depth and duration, i.e. by its intensity. The excess of rainfall, or the lack of it, usually cause hydrological extremes: floods and droughts. The following sections (3.1 and 3.2) give a general idea about the conditions of their origin and frequency. How to mitigate their harmful impacts and what the public expects from agricultural and forestry industries will be discussed in section 3.3.

Fig.1: Catchment characteristics and management




### 3.1 Hydrological extremes

Significant irregularities in rainfall-runoff regimes cause floods when rainfall and consequent runoff components are too high or, on the other hand, drought when rainfall is lesser than evapotranspiration during certain extreme periods. Both extremes degrade sources of drinking water.

#### 3.1.1 Droughts

Drought events are widely recognized as being a major cause of natural disasters of regional and even global importance. Droughts are usually dealt with in a responsive manner, rather than by applying a preventive management approach that allows the effective use of all available information. Policy development related to national and even regional management

of droughts is generally unsatisfactory and even lacking in most countries. Likewise, early warning, prediction and monitoring of droughts is inadequate in most regions and there is an insufficient capability in many of the most affected countries to effectively use drought prediction results and tools in management practice. The fragmentation of responsibilities for drought management in most countries and insufficient coordination between the organizations concerned add to the problem and impede stakeholder participation at the community level. Literature (Tallaksen, van Lanen, 2004) gives the definitions of meteorological, agricultural and hydrological drought and describes causal factors of hydrological drought, reviews statistical methods which are used for assessments of drought duration and drought severity expressed as deficit volume. Low-flow frequency analysis and flow-duration curves are the basic methods to evaluate droughts. If the deficiency is likely to be too great and too frequent, then storage must be provided to held high flow for release during low-flow periods. Reservoir operation methods can be well applied to decrease the harmful impact of draught, in particular in catchments where the "water holding" capacity is low. These catchments are characterized by a more steeply falling master depletion curve.
Research on drought problems made at the CUA Prague implemented mainly the Water Balance Model (WBCM) and proposed new methods for reservoir operations as well as irrigation systems usage (Kovar, 2004).

### 3.1.2 Floods

Catastrophic flood events in Europe seem to have been more frequent in the last decade. The floods that occurred in the Czech Republic in 1997, 1998, 2000 and 2002 have shown that there is urgent necessity of improving the flood protection measures, following an almost 100 year period without severe flooding. Floods obviously represent the largest natural risk for this country, partly due to its hilly profile causing very fast outflow of storm waters. The time interval between the occurrence of rainfall and resulting flood waves is mostly quite short.
The concept of flood defence involves a number of activities and measures to be carried out. The total area that could be flooded (flood plain area) by a hundred year flood is 1 953 $km^2$. Flood defence measures in the CR can be divided into preventive (flood control plans, forecasting, early warning by the Czech Hydro Meteorological Institute and River Management Boards) and those implemented during floods, such as flow regulation by reservoirs, safety and rescuing activities.
Flood protection activities are governed by flood control bodies, which are responsible in their respective areas for organising flood control activities. Municipal offices, district authorities (or councils of statutory towns) and the Ministry of Environment of the Czech Republic are permanent flood control bodies. All activities which are carried out during floods have to follow directions of flood control plans and instructions of the flood control bodies. The plans are annually examined, and, if necessary, amended or refined.
"Early warning flood systems" including operational plans based on recent forecasting technology (models), executive systems of integrated system of rescue (firemen, police, health service, civil service) organised locally and regionally are the first prerequisite for saving lives and to mitigating flood damages. The CUA Prague has been extensively involved in flood analyses in 1997 and particularly in 2002. These catastrophic floods in Central Europe have caused the following losses (CHMI, 2003):
**1997** (in Moravia and Eastern Bohemia):
53 casualties, damages in 2 billion of EUR
**2002** (in Bohemia):
8 casualties, damages in 3.2 billions of EUR

Since 2003 many European countries have been working on a methodology for flood risk analysis through methods to determine "Active Zones" (AZ) of flood plain areas. The AZ is defined as the part of flood plain area where a substantial flood passes through and thus imminently endangers human lives and property of people. This methodology is not yet the subject of the EU Water Framework Directive, however there is a proposal that AZ should be the area where 70% of the 100 years´ flood discharge go through. This area reflects the flood plain area of a 20 year discharge. In the Czech Republic it is the limit above which insurance companies refuse to insure real estates against flooding. All AZ should be determined, published on maps and subjected to a special system of flood management. For a flood risk determination a simple equation can be written:

$$\text{flood risk} = \text{probability} \cdot \text{damage} \qquad (2)$$

This equation shows that the extent of flood risk is based on the combination of water level probability (i.e. reciprocal value of N-year recurrence flood) times presumed damage for various flood water levels. This method is currently used by many insurance companies in Europe and it can also be used for a comparison with the cost for flood control measures when calculating cost benefit analyses.

### 3.2 Climate variations/change

Since the beginning of 19$^{th}$ century, $CO_2$ concentration has increased by 30%, $CH_4$ by 150% and $N_2O$ by almost 20%. Based on recent model scenarios, the average global temperature should increase by 1,9$^{o}$C to 4,3$^{o}$C by the end of 21$^{st}$ century (Pretel, 2006). Next to agriculture and forestry, the water resources sector is the most vulnerable. Climatic systems and freshwater systems are interconnected in a complex way, a fact which implies that any change of one of these systems induces a change in the other one. In the last decade significant changes in average annual runoff, groundwater storage and quality have been observed in many regions. Based on climate models, it has been assumed that over many areas the hydrological cycle will intensify, i.e. floods and droughts will become more extreme and more frequent. Climate variation impacts are closely linked to individual hydrological systems, water management practices, and implementation of adaptation measures.
Four internationally recognised climate change scenarios have been derived from the support of General Circulation Models (GCMs) further based on the future socioeconomic development of the world. This development is projected according to the future emission of greenhouse gases. Problems arise, when downscaling GCMs results from macro-scale to catchment scale hydrological models. The greatest uncertainties appear from the fact, that local precipitation patterns from the coarse gridded GCMs are uncertain.
Four basic scenarios have been presented and used as follow (Kabat, Schaik, 2005):

**A1 - Global Economy:** very rapid economic growth, new technologies population peaks in the mid 21$^{st}$ century;

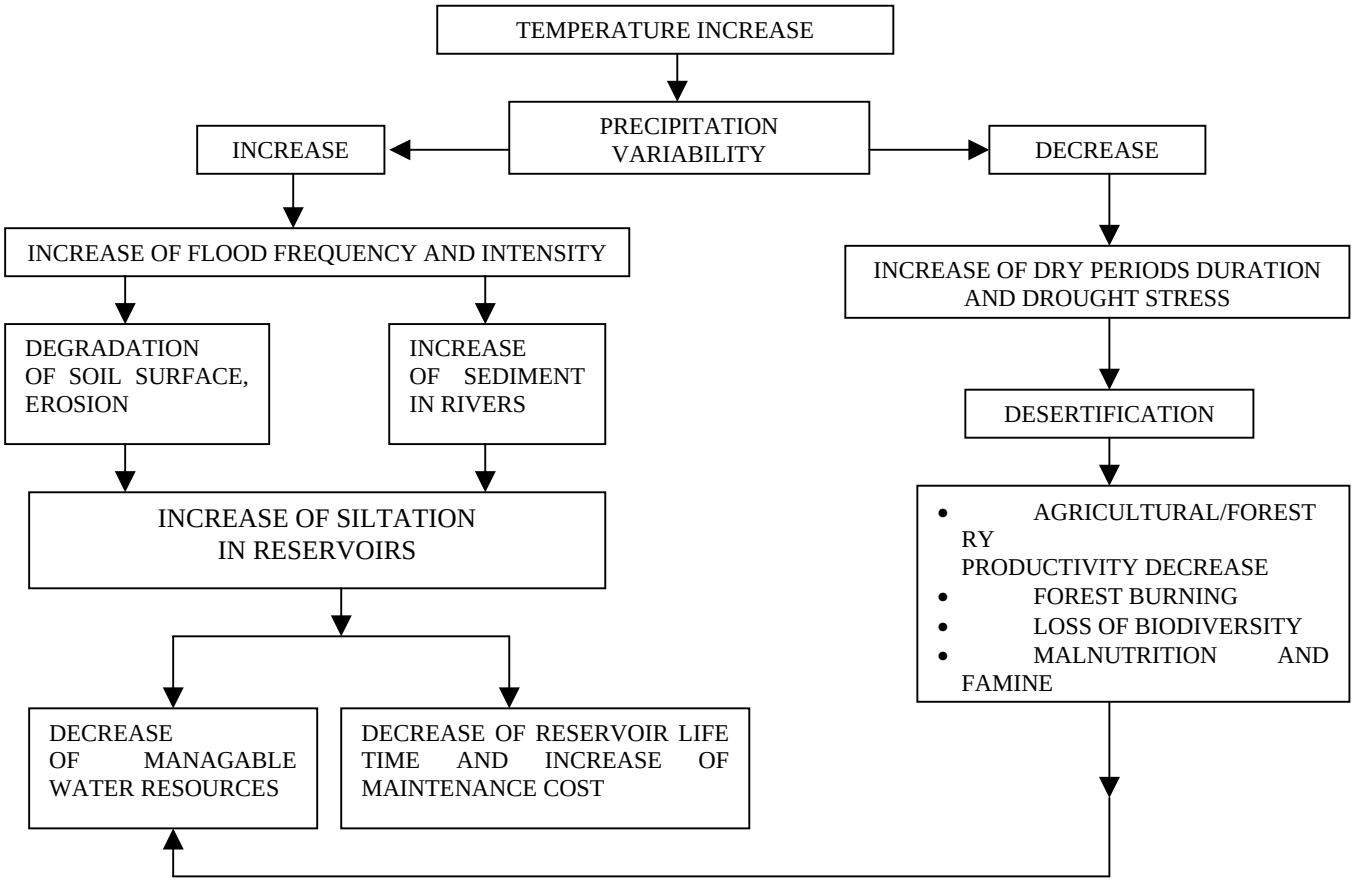
**A2 - Continental Market:** heterogeneous world, regionally oriented economy, technological changes fragmented, continuous growth of population throughout the 21$^{st}$ century;

**B1 - Global Co-operation:** similar to A1 (population) but based more on a service and information based economy;

**B2 - Regional Communities:** local and regional solutions to economic, social and environmental sustainability, continuously increasing population but less than A2.

These scenarios can be subdivided in up to 40 detailed sub-scenarios, taking into consideration details on fossil sources, population growth, technological development, new energy sources, etc. From the text on greenhouse gases concentration concerning the above mentioned scenarios it can be seen, that the highest concentration is to be found in scenario A1F (with fossil sources), the lowest B1 or B2.
Possible impacts of climate variations or even changes in water resources availability, under different scenarios, vary with the physiographic and land use characteristics of specific catchments. Small headwater catchments may be particularly more sensitive to a change than large catchments (Kabat, Schaik, 2003). Several studies on climate change have anticipated more frequent and more severe floods and droughts. Figure 2 below provides links interconnecting activities and phenomena expected when both hydrological extremes intensify.

Fig. 2: Possible impacts of climate change in water resources




### 3.3 How to mitigate impacts of hydrological extremes

#### 3.3.1 Flood and drought control

In the aftermath of devastating floods, anywhere in the world, the public discussions generally evolve around a demand for radical solutions in flood prevention. The solutions are usually embedded in a flood prevention strategy that includes building a flood protection system which will increase retention capacities, i.e. protecting dams, flood plain areas controlled by dikes and polders and other **structural measures.** Obviously, it is not possible to leave parts

of flood plains, called "active zones", absolutely without control. On the other hand, it is hardly possible to build new dams, to limit radically the functions of drinking water storage facilities, to increase transformation capacities of river systems etc., without public and government support. Nevertheless every flood control strategy should generally involve at least three basic steps:

- Increasing retention capacities in a catchment;
- Decreasing harmful impacts of floods, particularly in urbanised areas;
- Maintaining social - , economic - , and water delivery functions of water management infrastructure in a catchment.

Flood control strategy also consists of **non-structural measures** which usually do not imply any capital investment, in contrast with structural measures. They include the following preventive means:

- Operational flood control plans, early warning systems, information for inhabitants;
- Risk knowledge, systematic data collection and processing, mathematical models;
- Flood areas zoning - active zone ($1^{st}$ and $2^{nd}$ class) determination, evacuation plans;
- Training of integrated teams, incl. rescue teams, civil service and self administration.

These non-structural measures are much cheaper than structural investments. When prepared properly and on time, they can be very effective (and efficient).

Some flood control plans also consider land use changes and soil management techniques as non-structural measures meant to increase water retention and strengthen erosion control. As far as drought management is concerned, the bulk of measures meant to mitigate drying processes are of a structural character. First of all there are rainwater harvesting structures and water-saving drip irrigation systems. Water-retention measures designed for keeping water in the soil and allowing it to infiltrate downward, thus replenishing ground water storage, may also be considered as part of non-structural measures.

### 3.3.2 Management control practices

Amongst management techniques which are effective in reducing surface runoff we may list the following:

- **Vegetation/cropping**

Crops with a dense canopy, such as grass, have the effect of reducing kinetic energy of rain, diminishing erosion by decreasing runoff velocities and intercepting rainfall. The protective canopy afforded by tree cover on the soil often gives complete protection. This is also because of the accumulated leaf litter on the soil surface that acts as surface mulch. There are some data (Armstrong at al, 1990) indicating relative erosion tendencies (see Table 1.).

Table 1: Relative erosion/runoff risk

| | |
|---|---|
| Least Risk | Forestry / Woodland |
| | Permanent Pasture |
| | Spring Cereals |
| | Autumn Cereals |
| Greatest Risk | Short Term Grass Ley |
| | Sugar Beet / Potatoes |

- **Soil management**

Deep ploughing and other forms of sub-soiling, meant to remove compacted layers and support the unobstructed flow of water and air through the soil profile, have long been used in agriculture. These methods are often more efficient when applied on the contour. This creates small depressions that temporarily impound the water and provide infiltration opportunities. Unfortunately contour tillage and management is seldom used, as it is difficult to persuade farmers to change their working methods (Goodwin, Dresser, 2000). In order to reduce the overall slope length strip, cropping is a useful technique. A similar however much more extensive practise is mechanical soil adaptation or terracing.

- **Headwater management**

The main purpose of any headwater soil management is to transform the outflow and to reduce water flow velocities, thus achieving a drop in the peak flow. In practice this can be done by a gentler slope, by a rougher surface, by introducing a larger storage, etc. Water storage can be increased using ditch storages, small ponds and winter lagoons. The effects of all three management control practices are incorporated in the set of methods for runoff prediction from small agri-catchments, as described in the U.S. Soil Conservation Service Method and the Rational Method or British ADAS (Goodwin, Dresser, 2000).

- **Management in water - protected areas**

For the protection of drinking water sources the EU Water Framework Directive provides a legislative background that is often used for national Water Acts in European countries. Their purpose is to protect areas of "good quality natural surface water and groundwater supply as needed for sustainable, balanced, and equitable water use" (Directive 2000/60/EC). In general there are two protective zones surrounding sources of drinking water. Zone 1 is usually situated in close vicinity of the source, i.e. 30 to 200m, whereas zone 2 spreads around in a radius of approximately 1 to 2km. These protected areas are known as belts for water sources. Public access to the first zone is generally prohibited and usually this zone is protected by a fence. According to Czech legislation (Czech Act 254/2001) agricultural activities in the second zone of water protection are limited only for organic farming and to a lesser degree for animal husbandry.

### 3.3.3 Integrated water resources management

Water demand is increasing, yet one fifth of the world's population has no regular access to drinking water and one half has no functioning sewage system. A world-wide Integrated Water Resource Management (IWRM) system is therefore necessary to ensure co-ordinated and sustainable development of water resources for all human society. The importance of an integrated approach to land and water management is based on the hydrological cycle - the flow of water between air - soil - vegetation - water storage environment. Management of this cycle is important not only for ecosystems and for proper land and water use, but also for the relation between water quantity and quality and for agreement among upstream and downstream users. This idea emphasizes the basic criteria of IWRM: Economic effectiveness of water use, social justice in distribution, and permanent sustainability of life. These criteria form the background of the EU Water Framework Directive (2000) and consequently of the Czech Water Policy (2004). Economic and social development is limited by water problems in an increasing number of countries. The most frequent problems that need special attention are (GWP, 2000): water deficiency, deterioration of water quality, and floods/drought consequences. The principles (known as Dublin principles) are being applied to the conception of common water policy:

- **Water is an exhaustible and vulnerable resource**
  - A complex approach, taking into account the hydrological cycle and its impact on other natural resources and ecosystems. Water is undoubtedly needed for many purposes and activities, and a complex approach has to include the requirements put on water sources and the threats to water resources. Water resources are limited.
  - The influence of human activities can be either negative (enormous abstraction, contamination, improper land use, etc.) or positive (artificial infiltration, reservoir operation, afforestation, good management, etc.). The value of a water source depends on the type of utilisation.
  - The relations among downstream and upstream users in the matter of water quality require mutual respect. Increased abstraction or water pollution upstream can deprive downstream users of their legal rights. Therefore, a mechanism for negotiation water rights is necessary. A co-ordinated policy is a prerequisite for good relations.
- **Participation of all**
  - Participation involves more than consultation. The principle of participation requires an equal and democratic level of negotiation. Consultation is a part of participation, and participation is only the way to achieve an agreement.
  - Mechanisms and possibilities of participation. A civil Service is responsible for participation on a central, regional and local level, and has to develop a mechanism for achieving a legal agreement.
- **Water as an asset**
  - The value of water and its price are two separate issues. The value of water has a more social meaning, while the price of water is an economic issue. Price involves all costs for water operation, maintenance, distribution, its alternative uses and externalities. The aim is to balance costs and benefits.

Institutional umbrellas in EU countries are often Ministries of Agriculture or Water Resources, the institutional framework of water management in the CR is given by the Water Act No. 254/2002 which can be specified as follows:

- Central authorities of the state administration: **Ministry of Agriculture** (executive power), **Ministry of Environment** (control power) + Ministries of Interior, of Health, and of Transport.
- Professional management of significant water courses: **Water Boards**. This institution manages besides significant water courses (16.6 thousands km), water reservoirs (216), weirs (approx. 1 thousand), dikes (612 km), sludge setting lagoons (40), drinking water supply systems (92% of inhabitants), sewerage systems (75% of inhabitants), waste water treatment plants (75% of inhabitants), hydroelectric plants (2 140 MW).
- Professional management of small water courses: **Agricultural Water Management Administration** (AWMA), managing small water courses (34 thousands km), fish-ponds and small reservoirs (approx. 24 thousands), irrigation systems (132 thousands ha), drainage systems (1 mil. thousands ha). The last unit is **Czech Forests (CF)** managing 18 thousands torrents. This management and infrastructure of the Integrated Water Resources Management is traditionally well used in the CR. The strategic aims of IWRM, in general, can briefly be given as follows:

- Better care for WRM using EU WF Directive as a tool for implementation ;
- Further development of both drinking and sewerage water systems;

- Better development of hydrological extremes prevention systems;
- Upgrading system of WRM institutions including training and international co-operation.

The general role of stakeholders in Watershed Management is provided in Table 2.
Awareness of the need to protect and preserve watersheds and the quality of their ecosystem is well engraved in the minds of the farming community, particularly the traditional farmers. Today, this same group is being asked to reduce its production and conserve the natural resources - a dilemma that presents some of the following challenges:

- Enhanced sustainability concerns;
- Need for holistic approaches;
- Inducing community participation;
- Utilizing modern technology; and
- Taking seriously consequences of mismanagement and learning from these lessons.

Table 2: Role of different stakeholders in Watershed Management (adopted from Lal, 2000)

| Level of activity | Stakeholder(s) | Activities |
|---|---|---|
| Farm/household | Farmer, land user | agri/forestry productivity-<br>income generation,<br>risk aversion |
| Community | Leaders<br>Elders (Civil Service, Self-Service),<br>Extension,<br>Inhabitants | Help decision making,<br>planning, link with larger<br>political entities, facilitate<br>marketing, respond to national<br>policies, taking responsibility<br>for their property, communication |
| Local to national | Politicians<br>NGOs | Policy environment, economic<br>incentives<br>Environmental concerns |
| International | Institutes<br>Universities<br>Trade institutions | Shared watershed concerns<br>Education, research<br>Profit generation |

The sectors of agriculture, forestry and water resources therefore should pay more attention to:

- Predicting and managing natural disaster processes;
- Quantifying economic benefits;
- Developing training/research facilities;
- International co-operation on shared watersheds.

## 4. **Water quality:** use, standards, risk and hazards

### 4.1 Drinking water treatment

Safe drinking water and its regular supply in an appropriate amount is one of the main prerequisites for human life. The situation in drinking water supply varies very much in different countries. Generally speaking the lower a GNP of a country the lower is the level of drinking water supply. According to the latest report of the WHO, dated November 2004

(World Health Organization: Water, Sanitation and Hygiene Links to Health, FACTS AND FIGURES):

- 1.1 billion people lack access to improved water sources, which represents 17% of the global population.
- Over half of the world's population has access to improved water through household connections or yard tap.
- Of the 1.1 billion without improved water sources, nearly two thirds live in Asia.
- In sub-Saharan Africa, 42% of the population is still without improved water.
- In order to meet the water supply MDG (Millennium Development Goals) target, an additional 260 000 people should gain access to improved water sources until 2015 (initial target to guarantee 20 liters per capita).

The lack of safe drinking water brings specific diseases to various regions in the world. For example:

- 1.8 million people die every year from diarrhea diseases (including cholera); 90% are children under 5, mostly in developing countries.
- 88% of diarrhea diseases are attributed to unsafe water supply, inadequate sanitation and hygiene.
- 1.3 million people die of malaria each year, 90% of whom are children under 5.
- There are 396 million episodes of malaria every year; the disease burden affects mainly populations living in the sub-Saharan regions of Africa.

In Europe the situation in drinking water supply is more favorable and in most European countries the daily consumption of drinking water exceeds 100 liters per capita.
The situation in drinking water supplies of the Czech Republic can be taken as an example of more developed EU countries (in respect to water management), because most of the population is supplied from centralized drinking water networks. According to the latest data available (Ministry of Agriculture: Drinking water supply and sewerage systems in the Czech Republic, Prague 2005), 91, 6 % of the population was supplied with water from water-supply systems in 2005, which matches with 9, 38 million inhabitants of the Czech Republic. The total potable water production was 698, 9 millions $m^3$. Overall 531, 6 millions $m^3$ were delivered to consumers and thus accounted. Domestic water consumption amounted to 338, 6 millions $m^3$, which represents 98, 9 $l/day^{-1}$ per capita. The total specific water consumption (paid water) was 155 $l/day^{-1}$ per capita. The specific water consumption was lower compared to previous years.

Most of the drinking water is produced from surface water which is taken either directly from rivers or from dams built specifically for drinking water supply purposes. These artificial lakes are protected in a special regime, which means, for example, limited agriculture activities in their catchment areas and prohibited or strongly controlled recreational use (swimming, angling). A similar protection regime is valid in areas with wells for pumping of ground water for centralized drinking water supplies.

The technology of drinking water treatment is rather simple and consists of several standard steps:

Pre-treatment – chemical coagulation – sedimentation – filtration – chlorination and/or ozonization

Treatment technology can be complicated due to raw water pollution caused by nitrates or by specific organic pollutants (pesticides/herbicides residuals), which in both cases are mostly generated by agricultural activities.

The situation in drinking water supply within rural areas is more complex. The main problem is the transport of produced drinking water on long distances. This is i) expensive and ii) risky for the quality of drinking water. A certain part of the total population will thus always be supplied from local sources of groundwater. Even in the Czech Republic about 0.85 million people living in rural areas are supplied from local wells. This system of drinking water supply is very sensitive to qualitative and quantitative risk factors such as:

- Local pollution of ground water from agriculture and forestry (bacterial pollution, pollution by ammonia, nitrite and nitrate, organic refractory compounds)
- Strong dependency of ground water quantity and quality on climatic conditions (the effect of floods and droughts)

The supply of drinking water from both centralized distribution networks and local sources is under regular and efficient control of state health authorities. In most of the EU countries the legislative norms for drinking water quality and their supervision are connected with national health act. This fact reflects the responsibility of the state for guarantying the supply of safe drinking water to local population (system of state surveillance and quality control). The general policy of EU countries is to provide the population from central and local sources drinking water:

- with proper chemical composition
- safe from the bacteriological point of view
- with acceptable organoleptic (sensoric) properties

In this respect the popular bottled water is not a matter of necessity in EU countries but it is more a result of successful marketing policies of water selling companies.

### 4.2 Waste water management issues

Wastewater treatment is also connected with strict protection of human health. Already the ancient Greek and Roman civilizations were aware of the importance of efficient sewage collection for safe and healthy life in their towns. Most European towns were equipped with modern sewerage systems during the $19^{th}$ and in the first half of the $20^{th}$ century.

In 2005 79, 1 % of the total population of the Czech Republic lived in houses which were connected to public sewers. This figure represents very good standards, which have not yet been achieved even in all of the “old” EU countries. More than 90 % of collected sewage is treated by an appropriate technology and the final effluent meets discharge limits. For agglomerations with more than 2000 inhabitants discharge standards are uniform for all EU countries and the national legislation for wastewater treatment must be in agreement with the directive of EU No. 91/271/EEC.

The situation in sanitation and wastewater treatment in Europe is in big contrast wit the situation in the rest of the world, especially in the so-called third-world countries. Again according to the latest report of the WHO from November 2004 (World Health Organization: Water, Sanitation and Hygiene Links to Health, FACTS AND FIGURES):

- 2.6 billion people lack access to improved sanitation, which represents 42% of the world's population.
- Over half of those without improved sanitation – nearly 1.5 billion people – live in China and India.
- In sub-Saharan Africa, sanitation coverage is a mere 36%.
- Only 31% of the rural inhabitants in developing countries have access to improved sanitation, as opposed 73% of urban dwellers.
- In order to meet the sanitation MDG (Millennium Development Goals) target, an additional 370 000 people per day should gain access to improved sanitation up to 2015.

The treatment technologies used for wastewater purification are very diverse but in general they consist of several blocks of unit operations:

- mechanical pretreatment
- biological treatment including the removal of organic pollution, nitrogen and phosphorus (with activated sludge process as the most common biological treatment technology)
- removal of biomass from treated wastewater
- simultaneous or additional chemical treatment (precipitation of residual phosphorus)
- tertiary post-treatment (mainly filtration and disinfection)

When the wastewater treatment is not appropriate to the requirements of environment protection, the following problems may be encountered:

- organic pollution of surface water (depletion of dissolved oxygen which is dangerous for aquatic organisms, especially for fish)
- eutrophication by nitrogen and phosphorus compounds with all consequences like deterioration of water quality for recreational purposes or use for drinking water preparation
- health risk (bacterial contamination of surfaced water; the effect of endocrine disruptors on human health)

Even in the most developed European countries (for data see http://epp.eurostat.ec.europa.eu/portal/) the population connected to urban wastewater collecting systems does not reach 100 %. Especially in rural areas the sanitation is based on local solutions because the connection of scattered wastewater sources to central wastewater treatment plants by conventional gravity sewer drainage systems is complicated and expensive, especially in terms of investment costs. Today the optional solution of vacuum or pressurized sewer systems is available but their application is connected with high operation and maintenance costs. An on-site wastewater treatment in small wastewater treatment plants ("package units") could be an alternative to centralized treatment systems. But high investment costs, complicated operation and maintenance, low effluent quality and complicated supervision by state authorities limits the application of such small wastewater treatment units for individual houses. It seems that one of the most feasible solutions is the use of cesspools (no-flow-through septic tanks), wherein collected sewage is periodically transported by tankers to nearby wastewater treatment plants. This is a very simple and convenient solution for owners of individual houses, farms, country pensions etc. The application of septic tanks may be limited by the far distance of the nearest wastewater

treatment plant (high transportation costs) or by seasonal problems (snow in mountainous regions). In some regions with suitable conditions the combination of mechanical pretreatment with “natural techniques” like soil filtration, biological ponds, artificial wetlands etc., could be a feasible option of wastewater treatment in rural areas. However, although these methods seem quite simple, they are susceptible to inadequate operations and require regular maintenance.

In spite of the fact that in most of the developed European countries more than 90 % of urban wastewater is treated in accordance with legislation, the quality of surface waters is not as good as one would expect. The reason for this situation is the so-called non-point or diffuse pollution caused by surface run-off of rain water to rivers and lakes. The pollution of surface run-off is chiefly caused by agricultural activities and contains above all:

- compounds of nitrogen and phosphorus which cause the eutrophication of surface waters (unofficial data available for countries in central Europe indicate that the diffuse pollution contributes by about 60 % of total load of nitrogen to receiving waters and by about of 40 % of phosphorus)
- specific organic compounds (biocides, pesticides and their residues)

Thus the task of preventing the natural waters from pollution cannot be performed without the cooperation with agriculture and farmers.

### 4.3 EU Water Framework Directives

The legislation of the EU for water pollution control is based on three directives issued in the last decade of the 20$^{th}$ Century:

- The Urban Waste Water Treatment Directive (1991), providing a framework for secondary (biological) wastewater treatment, and even more stringent (tertiary) treatment where necessary.
- The Nitrates Directive (1991), addressing water pollution by nitrates from agriculture.
- Directive for Integrated Pollution and Prevention Control (IPPC), adopted in 1996, addressing pollution from large industrial installations.

Pressures for a fundamental rethink of Community water policy came to a head in mid-1995. The Commission accepted requests from the European Parliament's environment committee and from the Council of environment ministers. In year 2000 the so-called Water Framework Directive (WFD) was accepted with the following key goals:

- expanding the scope of water protection to all waters, surface waters and groundwater
- achieving "good status" for all waters by a set deadline
- water management based on river basins
- "combined approach" of emission limit values and quality standards
- getting the prices right
- getting the citizen involved more closely
- streamlining legislation

The WFD certainly represents an important turning point in the understanding of water quality protection in Europe. It underlines the international character of water pollution control by introducing the term “water protection in international river basins”. The WFD also requires a more active role of the general public and the governments are obliged to provide

sources for the involvement of citizens in actions taken with the goal of improving the water environment.

## 5. Teaching/Learning: Water oriented-programmes

### 5.1 Land and Water Programmes

Study programmes in Land and Water Management have a long tradition in the Czech Republic. For both international and home students the Czech University of Agriculture (CUA) Prague provides MSc. courses in **Land and Water Management** in English. They have a strong component of hydrology and water management, which represent the basic prerequisite for developing joint double-degree programmes with similar courses designed, e.g. at Wageningen University with their **Hydrology and Water Quality** programme which is complementary to the Land and Water Management programme of the CUA. The curriculum of these programmes is available elsewhere (Kovar, 2005). Water-oriented studies at PhD level at CUA Prague are offered in three study programmes:

- Agricultural and Forest Hydrology
- Soil Protection and Water Reclamation
- Landscape and Applied Ecology

Czech and foreign PhD students usually take some parts of their study programmes abroad (at least one semester). At CUA Prague, PhD students take selected courses according to an individual study plan (usually not more than four or five courses). However their main task consists of doing original research and writing a thesis on it.

In accordance with the intentions of the Bologna process, the sequence of undergraduate and graduate programmes is followed by **life-long learning courses** on hydrology and water management. In recent years there have been two workshops running at CUA Prague. One focused on the topic of **"Hydrological Data for Water Resources Management"**. It ran for twenty years and ended in 2002. For the third consecutive year (since 2004) CUA Prague has also been running a workshop on **"Natural Disaster Prevention",** each one lasting ten days and involving intensive indoor/outdoor education. The main purpose of these workshops has been to acquaint the participants with techniques used in the identification of origins of disasters (hazards) and vulnerability of concerned regions, with risk assessment and monitoring, with data collection, processing, transmission and use, with systems of early warning (EW), local, regional and national preparedness, disaster management and the role of civil society, education and training. The Workshop includes hands-on exercises and two field trips. For detailed information please consult www.eu_workshop.czu.cz.

The lectures and exercises have been listed as follows:

- Disaster Prevention in Local, Regional and International Framework;
- Basics of Hazard, Vulnerability and Risk Assessment;
- Early Warning Systems;
- Nationwide Flood Forecasting (Czech Republic);
- Forecasting Systems and their Case Studies;
- Flood Forecasts on Small Catchments;
- Groundwater in Flood Emergency;
- Drought Forecasts;
- Impact of Land Use on Water Regime;
- Role of Soil Physics in Floods and Droughts;
- Role of Civil Society in Emergency and Legislation;

- Field Trip to Jizerske hory (one full day);
- Field Trip to the Prague Flood Control System (half a day).

The Department of Water Technology and Environmental Engineering of the Institute of Chemical Technology in Prague has prepared, within the framework of lifelong learning, four-term courses on water management which offer a variety of subjects, from aquatic chemistry and microbiology to treatment technology and water quality control.

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# The Public's Expectations Regarding the Green Sector and Responsive Practices in Higher Agricultural Education

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*Abstract*

The public has certain expectations regarding agriculture and food production, trade, distributions practices, the management of natural resources, and land use. Since agriculture in many countries proceeds from crisis to crisis, there is not only concern about animal welfare, food safety, and sustainable production, there is also indignation, protest, and conflict. The public has multiple claims regarding the issues mentioned, and workers in the respective fields have to be able to cope with these. They have to understand different views, have an open mind, show integrity, and respect for other values, whilst being able to justify their own practices.

Agricultural schools and colleges started to changing their identity, introducing new programs, and innovating existing programs, positioning themselves as educational institutions for life sciences, which contribute to a better world. For instance Wageningen University did this and in redefining it's image, it puts among other things weekly advertorials about the commitment to helping to solve societal problems regarding food safety, the environment, landscape, health, community development in the South, etc. on the front page of one of the leading quality news papers in the Netherlands.

The changes in the public expectations lead to various new qualification requirements of graduates. New competencies are needed, such as multi-disciplinary problem solving, addressing multiple stakeholder interests, participatory approaches in innovation, interactive methods in conflict resolution, responsive actions regarding community needs, and social responsibility in entrepreneurship, to name a few.

How do agricultural schools and colleges deal with these new demands? In a project on knowledge circulation of Wals et al (in fact based on ideas of knowledge co-creation) it is emphasized that effective arrangements between research institutes, industry, institutions and ngo's should be created, to inform education about the developments so that they can be integrated in their programs.

In a project conducted by Eernstman et al, strategies of various institutes of higher agricultural education in Europe are studied, strategies which are employed for developing the new competencies needed. Related to the public expectations identified by representatives of these institutes, various innovations in higher agricultural education are reviewed in this study, which will be elaborated in the presentation and paper.

Based on this illustrative review (which by no means was intended to be exhaustive), a series of educational, pedagogical, and instructional approaches in Dutch higher agricultural education are described as examples that can help develop the new competencies required. These approaches are:

- Project education, which is employed for instance to a large extent by the college of Larenstein in Velp (now part of Wageningen University), which addresses social

learning in self-directed student teams to a large degree;

- Problem-oriented education (a model which started in the Netherlands within the School of Medicine of the University of Maastricht, and which was adopted in a modified way by Wageningen University), which addresses integrated problem analysis, information finding and processing, team learning, and problem solving;
- Multi-disciplinary design and problem solving (a model developed at various technological universities, but also implemented in a specific way in the Academic Master Cluster of Wageningen University), in which communication of students from various disciplines is developed;
- Computer-based collaborative learning (a model of a-synchronous network-based communication about learning content, knowledge construction and development of collective representations, widely used world-wide, but still in it's infancy in Wageningen University), which is typically used for content areas in which diverse perspectives are existing, and students can have differences of opinion;
- Video-based case study and problem solving techniques (a way of working with new and sometimes emotional situations with which students may not have much experience, such as HIV-Aids or conflicts); this addresses for instance handling emotions, negotiation, and conflict resolution;
- Competence development, based on competence assessment, personal development plans, coaching, feedback and reflection (widely use, not only in education but also in companies in Europe);
- Entrepreneurial learning, in models of small business education or simulations (such as being practiced in an agricultural college in Goes); inspiring learning environments of entrepreneurs can serve as examples for course activities in higher agricultural education (as studied in the greenhouse sector by Lans et al).

These approaches will be elaborated further in the paper and presentation.

In a project of the Environmental Sciences Group (of Mulder et al) a whole series of educational innovations regarding problem-based learning, ICT and beta-gamma interaction in education were evaluated in an interactive study with project managers, teaching staff and students, with the aim to collectively share the experiences within the whole Group, which covers a series of Bachelor and Master programs. The lessons learnt will be summarized.

The overarching innovation at this moment is competence-based education. The implementation of this innovation is further in colleges for professional education than in universities, since the colleges are more oriented towards professional practices, whereas the universities are more focused on academic skills and research. (Principles of and experiences with competence-based education will be elaborated further, based on studies of Wesselink et al). Nevertheless, various faculties and universities are now in the process of working with the concept of competence in their programs, also based on the Bologna process, the European Qualification Framework, the Dublin-descriptors, and accreditation requirements regarding the societal relevance of educational programs. Wageningen University takes this very seriously, and has implemented a program of identifying competencies in all programs, and now places this in a wider perspective of the preparation of students for the labour market and society, in which the expectations of the public also play their part.

## Introduction

The public has certain expectations regarding agriculture (Scholderer, 2006), food production (Brennan, 2006), the landscape (Scott; 2006), the rural environment and safe drinking water (Kovář, 2006), sustainable forestry industries (Pitkänen, 2006), trade, and distributions practices. Since agriculture in many countries proceeds from crisis to crisis, there is not only concern about animal welfare, food safety, and sustainable production, there is also indignation, protest, and conflict. A recent example from this from the Netherlands is the scandal regarding two large cattle markets in which the Foundation Animal Right made secret pictures of abuses regarding the treatment of cows. Video pictures were shown during the evening news on television that went against the grain. Cows were beaten, devices were used to give cows (current) surges, emaciated cows, cows with overloaded udders and various downers were brought to the market. These practices go beyond the market regulations that are agreed with the trade sector. The market manager was interviewed and said that the situations depicted were exceptional, but that these incidents would be further investigated, and that when necessary appropriate measures would be taken against the traders who did this. The minister of agriculture, nature and food quality responded furiously and said that the practices shown would be scrutinized and if rules were violated, the responsible actors can anticipate legal actions. Nevertheless, the public has these pictures on its retina, together with various others of previous scandals, pests and diseases.

## Claims of the public and responses of agricultural schools and colleges

The public has multiple claims regarding the issues mentioned, and workers in the respective fields have to be able to cope with these. They have to understand different views, have an open mind, show integrity, and respect for other values, whilst being able to justify their own practices which need to comply with agreed rules.

Agricultural schools and colleges started to changing their identity, introducing new programs, and innovating existing programs, positioning themselves as educational institutions for life sciences, which contribute to a better world. For instance Wageningen University did this and in redefining it’s image (in terms of science for impact for the quality of life); it puts among other things weekly advertorials about the commitment to helping to solve societal problems regarding food safety, the environment, landscape, health, community development in the South, etc. on the front page of one of the leading quality news papers in the Netherlands. Since four years the enrolment figures of Wageningen University are slightly increasing, which is a trend breakage compared to the years before. Draconic measures were taken during the years 1999-2003; complete programmes and about twenty five chair groups were erased. But this resulted in new and creative solutions for the tensions that were felt throughout the university, which is a good example of innovation under pressure.

## New qualification requirements and how agricultural schools and colleges deal with these

The changes in the public expectations lead to various new qualification requirements of graduates. New competencies are needed, such as multi-disciplinary problem solving, addressing multiple stakeholder interests, participatory approaches in innovation, interactive methods in conflict resolution, responsive actions regarding community needs, and social responsibility in entrepreneurship, to name a few.

How do agricultural schools and colleges deal with these new demands? Several projects on this question will be presented that have been conducting during the last couple of years. In this overview the emphasis will be on content-related innovations, and not so much on organizational change of institutes of agricultural education (see for this Mulder & Kupper, 2006), nor on the sectoral approach employed in EU sponsored innovation projects in the domains of agri-food and environmental sciences (see for this Mulder, 2006).

First of all, a European review of competence needs and pertaining varieties of educational practices is presented. Next, an overview is given of various educational practices which are being used to develop new competencies, and finally, some recent projects in which innovative learning arrangements are being studied will be presented.

**Innovation and development strategies of institutes of HAE in selected EU member states**

In a project conducted by Natalia Eernstman, strategies of various institutes of higher agricultural education in Europe are studied, strategies which are employed for developing the new competencies needed. Related to the public expectations identified by representatives of these institutes, various innovations in higher agricultural education are reviewed in this study.

Several universities (Austria – Universitat fur Bodenkultur Wien (BOKU); Czech Republic - Czech university of Agriculture (CUA); Denmark – Royal Veterinary and Agricultural University (KVL); France - Institut Supérieur D'Agriculture Rhone-Alpes; Germany – Hohhenheim University and Technische Universität München (TUM); Hungary – Corvenus; Ireland – University College Dublin; Poland – Warsaw Agricultural University (SGGW) and Agricultural University of Poznań; Romania – Agricultural Science University Bucharest; Spain - la Politécnica de Madrid; United Kingdom - Newcastle University) were either visited or contacted by the researcher.
A topic list was used during the interviews that were held with the institutes. As a drawback of the study we can mention that only one or two interviews were held with the respective institutes, which of course does not give a total picture of the challenges and educational innovations in these institutes. To give such a comprehensive overview would be very costly, and at least in this project there was no budget for that. Nevertheless we think the project revealed various perspectives on the challenges, and interesting educational innovations.
An interim report was written, based on the site visits and face to face interviews, in which the findings were documented. The most important findings regarding the expectations of the public and the educational innovations, as experienced by the interviewees, were brought together in an overview of focal points. The most important focus points were selected, and information gaps were determined regarding competencies needed for the observed demands and related pedagogical/didactical solutions. This led to a refined study description and a new questionnaire. Reactions on this questionnaire were used to complement the document of focus points. This overview is added to this paper as Annex 1, and serves as the final result of the study.
There were some practical constraints when the study was conducted. First of all, the study took place during the end of the academic year 2005-2006, which of course is a difficult period for data collection in universities. Nonetheless, the majority of the universities contacted for personal interviews were available for these interviews. Secondly, respondents

said to have difficulties in answering the questionnaire, as it was too broad. Therefore the answers received were not very specific either. Lastly, the differences between universities in the East and West were vast. The extent to which the Bologna Declaration was implemented differed considerably, which made comparison between those universities rather difficult. However, comparison between the various universities was not the main intention of this study. The intention was to get a picture of challenges regarding public expectations with which institutes for HAE were confronted, and how they responded to this in terms of competencies stressed and didactic/pedagogical strategies for the competence development needed.

The results from the literature review and the interviews regarding the requirements of the public and pertaining competencies perceived by the respondents were the following. First the requirements are mentioned, which are shortly described, and then the pertaining competencies are listed.

Requirements of the public and pertaining competencies perceived by the respondents were:

### 1. Dealing with the complexity of the contemporary society

The society is thought to be highly complex. Partly through the process of globalization, everything and everyone seems to be interconnected. Because of this interconnectedness, issues have become increasingly ambiguous. That is, there are various sides to a subject because there are more stakeholders involved, which each have conflicting needs and views (e.g. the issues of GMOs).

Pertaining competencies:

- knowing the different sides to an issue and being able to deal with these conflicting points of views.

### 2. Decreasing the gap between science and society

There are concerns about the supposed gap between the scientific world and the society. The public to a large extent only sees the negative side of scientific experiments and universities invest too little in the communication with society. Consequently, the public looses trust in science.

Pertaining competencies:

- being able to get scientific information across to the society;
- in order to effectively transfer information, a student should understand a problem in such a way that they are able to explain it in ‘layman’s language’;
- this means that they should understand the problem as a whole and not just focus on the details, i.e. have a holistic view of issues and problems.

### 3. Preparing students for the increased competition

Competition has increased, also on the labour market. There used to be sufficient demand to absorb graduates from agricultural education, but this has changed. In many subsectors the absorption capacity is too small to warrant employability of all graduates in their specific fields of study. The consequence of this is that educational institutions should not only provide narrow technical knowledge, but broad qualifications for the agility of graduates in career development. Employers furthermore value personal qualifications on top of sound scientific training. This is of special importance for Easter countries, were society is suddenly confronted with the highly competitive market economy.

Pertaining competencies:

- having communications skills, e.g. being able to present oneself, etc.;
- a student has to go through a process of personal development in order to be a ‘more complete person’ when leaving the university.

### 4. Responding to internationalization

Due to the ongoing internationalization of the agricultural sector (increasing international trade and dependency of international organizations such as the WTO and EU) people working in the agricultural

sector have to be ready and able to communicate and associate with people from different cultures.

Pertaining competencies:
- being able to communicate in foreign languages;
- being able to establish contacts abroad;
- being able to communicate with people from different cultures;
- being able to participate in discussions on natural resource management in a global context.

## 5. Shifting from generalization to specialization

Due to the high competition on the world market and extremely low market value of agricultural products (the price of food products is kept artificially low through subsidies), farmers nowadays have to be extremely innovative. The traditional production system is not profitable anymore. Many small farmers all over Europe and large-scale farmers in the east are unable to compete with the strong market position and efficient production methods of highly organized and mechanized (mainly western) farmers, and go bankrupt. In order to keep in business there seem to be two options. Either farmers have to cut production costs by further enlargement of the farm; or they have to shift to specialized farm management, by finding a specific niche in the market and thereby attach an additional value to the product and that allows him to receive a higher price. In order to be able to find such niches, not the practical knowledge of production is important, but the knowledge of market and trends has become more important, combined with an ability to anticipate these trends by being innovative.

Pertaining competencies:
- being innovative/ creative;
- being able to combine activities.
- Having both practical and theoretical agricultural knowledge and experience.

## 6. Human resources development (extension - consultancy)

The agricultural sector is under continuous pressure for change. Not only do farmers have a hard time finding a production niche that enables them to survive in the current climate of world competition and 'free market' (WTO regulations). They also have to comply with a whole stock of standards and regulations enforced by the EU and they have to combine food production with other activities such as landscape and nature management. All of this requires a broad range of knowledge and skills that many farmers do not have. Consequently, there is a demand for educated and skilled consultants who can support the development of human resources in rural areas about innovative and efficient production methods, EU standards, expectations and market trends.

## Pertaining competencies:

- have practical agricultural knowledge and experience;
- being able to speak on farmer's level;
- being able to convey information to the group one is targeting (e.g. through presentations/ exhibitions)

## 7. Responding to the wishes of the capricious consumer

This regards the dynamics of today's society which reflects on consumer level. Consumer patterns change continuously. Upsurges in certain products are followed by the sudden development of different trends. And the agricultural sector is bound to anticipate these changes.

Pertaining competencies:
- having analytical capacities in order to judge situations (graduates should be able to decide what is important and what is not);
- being able to see and understand the connections between things;
- being flexible in order to be able to act upon these trends;
- being able to solve problems creatively.

## 8. Decreasing the gap between the consumer and the agricultural sector

This regards the gap between the consumers (or city dwellers) and the farmers. There is a clear lack of knowledge/ interest on the consumer side with regard to agriculture and food supply. What is more,

they have a one-sided, rather negative view of the agricultural sector due to recent food scandals and crises as attention is only given to the sector at times that a crises taken place.
Another source for this gap is the world market trough which food production is increasingly detached from food consumption. Products that are produced in one part of the world are transported to the other and consumers have no relation what so ever with the production process of the food.
The agricultural sector calls for more understanding from the consumer side, by increasing public awareness with regard to the production of food items; the consumer should understand how sensitive the sensitive the productions system is.

Pertaining competencies:
- being able to communicate agriculture in a positive way to the public;
- being able to transfer information to the consumers.
- In order to effectively transfer information, a students should understand a problem in such a way that they are able to explain it in 'layman's language' this means that they should understand the problem as a whole and not just focus on the details, i.e. have a holistic view of issues and problems.
- Being able to talk to different target groups (farmers, consumers etc).
- Being able to convey information to the group one is targeting (e.g. presentations/ exhibitions) address.

## 9. Dealing with the consumer paradox

This regards the dichotomy between 'consumer' and 'citizen', that causes a paradox in the consumer behaviour: costumers claim to support sustainable and healthy production methods, but at the same demand the cheapest food products. The agricultural sector is in a fix and farmers are squirming to live up to these paradoxical expectations.

Pertaining competencies:
- students should be able to understand the different sides of agricultural issues, conflicting interests of different stakeholders (from environmental impact to producer's motives, economics, marketing), in order to understand the consumer's motives.
- As it is impossible to comply with the wishes of all groups within a society, students should decide for themselves which production process they want to support (the intensive one, in cheap products; or the more extensive one, leading to sustainable but more expensive products.) To do so, students should be aware of all the opportunities and be able to make consistent decisions.

## 10. Sustainable production/quality orientation

There is a strong demand for food that is produced in a sustainable manner. Many consumers have become more critical, they want to know where food came from (traceability of food) and under what conditions it was manufactures. Where farmers in the past where predominantly focused on the production outcome (volume and appearance), they now have an increasing interest in quality and the production process.

Pertaining competencies:
- Having knowledge on organic production;
- knowing that agriculture is more than just production by understanding the consumer part of agriculture;
- being aware of the definition of 'quality';
- being aware of environmental, health and social issues.

## 11. Considerations about GMOs

The European public is very much against genetically modified food. Consumers declare themselves openly against GMOs and demand clear instruction on packaging materials informing on GMOs. Universities however flourish in biotechnology; both the provisions of study programs and the implementation of scientific research in this field are expanding.

Pertaining competencies
- having a basic knowledge of the issue but at the same time have a neutral opinion in order to have an overview of the risks and opportunities, so that they can come to a personal view upon the

theme. This is something that they should have with regard to all issues related to agriculture and science; GMO therefore is a good field to practice.
- Being able to think critically.

It is interesting to see that topics like the bio-based economy, food security and animal welfare were not mentioned so much as challenging, whereas these are actually also important fields for which graduates need preparation, and which call for specific competencies.

Eernstman (op cit) has distinguished various educational innovations, or rather educational practices that in the HAE institutes consulted were observed as being important for the challenges and respective competence development issues identified. These educational practices are listed below, and not further elaborated here. That will be done in the next section when innovative

- Organizing language courses at university or making language courses very accessible
- Organizing subjects on intercultural education
- Organizing student-exchanges between different countries
- Inviting foreign students to a university
- Strategic networks with leading international universities
- Interdisciplinary education
- Trial stations, in which students learn the practice of agriculture (TUM)
- Merging universities with more practical educational institutes (Fachhochschule); organizing lectures together or designing joint Master programs
- Merging more practical and theoretical knowledge (TUM)
- External students (organizations) provide more practical education for students: WUR: Boerengroep: Integrand; AIESEC
- Thematic courses (KVL) AMC (WUR)
- Project oriented education to make students judge by themselves and think of solutions
- Providing a student divers stock of knowledge and opinions that students then merge in order to come to new conclusions; this gives them knowledge on both the details of an issue and an overview; for example, different scientists organize a lecture on plant, one of them will focus on cell-level, the next focuses on the plant as a production system, the third looks at the plants in relation to animals, etc.
- Problem-based learning
- Courses on communication skills
- Organising opportunities in which students practice presentations
- Multi-stakeholder projects: students are taken away from the scientific world and drawn in practice, as stakeholders come up with practical questions and issues that automatically are more holistic
- Joint lectures: a subject is taught by a consortium of different experts/lecturers; they all focus on a different component of the issue; joint lectures (TUM with BOKU and CUA)
- Education-industry collaboration
- Venture Cup and Yearly industry convention (KVL)

In the remainder of this contribution various educational innovations in the Netherlands are described which are studied in different projects, and which are aimed at developing competencies which are relevant for being able to cope with the diverse expectations of agricultural education of the public.

## Educational, pedagogical and instructional approaches in the Netherlands

Based on the illustrative European review (which by no means was intended to be exhaustive), a series of educational, pedagogical, and instructional approaches in Dutch higher agricultural education are described as examples that can help develop the new competencies required.

These approaches are:

- Project education, which is employed for instance to a large extent by the college of Larenstein in Velp (now part of Wageningen University), which addresses social learning in self-directed student teams to a large degree;
- Problem-oriented education (a model which started in the Netherlands within the School of Medicine of the University of Maastricht, and which was adopted in a modified way by Wageningen University), which addresses integrated problem analysis, information finding and processing, team learning, and problem solving;
- Multi-disciplinary design and problem solving (a model developed at various technological universities, but also implemented in a specific way in the Academic Master Cluster of Wageningen University), in which communication of students from various disciplines is developed;
- Computer-based collaborative learning (a model of a-synchronous network-based communication about learning content, knowledge construction and development of collective representations, widely used world-wide, but still in it's infancy in Wageningen University; see Veldhuis-Diermanse, Biemans, Mulder & Mahdizadeh, 2006), which is typically used for content areas in which diverse perspectives are existing, and students can have differences of opinion;
- Video-based case study and problem solving techniques (a way of working with new and sometimes emotional situations with which students may not have much experience, such as HIV-Aids or conflicts); this addresses for instance handling emotions, negotiation, and conflict resolution;
- Competence development, based on competence assessment, personal development plans, coaching, feedback and reflection (widely use, not only in education but also in companies in Europe);
- Entrepreneurial learning, in models of small business education or simulations (such as being practiced in an agricultural college in Goes); inspiring learning environments of entrepreneurs can serve as examples for course activities in higher agricultural education (as studied in the greenhouse sector by Lans et al).

Further studies regarding innovative educational approaches for competence development in the Netherlands are the program on knowledge circulation, beta-gamma interaction in education, competence-based higher education, learning with future, learning of entrepreneurs, and inspiring learning arrangements. These studies will be described in short.

## Knowledge co-creation

The first innovations that are described here are part of a program on knowledge circulation (Potters, Van der Hoeven & Gielen, 2006; Lans, Kupper, Wals, De Beuze & Geerling-Eiff, 2006) managed by Arjen Wals et al (in fact based on ideas of knowledge co-creation). In this program it is emphasized that effective arrangements between research institutes, industry, and educational institutions should be created, to inform education about the developments so

that they can be integrated in their programs and to implement new interactive and participative initiatives in which students can develop competencies and expertise the need.

In the project called ‘Learning with future’ (Potters et al, op cit), three pilots of innovative arrangements between education and research were tested in cooperation with the Clusius College Hoorn, CAH Dronten and INholland Delft.
First of all causes and consequences of suboptimal cooperation between research and education were analyzed and a model for future oriented learning was developed. The key causes of limited cooperation between education and research institutes were related to lacking overlap between the networks, little vision on cooperation and low priority, and restricted concepts for cooperation. All this resulted in limited vitality and sustainability in agriculture. Practical networks were not used as learning environment, new knowledge does not flow into educational innovation, chances for preparing students for professional practice were under-used, capacity for research of education was not used, which leads to less innovation power.
After these observations, two meetings were organized in which perspectives were shared and opportunities for cooperation were identified. The concept of learning with future revolves around the idea that structural cooperation only starts and continues as long as the various stakeholders have mutual benefits of it. Because of this participative methods were used to develop cooperation, and the project team played a facilitating role.
Based on the meetings three draft proposals were developed and the proposal which had the strongest support was elaborated and tested by three pilot core teams. The project gave room for exchanging experiences and go beyond traditional boundaries between entrepreneurs, research and education. The partners in the projects thus learned about new opportunities for cooperation and developed ideas for institutional integration of the ideas.
The core of the pilot projects consisted of student teams who were working on questions of entrepreneurs who participating in a practice network of a research institute. During the projects students could develop the following future oriented competencies: 1. strategic entrepreneurship in networks; 2. translating research findings into practice; 3. working in a teams and project management; 4. communication: deliberation, making agreements, informing, interviewing, human relations, report writing and presenting.
The student teams worked independently, but they were supported by researchers, teachers and consultants. Teachers were coaching the learning processes and created a safe learning environment, researchers and consultants gave advice regarding the content of the projects and the research process. The entrepreneurs served as project commissioners, but also acted as practical experts and information sources about the company.
As said, three pilot projects were implemented, one on biological agriculture, one on open integrated cultivation, and one on greenhouse horticulture. Reactions of all stakeholders about this interactive entrepreneurship-research-education model were very positive. Participants said: ‘This is REAL education’, ‘This is much better than doing an internship in a company. One makes the link between theory and practice. In other internships one in fact just works along in practice. Now one wants to also see what an entrepreneurs has on paper inside’, and ‘One learns things one normally does not learn in the program, for instance how one can get as much out of an interview as possible’.
Lessons learned were about the cooperation and knowledge circulation between the actors, and structural embedding of the model.
Regarding the cooperation and knowledge circulation it was found that the choice of the theme for projects influences the perceived value of the project for the partners. It is important to choose a specific question of entrepreneurs, to relate to project theme to current research

which fits it the running research program, and to link it to existing educational programs and themes of educational innovation. Furthermore, the right persons who have the right competencies should be linked together. Also, the learning project should be well defined, and a start-up meeting is essential. Clear communication, quality management and the flow of knowledge are also important.
As for the institutional embedding vision development, agreements, flexibility in added value, a joint year calendar, organizational support from all actors, keep watching overregulation, financing, training and coaching of teachers, researchers and entrepreneurs, linkages with innovation processes, and appointing a coordinator within the participating organizations are important.

**Knowledge arrangements**

The second project mentioned (Lans et al, op cit) was about knowledge arrangements as powerful learning oriented combinations of groups of actors. Ten of these knowledge arrangements were monitored, about cow and chances, poultry knowledge, declaration-obligatory animal diseases, duration cultivation, crop protection, new style tree nursery, learning with future (described above), pre-university campus (a service of the university for students of pre-university education for instance for the support of students who have to make assignments in field that are covered by the university), knowledge circle food safety (a knowledge circle is a group of experts around the relatively new position of reader in higher professional education, who has the task of innovating educational programs, creating new programs, and to do practice oriented research), and the rural house of a specific region in the Netherlands. All knowledge arrangements were analyzed, and again lessons were distilled that are important for setting up and maintaining good and innovative practices. Competencies were identified which are essential for these arrangements, and guidelines were given for ‘directors’ of them, based on 1. the four factors identified in this study that are important for success: vision, support, competence and culture, and 2. the three levels of the actors: individuals, organizations and the networks. Directors can assess the situation of a knowledge arrangement on theses factors and levels and decide on a deliberate strategy to orchestrate (and develop and manage) the arrangements.

**Beta-gamma interaction within Environmental Sciences in Wageningen University**

In a project of the Environmental Sciences Group (Mulder, Van Loon-Steensma & Broekman, 2004) a whole series of educational innovations regarding problem-based learning, ICT and beta-gamma interaction in education were evaluated in an interactive study with project managers, teaching staff and students, with the aim to collectively share the experiences within the whole Group, which covers a series of Bachelor and Master programs. The project was commissioned by the Environmental Sciences Group of Wageningen UR to study the experiences with educational innovation financed by its Board of Directors. The educational innovation was aimed at stimulating problem-based education (PBE), information and communication technology in education (ICT) and, what is so characteristic of Wageningen University, integration /interaction of natural, technological and social sciences (Bèta-Gamma Interaction - BGI) in education.
The aim of this project was also to share experiences regarding educational innovation. Over thirty innovation projects were conducted, all aimed at content-related courses.
Educational innovation is often carried out by project teams, but communication of results between these teams is not always optimal. The exchange of experiences was facilitated

through group discussions, interviews and a workshop. It was readily apparent that the participants very much appreciated this opportunity to exchange experiences. They believed that the content and design of renewal in education should be discussed more frequently among colleagues. In their experience, discussions focused too often on preconditions for change (regarding budget and time allocation and other facilities).
This project provided a number of important insights for educational innovation in problem-based education, ICT and BGI. Various general conclusions can also be drawn. In addition to conclusions regarding the organization of and conditions for renewal (such as the mandatory character of the innovation, the tasks of the various actors, the evaluation of proposals and the financial aspects of projects), the most important general conclusions that can be drawn from this project are the following:

- Implementation of beta-gamma integration in education should receive greater attention, especially with respect to testing, didactics and competencies of teachers. It would be good to initiate a research program aimed at the didactics of the integration of beta-gamma disciplines in education.
- Educational innovation pursued only within specific subjects is too narrow in scope. BGI and PBE are innovations that clearly have to be viewed from the perspective of life-long learning trajectories. It is impossible to acquire all of the desired BGI competencies within one subject. BGI is a learning process that has to be stimulated in various subjects over the entire width of BSc and MSc programs. This requires smart planning and intensive collaboration.
- Competence development can only be partially programmed, because over the course of their education students will diversify and design their own learning trajectories according to their own needs. Due to the various entrance possibilities for students, it is now more important than ever to consider differences in pre-entry competencies.
- Educational innovation requires coordination of educational philosophy, objectives, content, organization and testing. Change in one of the components has implications for all of the others.

The specific conclusions regarding the introduction of BGI education were the following.

- Didactics - Problem-based learning and case-based learning are good didactical approaches to realize BGI.
- Needed bèta and gamma knowledge – Important is to determine with which core problems in the subject domain graduates will have to deal and which bèta- and social science knowledge is needed for solving those problems. BGI-education needs to be programmed based on these problems.
- Necessity of BGI – Students should get clear examples as to in which way they will be confronted with inter-, multi- or trans-disciplinary work after they have graduated, and that it is the task of the university to give attention to the integration between core subjects next to further (super) specializations. To make BGI understandable the way in which different disciplines are connected should be clearly indicated: there should be alignment. This can be achieved by presenting a conceptual framework of to make the read thread visible.
- Mutual interest - BGI has to scaffold the stimulation of mutual interest and understanding in one another’s content area and the differences in design and problem solving approaches. BGI education should be linked to the zone of proximal development of bèta and gamma students.

- Language and way of thinking - Bèta and gamma students have to learn to know their mutual language and way of thinking. They also have to be curious to the background of that thinking not only because of getting a better understanding of that, but also to be able to cooperate were necessary.
- Mixed teacher teams – Employing mixed teams with bèta and gamma teachers works especially good when good ex ante agreements are made between the teachers involved and there is a clear framework of actions.
- Knowledge of teachers – Both bèta and gamma teachers who are being chosen to implement BGI education have to have insight in their mutual domains.
- Continuous learning lines – Multi- or trans-disciplinary problem solving cannot be learned in one subject. That calls for continuous learning lines spread across the program. It is important to program BGI oriented competence development in such learning lines.
- Exams – It is also important to give attention to assessment of BGI competence. Teachers have to be very well aware of different assessment frameworks and accompanying standards. Different disciplines have their own grading practices. Bèta teachers may have lower marks in mind when assessing work of BGI groups regarding the social sciences component and vice versa.

**Inspiring learning arrangements for entrepreneurs**

In this project an attempt is made to design various learning arrangements for entrepreneurs which are inspiring for them to engage in (Gielen, Biemans & Mulder, 2006). It is well-known that entrepreneurs are not very interested in participating in formal education and training courses. Their learning preferences are different (Lans, Wesselink, Biemans & Mulder, 2004), and in an innovative context they tend to rely on reflection, observation and imitation (Mulder, Lans, Verstegen, Biemans & Meijer, 2006). Supporting entrepreneurs in their learning effort is a challenging effort, and the idea was that if learning support would be inspiring entrepreneurs would be more benefit from it. Therefore, various pilot studies were conducted in which inspiring learning arrangements were found, which were labelled with metaphors. The metaphors are listed below, and the pertaining competencies are indicated behind the metaphors. Various specific didactic varieties are listed below the metaphors.

- Master class - Insight and experiential knowledge
    - Workshops, cases, court game
- Clinic - Skill
    - Demonstrations, audits, benchmarks
- Workshop - New perspective
    - Brainstorms, mindmapping, creative sessions, scenario-development
- Laboratory - Viability of solutions
    - Model development, practice simulation, research, concept development
- Academy - Multidisciplinary knowledge
    - Classes, lectures, seminars, symposia
- General rehearsal - Collective routine
    - Training, conducting, development of cooperation and routines, presentation
- Entrepreneurs café - New networks
    - Lectures, discussion, teamquiz, socio drama
- Boxing ring - Improved performance

    - Debate, panel discussion, game, training and coaching, competition
- Kitchen table - Deepening network
    - Dialogue, group conversation, coaching conversation, reflection conversation, consultancy session
- Utopia - Innovation
    - Discussion, negotiation, presentation to the public
- Study club - Mirroring company results
    - Story-telling, company visit, company audit, systems analysis, presentation
- Expedition - Self-knowledge and new values
    - Excursion, blind date, study tour, survival, journey report

These inspiring learning arrangements are being advised to institutes of HAE. The general idea is that taking authentic learning of entrepreneurs as an example, students of HAE will also be motivated to engage in these activities, in which they then acquire the competencies that are being conceived of as very important.

**Towards competence-based education**

The overarching innovation at this moment is competence-based education. The implementation of this innovation is further in colleges for professional education than in universities, since the colleges are more oriented towards professional practices, whereas the universities are more focused on academic skills and research. Various principles of and experiences with competence-based education are elaborated, based on studies of Wesselink, Biemans & Mulder (2007). A matrix was developed with these principles and levels of implementation. This matrix is primarily meant for competence-based agricultural vocational education, including higher professional education. The principles are:

1. The competencies, that are the basis for the study program, are defined.
2. Vocational core problems are the organising unit for (re)designing the curriculum (learning and assessment).
3. Competence-development of students is assessed frequently (before, during and after the learning process).
4. Learning activities take place in several authentic situations.
5. In learning and assessment processes, knowledge, skills and attitudes are integrated.
6. Self-responsibility and (self)-reflection of students are stimulated.
7. Teachers both in school and practice fulfil their role as coach and expert in balance.
8. A basis is realised for a lifelong learning attitude for students.

The matrix for competence-based agricultural-vocational education is depicted as an attachment to this paper.

First research into the application of competence-based agricultural-vocational education showed the following.

1. The relationship between competencies in the job profiles and the education programmes is not always clear.
2. Sufficient collaboration is needed in formulating objectives and making agreements.
3. It is difficult to establish core assignments because tension is inherent between content-matter thinking and practice-oriented thinking.

4. The important thing is to bridge this difference in a productive way.
5. Intake of students has to be clearly explained and should return later in the programme.
6. The strong linkage in competence-based education programmes between education and practice is viewed as very positive.
7. Teachers find the facilitating and coaching role needed to support competence development new and difficult. They fear that the learning process will become fragmented and that the students' potential will not be optimally utilised.
8. Methodologies are needed to give the teachers a clear idea of the students' experiences in practice.
9. Recognition of the competencies by students is limited.
10. The students' response to independent study varies. Some enjoy it, while others would prefer more support from the teacher.
11. Students find that they are too often confronted with the concept of competence, the added value of which is not clear to them.
12. Too much bureaucracy presents a constant threat. If students are asked too often to fill in forms and write evaluation reports, they will eventually balk.
13. Opinions vary with respect to the functionality of assessments. Teachers doubt whether enough is asked of the students in assessments, whereas students find this to be a pleasant way to be tested.
14. Assessment is a more intensive way to test student achievement, and the additional workload for teachers must be taken into consideration.

Various faculties and universities are now in the process of working with the concept of competence in their programs, also based on the Bologna process, the European Qualification Framework, the Dublin-descriptors, and accreditation requirements regarding the societal relevance of educational programs. Wageningen University takes this very seriously, and has implemented a program of identifying competencies in all programs, and now places this in a wider perspective of the preparation of students for the labour market and society, in which the expectations of the public also play their part.

## Conclusions

The public had various expectations about a multitude of issues in the fields of agri-food production, environment, landscape and the management of natural resources. New competencies are needed for graduates to meet the challenges of the diverse demands of the public and the strengths and weaknesses of many practices. Educational institutes which traditionally were aimed at providing agricultural education have responded widely to new qualification needs (Mulder, 2006). There are also various ways in programs, courses and in practical educational settings, to develop the new competencies needed, such as beta-gamma interaction, facilitating multiple stakeholder processes, participatory methods, interactive strategies, conflict resolution, responsiveness regarding community needs, and social responsibility. Examples have been given of ways in which competence development can be brought about, some at the systemic level, others at institutional level, and still others at organizational, team and individual level. We can conclude that HAE does not fall short of strategies, methods and tools to support the competence development of students in the directions described. In various cases faculty development may be needed to share experience about new ways of supporting learning. Traditional educational innovation trajectories of needs assessment, curriculum design, instructional design, implementation and evaluation are

not sufficient to reorient HAE towards the direction needed. These trajectories take too long because of their immanent time lag of many years. Clear values regarding the content-related issues together with an appropriate educational philosophy are imperative. Based on that, new ideas about knowledge circulation (or knowledge co-creation), interactive knowledge arrangements, inspiring learning environments, entrepreneurial learning and competence based education can be used. Further research is necessary to look at the implementation and longer term impact of these interventions.

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Framework for competence-based learning (Source: Wesselink et al, 2006).

| | Principle | Not competence-based | Starting to be competence-based | Partial competence-based | Completely competence-based |
|---|---|---|---|---|---|
| 1 | The competencies, that are the basis for the study program, are defined. | There is no job competence profile put together. | There is put together a job competence profile without participation of the vocational practice. This (vocational) competence profile has been used during the (re)design of the curriculum. | There is put together a job competence profile with participation of the vocational practice and this profile is fixed for a longer period of time. This job competence profile has been used during the (re)design of the curriculum. | There is put together a job competence profile with participation of the vocational practice and this profile is tuned frequently with the regional and local vocational practice including the major trends. This job competence profile has been used during the (re)design of the curriculum. |
| 2 | Vocational core problems are the organising unit for (re)designing the curriculum (learning and assessment). | There are no vocational core problems specified. | There are vocational core problems specified, which are used as examples in the (re)design of the curriculum | There are vocational core problems specified. These core problems are the basis for the (re)design of the some parts of the curriculum. | There are vocational core problems specified and these are leading for the (re)design of the whole curriculum. |
| 3 | Competence-development of students is assessed frequently (before, during and after the learning process). | Assessment is the final stage of a learning process and takes place at a fixed moment. | Assessment takes place at several moments. Assessment is used for formal assessment and does not play a role in the learning process of students. | Assessment takes place before, during and after the learning process. Assessment is used for both formal assessment and competence development of students. | Assessment takes place before, during and after the learning process. Assessment is used both for formal assessment and competence development of students. Students determine moment and format of assessment themselves. |
| 4 | Learning activities take place in several authentic situations. | Learning in practice is of subordinate importance and there is no relation with learning in school. | Learning in school is leading. Sometimes, in the form of cases a relation is set up with learning in practice or experiences from practice. | Learning activities take to a large extent place in authentic settings, but the relation with learning in school is insufficiently. | Learning activities take to a large extent place in a diversity of authentic settings and the learning activities are clearly related with the learning activities in practice. |
| 5 | In learning and assessment processes, knowledge, skills and attitudes are integrated. | Knowledge, skills and attitudes are separately developed and acknowledged. | Knowledge, skills and attitudes are sometimes integrated in the learning process. Knowledge, skills and attitudes are assessed separately. | Knowledge, skills and attitudes are integrated in the learning process or in the assessment procedure, not in both processes in the same time. | Integration of knowledge, skills and attitudes is for both learning and assessment processes starting point and therefore operationalised. |
| 6 | Self-responsibility and (self)-reflection of students are stimulated. | Learning activities are characterised by external steering: students carry out assignments by means of elaborated instructions. There is no (self)reflection. | In a limited part of the learning activities, students determined the way of learning themselves. There is hardly any reflection on the learning process and functioning in vocational settings. | Students determined themselves the way of learning, and time and place of learning, based on the reflection on the learning process and functioning in vocational settings. | The student is after all responsible for its own learning process on the base of its own learning needs. |
| 7 | Teachers both in school and practice fulfil their role as coach and expert in balance. | There is no question of support. Knowledge transfer is central issue in the learning process. | To a limited extent the responsibility for the learning processes is handed to the students. The teacher is directive in his or her way of supporting. | The students enjoy to a certain level to determine their own way of learning. the teacher observes when the students needs support and offers his or her support. | The teachers stimulates the student to formulate learning needs and on the base of self reflection to determine his or her own learning process |
| 8 | A basis is realised for a lifelong learning attitude for students. | There is no attention for competencies that are related to learning or (labor) identity development. | In the curriculum there is attention for competencies that are related to learning and (labor)identity , but these competencies are not integrated in the learning process. | During learning trajectories competencies related to learning and (labor)identity development are clearly related to vocational core problems and attention is paid to those competencies to a large extent. | During learning trajectories competencies related to learning and (labor)identity development are integrated and reflection on the future career of the students has taken place. |

# Agriculture and the European public: Agendas, attitudes, and the management of issues

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*Abstract*

European agriculture has gone through troubled times. The critical point was reached in the 1980s. Support policies had increased production far beyond market demand. Allegations of support abuse were ripe. Policy-makers responded by partially replacing input- and output-linked forms of producer support with others. However, radical reform was avoided. In the period 2002-2004, the level of support to producers still amounted to approximately 30% of farm receipts in the EU, and 70% in Iceland, Norway and Switzerland. In the public eye, intensified agricultural production was also labelled a key culprit in environmental degradation. In the 1990s (notably in the reform plans set forth in the Agenda 2000 under Commissioner Franz Fischler), the EU responded by advocating the "multifunctionality" concept of agriculture. Among the EU's trading partners, the concept quickly gained notoriety. Non-trade concerns on environmental protection, rural development, food safety, and technological barriers were routinely criticised as concealed protectionism. Since the end of the Fischler era, the multifunctionality concept has largely disappeared from official EU vocabulary, and trade liberalisation has gained a more prominent (and hotly disputed) role on the agenda.

The paper analyses the degree to which agenda-setting processes in the political arena reflected (and sometimes prompted) changes in public opinion on agricultural policy. The main empirical basis for this will be the Special Eurobarometer Series on "Europeans and the Common Agricultural Policy". Furthermore, the paper assesses the degree to which attitudes towards specific agricultural issues are embedded in systems of more general socio-political attitudes and values, and identifies the psychological processes through which issues rise or fall on individual agendas. The main empirical basis for this will be the author's own research on attitude systems in the general public. Finally, recommendations are outlined as to how agricultural researchers, producers, and their respective lobby organisations may manage issues and respond to changes in public opinion without falling victim to counter-productive forms of identity politics.

## Introduction

European agriculture has gone through troubled times. The critical point was reached in the 1980s. Support policies had increased production far beyond market demand. Allegations of support abuse were ripe. Policy-makers responded by partially replacing input- and output-linked forms of producer support with others. However, radical reform was avoided. In the period 2002-2004, the level of support to producers still amounted to approximately 30% of farm receipts in the EU, and 70% in Iceland, Norway and Switzerland. In the public eye, intensified agricultural production was also labelled a key culprit in environmental degradation. In the 1990s (notably in the reform plans set forth in the Agenda 2000 under Commissioner Franz Fischler), the EU responded by advocating the "multifunctionality"

concept of agriculture. Among the EU's trading partners, the concept quickly gained notoriety. Non-trade concerns on environmental protection, rural development, food safety, and technological barriers were routinely criticised as concealed protectionism. Since the end of the Fischler era, the multifunctionality concept has largely disappeared from official EU vocabulary, and trade liberalisation has gained a more prominent (and hotly disputed) role on the agenda. The paper analyses the degree to which agenda-setting processes in the political arena reflected (and sometimes prompted) changes in public opinion on agricultural policy. Furthermore, the paper assesses the degree to which attitudes towards specific agricultural issues are embedded in systems of more general socio-political attitudes and values, and identifies the psychological processes through which issues rise or fall on individual agendas. Finally, recommendations are outlined as to how agricultural researchers, producers, and their respective lobby organisations may manage issues and respond to changes in public opinion.

**Public opinion and the dynamics of issues**

The general public are confronted with the agri-food chain in two primary roles: as citizens and as consumers. As citizens, we have attitudes towards issues (e.g., priorities for the EU's common agricultural policy, or new technologies in agriculture and food production), and these attitudes may influence our voting behaviour in elections, our participation in political activities, and the answers we give in opinion surveys. As consumers, we have attitudes towards products (e.g., a food category such as rye bread, or a particular brand within this category), and these attitudes may influence which foods we buy, where we shop, and the way we cook and eat. The two roles have relatively little to do with each other, and therefore it should be no surprise that actual consumer behaviour cannot usually be predicted from attitudes towards agri-food chain issues.

The focus of the present paper is on the citizen role. Looking back in time, a number of changes can be identified in the issues the general public in the EU considered most important. The first Special Eurobarometer about the common agricultural policy (CAP) was conducted in 1987. Back then, overproduction problems caused by output-coupled subsidies were on top of the public agenda, together with rural development issues such as depopulation of rural areas, equity issues such as inequality of small and large farmers, and the decline of farm incomes, unstable political reform will, and costs to farmers from adapting to consumer expectations (Commission of the European Communities, 1988). Two decades later, the public agenda has changed. The results of the latest Special Eurobarometer indicate that, although farm incomes are still a hot topic, other issues have gained a prominent role, in particular agri-environmental issues, food safety, quality assurance, and animal welfare (Commission of the European Communities, 2006).

Such agenda-setting processes emerge from rather complex dynamics in which numerous actors are involved (Pappi & Henning, 1999; also see Cook et al., 1983). The milk and wine lakes of the 1980s have disappeared, thanks to reforms of the CAP support mechanisms that have replaced many of the most distorting types of subsides – those linked to agricultural outputs – with decoupled ones, implemented through Regulations (EC) 797/85 and 2328/91 on improving the efficiency of agricultural structures. Other issues have emerged, partly prompted by pressure group activity, partly by their position on the general political agenda, and are still present in the public mind. Agri-environmental schemes are a good example of this; first implemented into CAP through the MacSharry reforms of 1992 (see Regulation (EC) 2078/92 on agricultural production methods compatible with the protection of the environment and the maintenance of the countryside). Other examples are food safety and animal welfare, pushed to the top of the agenda by the public outrage following the BSE

crises of the mid and late 1990s. Yet other issues emerged in the meantime but have already left the focus of public attention again, such as genetically modified food and feed (for details, see Scholderer, 2005).

## A closer look at multifunctionality

A whole bundle of the above issues is captured by the notorious concept of multifunctionality (Winters, 1990). In economic terms, agriculture can be seen as producing commodity outputs (such as crops and animals) as well as non-commodity outputs such as food security, biodiversity, rural development, and landscape preservation. These outputs have a "jointness" property because they rely on common input factors (including land and labour) which cannot differentially be allocated to either one or the other. However, commodities are private goods and traded, whilst many non-commodity outputs are public goods for which no market mechanisms exist. Hence, incentives for their production are provided through subsidies. Modern thinking favours subsidies that are decoupled from commodity outputs because, after a certain level of productivity is reached, commodity output tends to increase at the expense of non-commodity output.
There is considerable dispute in agricultural and resource economics as to whether these subsidies really encourage non-commodity production. The usual conclusion is that they only do so under less than completely realistic assumptions (e.g. Havlík et al., 2005; Kelijn & Sutherland, 2003), and that their absolute level is still way above optimum levels (e.g., Brunstad et al., 2005). In response to this, the European Commission is gradually moving away from the original multifunctionality concept as advocated in the Agenda 2000 process (notably Regulation 1257/1999 on support for rural development), and shifting support to more specific and targeted schemes in different areas such as cross-compliance, animal welfare, quality management and assurance schemes, and support for the development of new technologies (codified in Regulation 1783/2003, amending Regulation 1257/1999).

## Attitude structures in the general public

The development of new technologies in agriculture can be a problem though. Several instances could be observed in recent years in which new technologies were confronted with resistance from stakeholder activists and a sceptical public, often to a point where successful commercialisation was blocked. Agricultural biotechnology suffered most from such stigmatisation in Europe. Although the political processes were complex, "consumer resistance" was generally called upon by stakeholders to justify demands for moratoria and strict regulation of all consumer products derived from the technology (see Scholderer, 2005). A beneficial aspect of the crisis was that the nature of public attitudes towards agricultural biotechnology was intensively researched, and valuable lessons can be learned from the case that may apply to future technological developments as well.
Initially, research focused on risk perception and public understanding of science issues. Only later, when more elaborate frameworks were adopted, a consensus began to emerge as to how the nature and operation of these attitudes should be understood. According to current thinking, attitudes towards biotechnology are category-level evaluations, i.e. they are only represented on the category level of the general technology, not on the exemplar level of particular applications. They appear to be formed through a heuristic, largely affective evaluation mechanism, in which consumers perform congruity-incongruity tests relating biotechnology to other, more general socio-political attitude objects such as environment and nature, technological progress, and the trustworthiness of institutions (for an overview, see

Frewer et al., 2004; Grunert et al., 2003; Scholderer, 2005; Scholderer et al., 2000).
The embedded nature of the attitudes also explains why they have proven utterly resistant to communicative interventions, in many instances even resulting in serious boomerang effects (Frewer et al., 2003; Scholderer & Frewer, 2003). Apparently, the only way in which public attitudes towards agricultural biotechnology can be changed is through direct sensory experience with high-quality products (Grunert et al., 2004; Lähteenmäki et al., 2002; Scholderer et al., 2001, 2006). Our currently favoured interpretation is that direct experience with a product sample creates a highly accessible exemplar representation in a category that had previously been empty. The representational basis of the attitude switches from a category-level representation to an exemplar-based representation, and because direct experience leads to representations that are more accessible than merely conceptual ones, valence and extremity of the overall attitude will shift towards the valence and extremity of the affect evoked by the experience with the product sample (see Lord & Leppe, 1999; Sia et al., 1997; Smith & Sarate, 1992).

**Managing issues: a contingency approach**

The agricultural biotechnology case demonstrates that risk management strategies (such as traceability systems) which satisfy the demands of food chain actors, regulators and pressure groups, can be utterly ineffective when used as issues management strategies addressing the general public. Other cases corroborate this, including TSEs and chemical residues such as dioxins (for an overview, see Frewer et al., 2005; Verbeke, 2005; Verbeke et al., 2006, in press). Hence, a contingency approach is needed that can target different stakeholders, and the general public, with the information that is needed in that particular group by the means that are most effective and efficient in that group.
Such an approach should start with a thorough assessment of the issue, proceed with the generation of management options and their evidence-based evaluation, and conclude with the selection of an optimal bundle of targeted issues management strategies. In brief, such an approach would involve the following steps:

- Stakeholder identification: who has an issue with the technology?
- Problem elaboration: what is their issue with the technology?
- Structural assessment: what drives their attitudes towards the issue?
- Context identification: in which way would they be confronted with the issue?
- Options generation: what can be done to resolve the issues?
- Intervention scenarios: what would an implementation of the options look like in practice?
- Ecologically valid research design: how can stakeholder responses be predicted?
- Evidence-based assessment: wow effective would an implementation of the options be?
- Targeting: which strategies are most effective and efficient in each stakeholder group?
- Interference check: are there any strategies that might interfere across stakeholder groups?
- Shielding: how can implementation of the targeted stakeholder strategies be safeguarded?

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# What Kind of Countryside do we want: critical reflections from Wales, UK

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*Abstract*

What the public want from, and for, the countryside represents a significant policy conundrum and opportunity. Problems of measuring public perceptions together with defining "public" and "countryside" can hide more than they reveal. The countryside is subject to widespread politicisation and contestation, together with its aesthetic and functional complexity, which provides a rich research environment for rural research. Yet, despite its recent elevation to central policy and academic concern with rural white papers, dedicated countryside agencies, rural strategies and plans, and a new rural vocabulary centred around competing discourses of sustainability, post-productivism, reconstruction and restructuring , there is still no clear and comprehensive vision of the kind of countryside people want. This, some thirty years after Cherry's (1976) original lament about the lack of rural vision. This paper directly addresses such concerns by reporting on recent research funded by the Welsh Assembly Government entitled "What Kind of Countryside Do We Want?" The research used a variety of empirical approaches (household, community visioning, stakeholder and internet surveys) across urban and rural Wales, set against operational analyses of rural development and planning policies. The findings reveal an emerging consensus between public preferences and stated policies/guidance for a multifunctional, locally derived and 'joined up countryside' with development based upon "need". Such views are not new and reflect much of the rhetoric over integrated rural development in the 1980s. However, public expectations and policy rhetoric do not match people's actual experience of rural policy delivery on the ground. There was widespread and consistent criticism over the type, pace and scale of development in the countryside which fundamentally questions how rural policies are interpreted and operationalised at the local level and raises issues of power and equity in decision making. There is a clear mismatch between rhetoric and practice which we believe reflects institutional inertia and resistance to change. Our recommendations seek to improve local implementation of national policy, strengthen local voices and give greater emphasis to community plans as potential mechanisms to deliver sustainable development.

*Key words*

countryside, visions, reform, integration, sustainability

## Introduction

This paper assesses the extent to which the public's perceptions and aspirations for the countryside and its future management synergise with rural planning policies and practices set within the wider discourses of rural change and sustainable development.

There is a rich literature which charts the changing and contested nature of rural change and management (e.g. Wibberley, 1982; Marsden 1999; Mather et al (in press). Five key themes emerge which provide the context for this research. First, the shift in countryside from production to consumption functions has implications for the governance and management of rural areas (Slee, 2005). Marsden (1999) has charted this evolution where housing, rural

services, recreation and tourism now feature and interact with agriculture and forestry. This gives rise to new tensions and conflicts associated with the intersection of both production and consumption functions within the same geographical space. External pressures from diverse points of origin such as CAP reform, centralisation of public services, variations in local housing markets, commuting, population change and leisure demands, combine to make simple urban-rural conceptualisations redundant in favour of an approach that recognises the differing nature and extent of urban-rural interrelationships (Hodge and Monk, 2004).

Second, there is widespread recognition of the fallacy of a one size fits all approach to solving what are now well documented rural problems. Actions must be flexible, locally derived and integrated, accompanied by sound intelligence, institutional reform and change of operational culture (e.g. Scottish Executive, 2005). However, research has shown that institutional responses have been characterised by inertia consistent within Curry's (1993) fallacy of "creeping incrementalism". For example Scott *et al.* (2004), in their review of the impacts of foot and mouth, demonstrated the inappropriateness of current institutional arrangements to address the demands of a multifunctional countryside.

Third, the planning system, whilst having a pivotal role in rural matters (Wakeford, 2003), has been significantly neglected in rural research. Arguably there needs to be greater connectivity between rural planning and rural development research and policy to grasp the social, cultural, environmental and economic synergies that arise. However, their sectoral treatment firmly embedded at European, national and local levels prevents substantive change despite the emergence and rhetoric of spatial planning agendas (Harris and Hooper, 2004).

Fourth, there is significant debate over the role the public should have in the formulation of countryside policies. Whilst the Aarhus Convention provides the statutory footing for involvement (UNECE, 1998), there is considerable literature that highlights the problems facing policy makers when engaging with different public(s), particularly in translating outputs into decision making processes (Stirling, 2006). Indeed, the plethora of short term, top down and reactive nature of much public engagement risks becoming an end in itself rather than an interactive process of debate and iteration.

Fifth, previous research on public perceptions of countryside in Wales reveals strong support for a more holistic approach with powerful attachments to local landscapes both aesthetically and functionally. Complexity, diversity, traditional landscape features and working landscapes are all highly desired and valued components. Development is supported so long as it respects the qualities of place and space locally and is based on need. However, negative reactions were recorded for the current pace and scale of landscape change through the perceived homogenisation and industrialisation of the countryside, together with a sense of frustration at the perceived marginalisation of the public from planning decisions (Scott, 2003).

## Methodology

Our appraoch in this project combined qualitative and quantitative techniques to elicit the views of different public(s), communities and professionals across Wales set against an evaluation and comparison of national planning strategies and local development plans. The method was informed through a simple four fold classification of Wales at ward level into rural, rural fringe, urban fringe and urban using Office of National Statistics data. Five stages involved:

1. A stratified random household survey: Eight wards were selected at random; 2 corresponding to each rural/urban classification. A standard questionnaire was devised which addressed the themes listed above. A random sample of 75 residents was undertaken for each ward making a final sample of 600.
2. A stakeholder survey: 105 stakeholders were consulted with 22 written responses. A seminar was used to elicit feeback from the emergent findings.
3. An internet survey: This was made available via the Institute of Rural Sciences home page and publicised throughout various email forums in Wales. This replicated the household survey and 128 usable responses were obtained.
4. Community visioning exercise: Eight communities were selected, 2 corresponding to each rural/urban classification. A purposive sample of residents was taken on a 3 hour field trip to different pre-selected viewpoints around their community with briefing/plenary sessions to assess/discuss desired rural visions.
5. Analysis of Planning Policy documents: Planning Policy Wales and selected development plans from the community exercise were assessed and compared. A planner's seminar was also held.

**Results**

Table 1 highlights the main findings from the public surveys and planning analyses. Overall the findings show synergies between the different publics interviewed and the planning agenda for the countryside. Four key points emerge from these findings.

First, that there is an emerging consensus over the kind of countryside that is wanted but within no simple unified vision. Specifically, a locally derived and sustainable countryside was required. Integrated development in the countryside was supported but only where there was clear evidence of need. There was widespread rejection of developments which increased commuting, fragmented community structures and reduced available and accessible green space/countryside. There was also rejection of top down approaches which consistently bypassed public views

Second, a more integrated and holistic approach to the countryside was needed which recognised its multifunctionality and allowed the plethora of agencies with countryside remits to work together with, and for, local communities, businesses and visitors to produce more joined up thinking and strategies.

This informs the third theme of policy subsidiarity and local distinctiveness, where planning and decision making should be more devolved to local communities who become actively engaged in policy formation.

Finally, there is a key theme about the mechanics of the town and country planning system in Wales. The results show strong levels of public support for much of the theory of current planning approaches protecting the countryside, but universal criticism of their experience of planning in their countryside where the type, pace and scale of development does not equate with either policy or respondent vision. Here the institutional responses to rural development and planning and decision making processes require further scrutiny.

## Discussion and Conclusions

This paper has highlighted a significant gap between public perceptions and policy guidance which broadly concur, with people's actual experiences of rural planning and development on the ground. The reasons for this are complex, inherently political and institutional reflecting inbuilt resistance within the current system of rural governance which is reluctant to lose its traditional sectoral roots and autonomy. Revisiting the integrated rural development debates in the 1980s I am struck by the similarity of the discourse and recommendations with this research in 2004, albeit with a different vocabulary.

| **Overarching Public issues** | ***Policy Comments (NATIONAL Planning Policy Wales )*** |
|---|---|
| Public disquiet with their experiences of planning for their countryside. | *There is a clear disquiet with the experience of planning though public preferences do in part reflect current planning policy.* |
| Clear recognition of a multifunctional countryside | "*The countryside is a dynamic and multipurpose resource. In line with sustainability principles, it must be conserved and, where possible, enhanced for the sake of its ecological, geological, physiographic, historical, archaeological and agricultural value and for its landscape and natural resources, balancing the need to conserve these attributes against the economic, social and recreational needs of local communities and visitors*". (2.4.5) |
| Strong affinity with the countryside | *Attractive and ecologically rich environments are important, both for their own sake and for the health and the social and economic well being of individuals and communities. Biodiversity and landscape are important in the economic life of many communities and the quality of the environment is often a factor in business location decisions.* (5.1.1) |
| Strong concern with overdevelopment | |
| Strong concern with the littering of the countryside. | |
| Protection of the open countryside and designations | |
| Appropriate scale and design of development | *Development in the countryside…. All new development should respect the character of the surrounding area and should be of appropriate scale and design.* (2.5.7) |
| Planning for established needs | *"for rural areas, set out an integrated rural development strategy for new development based on sustainable development principles and tailored to the area's specific assets and needs".* (7.5.1) |
| Policy integration | "*For these aims and priorities to be realised it will be essential that social, economic and environmental policies are fully integrated. The preparation of integrated rural development strategies is recommended".* (para 2.4.6., p17)<br><br>*foster development approaches that recognise the mutual dependence between town and country, thus improving linkages between urban areas and their rural surroundings."* (para 2.5.2, p17) |

**Table 1: Summary of results: (note how public and planning agendas coincide)**

Indeed, it could be argued that this research shows little that is new but it is this lack of progress which is key to unlocking the rural dichotomy. Whilst public views are demanding

fundamental change in the way rural policy is made the rural reality is locked into a policy dynamic that operates as an oil tanker. By way of illustration at the launch event of this project in 2004 a senior Welsh Assembly planning official stated that the recommendations could not be implemented as their timetable for the next 3 years was approved and next month they started their affordable housing policy work. This view is powerful in revealing how difficult it is to operate a change in culture particularly when they are likely to be the principal directors of that change themselves. For example we see the Wales Spatial Plan bolted on to the existing policy structures and mechanisms rather than any fundamental change to address the spatial planning agenda. I argue that we need to be more radical and look at culture change.

Work by Mather et al (2006) revealed that post-productivist values were increasingly evident in economic support structures for agriculture and forestry but not yet embedded in the attitudes of farmers and foresters themselves. Translating this to our research we certainly have the policy tools and mechanisms available to develop the countryside that people want and policy is indeed articulating these visions. However, there is little evidence of any culture change in those who make policy, and crucially, limited capacity building to help address this. This policy-practice deficit requires fundamental change in the culture of policy formation and decision making and perhaps it is this aspect of rural governance and sustainability that has escaped significant scrutiny. I conclude that the principal mechanisms are already in place and it is their proper operationalisation at the local level concomitant with the political will to do so that is now required.

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# Stakeholder engagement is vital for accountable business – case Stora Enso Oyj

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Stora Enso uses sustainability as the umbrella term to describe responsible business operations that include economic, environmental and social responsibility. The challenge in sustainability management is to effectively balance the different aspects of sustainability in the long- and short-term decision-making processes at all levels within the Group.

Stakeholders are increasingly showing interest towards the forest industry's sustainability performance and especially towards companies' operations in new the growth markets. This new trend is a strong combination of market- and stakeholder-driven global sustainability interest. To answer these multidimensional stakeholder concerns Stora Enso's sustainability strategy is solely derived from stakeholder requirements.

Sustainability management is an essential part of Stora Enso's risk management, as potential risks related to sustainability could result in either material or reputational damage. Stakeholder engagement plays an important role in the risk management, and therefore Stora Enso is continuously developing its stakeholder dialogue and engagement tools in order to obtain a broader understanding of different perspectives on critical sustainability issues. Stora Enso aims to identify the stakeholder concerns early in order to consistently address them throughout its operations and decision-making, and to assess their significance to the business.

Strong strategic sustainability partnerships with stakeholders are an important way for companies to obtain evaluated information on their sustainability performance. Stora Enso has established various projects with credible and professional international organisations like United Nations Development Programme (UNDP) or WWF, as well as a multi-stakeholder project with major customers, local subsidiaries, suppliers and NGOs.

Sustainability makes perfect business sense and in the future it will be one way of defining successful business. Without responsible behaviour in environmental and social issues, companies will lack the platform needed to create financial sustainability. The value of a company brand, other intangible assets or a reputation are all economic aspects which add value for Stora Enso's stakeholders and, therefore are very important for financial success. In the long-run, to be economically sustainable means respecting all value creation sources, including the ecosystem that provides resources and people who make it all happen. This is especially important in the forest industry, which is dependent on natural resources and professional and performing workforce.

# OFFERED PAPERS
# FOR PARALLEL SESSIONS

# Education for sustainable development in the context of teacher training courses at the Czech University of Agriculture

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*Abstract*
The Institute of Education and Communication of the Czech University of Agriculture runs training courses for teachers for secondary agriculture and forestry schools. A part of the course is also environmental education. The aim of this subject is to provide the teachers-to-be by didactic skills, so that they can transform their present knowledge acquired during their studies at various faculties of CUA into the lessons of vocational theory and practice. The knowledge includes topics of ecology, ecological agriculture, sustainable development and environment. Apart from didactic competence, they gain a clear view of possibilities and means of environmental education. Moreover, they have a chance to suggest a method or form applicable for the particular school, locality or region. Thus, proposals and drafts of instructive foot-paths and trails have been created by students. Some of them have been successfully realised with the support of local authorities and they help to increase public awareness, the development of tourism and preservation of local areas. The paper submits some of the successful proposals, apart from other ideas.

*Key words*
sustainable development, teachers, environmental education, didactic skills, instructive foot-path

## Introduction

The Institute for Education and Communication of the Czech University of Agriculture runs training courses for teachers for secondary agricultural and forestry schools. A part of the course is environmental education. The subject follows the regulations of the National Programme of Environmental Education and Edification (EEE) in the Czech Republic (2000). Education following this theory should lead towards thinking and behaviour respecting the principle of sustainable development, towards one's feeling of responsibility for retaining the quality of environment and its parts and towards the respect for life in all its forms (Environmental Act No. 17/1992 Coll., § 16). The National Programme EEE follows the valid legal regulations, governmental resolutions, amended National Environmental Policy, international obligations which the Czech Republic is bound to and the European Union regulations.

## Environmental education of teachers of vocational subjects

The subject "Environmental education" is included in the study plan of the training courses for teachers of vocational subjects for secondary agricultural and forestry schools and expects from the future teachers some knowledge of ecology from the previous university study at CUA. The aim of the subject is establish and develop didactic skills of practical application of ecological knowledge into the content of education. The outcome of the subject is a teaching

performance presenting a chosen vocational topic with respect to environmental ideas. The future teachers also get acquainted with the environmental situation in their place of work – a school, a village, a town, a region and are led to use this knowledge in the education of students at secondary schools.
The content of the subject "environmental education" is divided into the following topics:
- Environmental education – its aims and goals
- Techniques and forms of environmental education
- Methods of environmental education
- Application of environmental education in the lessons
- Environment of a classroom, school, village or town, region as an educational mean of environmental education
- The National Programme of Environmental Education and Edification in the Czech Republic
- Theory of sustainable development

The aim of the subject "Environmental education" is to establish and develop by future teachers didactic skills necessary for the application of their attained knowledge of vocational study into the lessons of vocational theory and practical training. It includes knowledge of ecology, ecological agriculture, sustainable development and environmental study.
Training courses for teachers of vocational agricultural subjects with respect to sustainable development is mainly directed at the development of those pedagogical competencies which would help to form by students professional and individual responsibility with reference to environment. It covers the skills of transformation the knowledge of ecology into the content of a subject, mastering the integration of knowledge of other areas into the content of the main subject, using information and communication technologies to find out and process information – e.g. information about the actual state of environment, about environment-friendly agricultural production, about environmental policy and new agro-ecological technologies. The teachers-to-be should be aware of the possibility of cooperation with centres of ecological education, of the possibilities of school involvement into the projects resolved on a school and resort level. The whole of teacher's endeavour should contribute to the development of student's thinking and behaviour conformable with sustainable development with the aim to create positive attitude towards life values and environment.

**An instructive foot-path as a form of environmental education and edification in a region**

Students in the subject "Environmental Education" of the complementary pedagogical study at IEC of CUA in Prague have a chance to suggest a method or a form which would have an environmental effect within the school, locality or region.
Thus, proposals and drafts of instructive foot-paths and trails have been created by students. Some of them have been successfully realised with the support of local authorities and they help to increase public awareness, development of tourism and preservation of local areas.
The paper submits examples of successful proposals of the new or restored instructive foot-paths and trails which have been suggested or reconstructed on the basis of students´ knowledge acquired in the classes of environmental education. The script and architectonical project of an instructive foot-path must accept its educational and edifying function, the effect on the protection of nature and the respect to it and to the sightseeing of the particular region or area. The pedagogical view allows the students to process their proposal on the basis of didactic principles and their own presentation skills. It is definitely a challenging task, in both

the content and form aspect. One possibility is that an author compiles a printed commentary – a guidebook – to the marked trail on the map, which serves as a source of information about the individual objects and stops of an instructive foot-path. However, a traditional instructive foot-path comprises information boards, which have to be efficiently proposed with the view of its purpose. The information and illustration on the board have to be presented in legible, simple and clear way. The information boards should help visitors with orientation in the area and they briefly inform about the area, products of nature and processes. Each board should have a title and a number, possibly a logo of the instructive trail. For easy map orientation, it is advisable that the cardinal points are symbolised on the boards, together with a scheme of the trail with numbers representing the individual stops and data concerning the length of the whole trail and the distance between the individual stops. The printed information should be clear and legible. It is advisable to supplement suitable illustrations, schemes and photographs. Extremely valuable are historical illustrations which allow visitors to compare e.g. a monument on an old picture with the present state. It is quite risky to mention information about a concrete habitat of protected species, because the irresponsible "visitors" can exploit the information to its liquidation. In a protected natural area, the introductory information board should inform visitors about the reasons of the area protection, possibly mention the protected botanical and zoological species (however without specifying the habitat) and establish the rules of behaviour in the protected natural area. The information boards should preserve its legibility for a number of years. They should be placed in the area not interfering with the views on the individual objects.

Proposals of the instructive foot-paths – see the presentation.

## Conclusion

To educate today on the basis of up-to-date knowledge of particular subjects means to educate for future. Education must definitely include the analysis of future possibilities. To maintain the future world sustainable, we must direct the strategies of every teacher to this goal.

Teachers should lead their students to the responsibility for the quality of environment and doing this, they realise their own responsibility of bringing up future generations with respect to sustainable development.

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## Facing Current Challenges: A Case Study of Ecological Training within Agricultural Engineering Education

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*Abstract*

Ecological problems are globally recognized as being one of the most current and vital challenges in the 21st century. In this context, an agricultural engineering education seems to be a true site of specific training, as it naturally combines agricultural and engineering issues discussed in classrooms and, thus, developed in greater detail by university researchers. At present, Russian society development has led to an ecological crisis in the country. Human health problems and national ecological disaster territories are growing in Russia, and their further development may endanger our national advancement. That is why professionals in agricultural engineering education are to feature ecological requirements competence, mastery of the present-day ecological problems, skill of cooperation with the relevant ecological monitoring and conservation services in the field of engineering projecting, in addition to understanding of the negative correlation of industrial developments and ecology.

Solution of the basic problems of ecological education requires the development of an innovative strategy of curricula and syllabi design, and technical and methodological re-equipment of agricultural engineering institutions. The biological paradigm of this training should give way to a more progressive one, i.e. ecological and economic. Depending on the field of training, particular attention is paid to different aspects of ecological training, which is reflected in the amount of practically-oriented research projecting, course and degree projecting and lecture and laboratory classes that are required for each individual major. Within the programme of ecological awareness development, our university conducts student research conferences and invite undergraduates and postgraduates to participate in the student scientific SIGs. Thus ecological training within an agricultural engineering education is identified as a highly efficient tool for facing the most current and vital challenges of the present-day world.

The mission of ecological training is to develop ecological conscientiousness of a professional and the professional community as a whole. Within this training, particular attention is to be paid to advancement of practical skills and theoretical competence of human society in the field of mankind survival. This target correlates with the general educational target of the humanitarian development of a professional, who is expected to dwell in the complete world of risks and natural disasters, and who should live in harmony with the society of other individuals. It is here that ecological training is identified as a decisive component of education.

It is most unfortunately that the layman comprehension of ecological issues is rather basic, negligible and consumer-type. And public crisis, supplemented with economical transitions in Russia, make ecological training even more complicated.

At present, Russian society development led to ecological crisis in the country. Human health, national fertility and overall well-being are strongly endangered. Ecological disaster territories are growing in Russia, and their further development may endanger our national advancement.

That is why professionals in agricultural engineering education are to feature ecological requirements competence, mastery of the present-day ecological problems, skill of cooperation with the relevant ecological monitoring and conservation services in the field of engineering projecting, as well as understanding of the negative correlation of industrial developments and ecology.

Thus, among the parameters of ecological training success there are ecological responsibility, solid competence in ecological requirements and skills in ecologically secure and quality engineering projecting.

Among the basic disadvantages of ecological training within agricultural engineering education there these:

- lack of a scientifically proved strategy of ecological education management;
- poor educational technologies of ecological training that are used within general subjects;
- poor provision of the university ecological training with relevant quality and up-to-date books;
- absence of Ecology teacher training system for agricultural engineering institutions;
- insufficient laboratory premises;
- underdeveloped curricula and syllabi for agricultural engineering institutions that would reflect specific aspects of ecological training.

Solution of these problems requires the development of an innovative strategy of curricula and syllabi design and technical and methodological re-equipment of agricultural engineering institutions. Biological paradigm of this training should give way to a more progressive one, i.e. ecological and economic. This will allow trainers to integrate closely ecological issues (e.g. the adverse impact of industries on ecology, human health and economic resources of individual areas) into professional training.

The quality of attainment of these new educational targets depends on the interrelation of different academic subjects and the ecological approach to the formation of professional competence, as opposed to the currently dominating single-subject ecological training approach.

Particular attention of the authors of this paper is placed with these university majors: Agricultural Mechanization, Mechanization of Agricultural Produce Processing, Agricultural Power Supply and Automation, Agricultural Machinery Maintenance.

The new concept of ecological training contents should feature multifieldedness, multilevelness, flexibility, variability and pragmatism.

The relevant experience of Moscow State University of Agricultural Engineering (MSUAE) is suggested to be used as a sound illustration in this context.

Ecological issues are incorporated in all major academic subjects of general and specialized-field clusters. Among the subjects there are Biology and Fundamentals of Ecology, Heat Engineering, Safety in Emergency Cases, Jurisprudence, Plant and Livestock Production, Tractors and Automobiles, Lubricants and Fuels, Cultivating and Harvesting Farm Machinery, Agricultural Production Processing Machinery, Refrigerators and Conditioners, Agricultural Machinery Maintenance Enterprise Design, etc.

The overall professional training at MSUAE comprises a cluster of ecological training elements, which facilitate education of future experts at engineering, vocational education and agricultural economics. Thus, the Department of Ecology and Safety that was established in 1996 conducts several research projects that are targeted at professional and personal of students in the field of ecology.

Depending on the field of training, particular attention is paid to different aspects of ecological training, which is reflected in the amount of practically-oriented research

projecting, course and degree projecting and lecture and laboratory classes that are required for each individual major. The student are not just required to master the ecological aspects of their majors, but also consider the specific industrial aspects of their field and the impact of these aspects on the ecological health of a particular region. Thus, students are taught to develop engineering, educational and economic solutions to the specified ecological security problems.

Employing the entire capacity of premises of the Department, our students conduct ecological research and evaluation of individual and complex ecological parameters and dangers, e.g. the adverse impact of tractor and automobile fleet, agricultural machinery and animal exhaust on human health and environment. The student-researchers make their extensive use of computers and professional instruments and methods, which gives way to students' professional advancement.

Studying Biology and Fundamentals of Ecology future mechanical engineers learn the adverse effect of engine emissions and other pollutants – those originating from farm machinery service stations, heating and power supply stations, animal breeding farms, etc. - on human health and environment, as well as effective ways of prevention of these adverse factors.

These concepts are later developed in the degree projects of mechanical students, with particular emphasis being placed with farm machinery ecological use and maintenance. In the specific chapter of the degree project the students are required to develop the efficient ecological methods that would provide human and environmental security.

The Department of Ecology and Safety in Emergency Cases promulgates the basic principle of supplementation of the major professional training of students with the emphasis on ecological issues, harmonious human relations with the environment, related data base accumulation and processing, application of computer systems for ecological security provision, etc.

Within the program of ecological awareness development, our university conducts student research conferences and invite undergraduates and postgraduates to participate in the student scientific SIGs. Some of the projects developed by our department students include the development of territorial geo-informational systems, industrial wastes recycling schemes, design of computer systems for ecological monitoring, ecological certification of farms and machinery maintenance enterprises, development of ecological audit principles, etc.

Through the transfer of Russia to international standards (e.g. ISO-14000, *Environment Management Systems*) there is a more extensive legislative basis for the provision of ecological safety and ecological education that paves way to further successful application of the received theoretical and practical background in actual industrial and agricultural activities of graduates.

Apart from the Department of Ecology and Safety in Emergency Cases, there are other university departments that teach degree courses with certain ecological components.

The *Plant Production* course taught to future mechanical engineers provides information on forecasting and assessment of the adverse impact of farm machinery on environment, and wise utilization of natural resources in intensive plant production. Considerably much school time is devoted to the studies in water, air and power resource conservation and adequate plant watering, as well as to soil fertility regulation; reclamation and conservation are stressed, especially in terms of soil compaction, erosion and gas and liquid emission from farm machinery. Students learn that even a minimal application of herbicides, pesticides and fertilizers may effect farm environment adversely, and their effects are retained for over three months. Some of these substances affect human health indirectly, through evaporation from fields and further secondary introduction into waters (with precipitation) and the human body

(with the inbreathe air); mineral fertilizers bring heavy metals and toxicants to plants, and these substances are later introduced into animal fodder and human food. All these factors call for a more balanced application of fertilizers and plant protection and feeding substances.

One of the key aspects of *Livestock Production Technology and Mechanization* course considers pollution of sewage waters with manure and other animal farm wastes. When taking this course, students learn about the need in more advanced engineering technologies for livestock production wastes recycling, ecologically aware farm design and ecologically clean primary and further milk processing.

The course of *Tractors and Automobiles* includes the studies of engine exhaust and lubricant wastes disposal and respective level decrease through remodeling of tractors and other mobile farm machinery. As is known, most harm is caused by the emission of pollutants from engines and transmission gear, and the engineering solutions are understood to be the most efficient here. Particular consideration is taken of pollution levels inside driver's cabin (i.e. dust, exhaust gases, excessive temperatures, etc.) and introduction of new types of engines that would run on alternative fuels, such as methanol, spirit, plant oils, etc.

The course of *Fuels and Lubricants* touches major aspects ecologically clean fuels, lubricants, lubricoolants and other technical liquids.

Additional information on ecological aspects of agricultural mechanization are treated within a specialized course, i.e. *Engineering Provision of Ecological Safety of Fuel Complexes and Stocks*. This course is mostly offered to students who major in fuel complexes and stocks. The mission of the course is to equip students with the practical knowledge and skills in preventing oil-products from entering sewage waters, soil, air and other elements of human environment. Some of the contents components are these:

- localization of oil pollutions and minimalization of adverse effects;
- ecological requirements to the design and use of fuel complexes;
- ecological monitoring in fuel storage, transportation and utilization;
- social issues of ecologically aware industrial development;
- ecological legislature in the field of fuel treatment;
- special tools and technologies for spilt fuel accumulation and neutralization.

The course of *Agricultural Machinery* includes certain information about forecasting and assessment of the impact of farm machinery and individual farm processes on the ecological conditions of regions. Soil conservation and reclamation techniques are given an advantage among other ones that may cause soil compaction and further soil erosion.

The course of *Machinery Fleet Use* covers, among other issues, the problems of ecological monitoring of farm machinery maintenance and utilization and employment of these machines for reclamated soil treatment.

The set of economic courses equip students with methods of economic assessment of ecological agricultural practices and advantages of human health provision in terms of farm personnel security and sick leaf cost reduction.

Professional probation and degree project development of mechanical engineering students are employed as the final stage of ecological training. The degree projects include the specialized chapter, i.e. Environmental Safety, which contains both the characteristic of ecological conditions at the researched enterprise and the description of the developed ecological methods for environment reclamation (i.e. waste recycling, exhaust reduction, etc.) in the particular region.

The in-depth study of ecological aspects of agriculture is available through students' mastery of the unique major, i.e. Engineering Provision of Ecological Safety.

There are certain basic pre-requisitions to the ecological training of students majoring in agricultural production, and some of them are these:

- ecological concepts, natural resource conservation, correlations of agricultural processes and human environment, as well as requirements should be included into all standard manuals, syllabi, reference materials, etc. In order to advance the quality of the teaching process, ecologists and practicing engineers are to be invited to both teaching and syllabus development;
- ecology conservation forecasting and assessment are to be stressed, as their arm students with the practical skills that they will need in the future;
- development principles of ecological legislature is required to be shared with students who may be involved into similar law-making practices in several years;
- development of progressive and ecologically clean farm machinery and techniques should be made a keystone in training of mechanical engineering students;
- ecological monitoring schemes and principles are to be mastered by students who will be responsible for ecological database accumulation and processing for engineering use;
- formation of students' ecological culture and environmental harmony orientedness are to be placed particular emphasis.

**Conclusion**

Engineer training programs imply ecological culture advancement, which means ecological awareness and ecological issue and legislature competence, as well as conservation and reclamation of environment when utilization of farm machinery.
Further advancement of ecological competence of agricultural engineering graduates require certain specified strategies and methods, as well as development of ecological curricula and syllabi, Ecology teacher re-training and development of ecological legislature. All this would stimulate introduction of ecologically clean methods and concepts by farm workers and supervising engineers.

# Knowledge arrangements in the green sector: co-creation, circulation and transfer

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*Abstract*
This paper presents the results of a number of studies conducted by Wageningen UR. The studies focused on three types of knowledge arrangements developed by agricultural educators, researchers, entrepreneurs and policy makers: co-creation, circulation and transfer. The primary objective of the respective arrangements is to share, create and disseminate knowledge in response to complex, often multidisciplinary innovation challenges. In practice, however, it appears to be unclear what people actually mean when they refer to knowledge processes and which factors are conducive to knowledge creation in dynamic settings. This paper provides the reader with insight into the differences between knowledge arrangements. The case 'Developing entrepreneurship in Dutch agricultural education' is discussed to illustrate the characteristics of a co-creation arrangement. Furthermore, this paper offers four main critical success factors (CSFs) for monitoring and evaluating knowledge arrangements: vision, competence, culture and support.

*Keywords*
Knowledge arrangements, agriculture, research, education and entrepreneurs

## 1. Introduction

The environment in which the agricultural sector operates is subject to continuous change. Small business owners (e.g. farmers and growers) must adapt to the vagaries of the market, changing consumer habits, stricter environmental regulations and other societal demands. In order to respond adequately to these demands effective use of knowledge is becoming increasingly important. In our new knowledge-based economy, which is challenged by globalisation and sustainability issues, survival depends on the capacity of individuals and organizations to generate and exploit knowledge (Boreham and Lammont, 2000). In such dynamic settings, the creation of new knowledge is not a linear process ('technology push'), but follows an interactive, often interdisciplinary path in which knowledge is actively constructed and thus not merely absorbed, unaltered, by individuals, companies or networks (Gibbons, 1994). In order to bridge the gap between knowledge production, its application and adaptation in innovations, different forms of cooperation in the Dutch agri-food complex can be discerned between education and training, research and development (R&D) institutes and business (Lans et al., 2004). We call these forms of cooperation knowledge arrangements. In this paper we try to contribute to the collective search for new innovative routes to create and exploit knowledge by generating 'knowledge about knowledge'. First of all, the different types of knowledge arrangements are defined and discussed. Second, the case 'Developing entrepreneurship in Dutch agricultural education' is presented as an example of a co-creative knowledge arrangement. Third, four CSFs for effective innovation are identified that can be used in evaluating and monitoring knowledge arrangements. Finally, this paper concludes with three questions for further research and discussion.

## 2. Three knowledge arrangements: co-creation, circulation and transfer

In this paper the networks in which cooperation between educators, researchers and entrepreneurs takes place are referred to as knowledge arrangements (Kupper et al., 2006; Lans et al., 2006). A knowledge arrangement is "a smart combination of hardware, software and intellectware as a result of cooperation between mostly heterogeneous parties within the knowledge infrastructure which leads to effective contributions to the knowledge economy" (Nijkamp, 2002). In our view, these arrangements can be distinguished with reference to different knowledge processes that are dominant within such arrangements. We distinguish three types: co-creation, circulation and transfer (Beuze et al., 2004; Geerligs et al., 2005; Kupper et al., 2006; Lans et al., 2006):

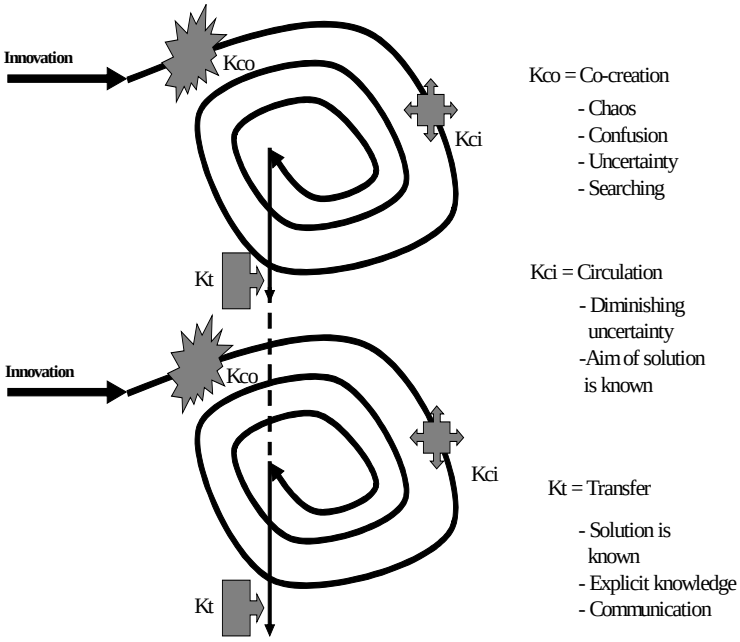

Figure 1: Knowledge and innovation

1. Knowledge co-creation: exploration of goals and solutions to questions pertaining to a reorientation in existing routines, principles, norms and values. It is a creative process in a dynamic social environment in which problems are characterized by a high level of uncertainty and complexity. The result of co-creation is shared awareness of a certain problem.
2. Knowledge circulation: sharing of theoretical and practical knowledge in an interactive process between mostly heterogeneous parties. Confronting each other, discussion and learning from one another are important aspects of circulation processes. It often concerns the integration of relatively implicit knowledge (e.g. gained through experience) with more explicit knowledge (e.g. new scientific insights).
3. Knowledge transfer: transmission of explicit, codified knowledge (Nonaka and Takeuchi, 1995) from sender to receiver (Van Cuilenburg, 1992). It is often a linear process in which it is important to address the target group properly so that they interpret the received information (more or less) correctly (Shannon and Weaver, 1949). Transfer is mainly at stake when there are clear solutions to (innovation) problems. The knowledge is robust and can play a role in upgrading the level of knowledge of target groups, optimizing existing routines or (widely) disseminating information. ICT plays an important role in the process of knowledge transfer.

These three arrangements are to be seen as circular movements from (1) co-creation, via (2) circulation via (3) transfer, leading to innovation (Figure 1). In general it can be argued that the nature of the innovation question determines whether co-creation, circulation or transfer is dominant. Innovations that require just an upgrade of existing knowledge demand an emphasis on knowledge transfer, whereas in the case of 'open innovations', knowledge needs to be created and exploited within a heterogeneous group of stakeholders. This type of innovation is mostly dominated by knowledge co-creation processes. In the next section, a

case of knowledge co-creation is presented and discussed to illustrate this type of knowledge arrangement.

## 3. Entrepreneurship in agrarian education: a case of knowledge co-creation

Stimulating and embedding the topic of entrepreneurship in Dutch education is an important political issue for the government (Kamp, 2004). To investigate the possibilities of reforming education and developing educational tools to stimulate agricultural entrepreneurship among students, a knowledge arrangement between researchers, educators and policy makers was formed (Hurkens, 2005). We examined this arrangement during the process in which the R&D mission and strategy were formulated to realize this objective. To this end, several interviews and a workshop were held. The mission and strategy will be further developed and implemented in 2006 and 2007.

In the process of knowledge co-creation, the participants in the arrangement sought first of all to articulate a shared *vision* that integrated different perspectives. The (agrarian) entrepreneur of tomorrow (the student) is both manager and professional and fully aware of his[1] environment. He feels part of the (regional) network in which he operates. He is the pivot in his society and has competencies like confidence, creativity, innovativeness, social skills and curiosity. Therefore education and educational tools must focus on competence development in the individual student instead of merely teaching specific professional skills. The role of the teacher is to coach the student to discover what type of person he is, what he stands for and to identify a job which would allow him to fulfill these needs. The relationship between teacher and student is therefore no longer top-down, but takes the form of a transparent and respectful co-partnership. Both educators and researchers have to become *competent* themselves in coaching and facilitating the student in his personal development and offer a challenging educational environment within and outside the campus. They have to work together to design suitable training materials and tools. Therefore they need to gain knowledge and insight into the student's interests and (regional) societal needs. Students should develop the capacity to creatively adapt to these needs in their future professions. Teachers need to be facilitated in developing their coaching skills, to the extent that they are adequately equipped to develop their own particular style of coaching. Researchers need to listen and work closely together with educators to be able to deliver demand-driven educational products. The tools developed should adequately reflect societal needs and demands. Furthermore, (scientific) knowledge needs to be better communicated and transferred to create better and more relevant educational materials. Within their research *culture*, researchers are not used to working directly with educators to develop educational products and vice versa. The participants in the arrangement have therefore formulated several concrete tasks for both educators and researchers on which they will work together.

An important critical success factor in accomplishing this change in education is *support* from the management teams of both educators and researchers. According to the educators in the knowledge arrangement, the education system is bureaucratic and the schools' budgets are often too small to accommodate the necessary structural reforms. Therefore it is important that the school management team sees this change in education as an opportunity to secure future success. The team needs to make available the necessary time and financial resources for training and developing educational material and tools. Formulating a joint R&D mission and strategy to develop the focus on entrepreneurship in education was a first step to tackle these problems. To strengthen these ideas, participants in the knowledge

[1] For convenience we use the masculine pronoun, but it refers to both male and female students/entrepreneurs.

arrangement also came up with a proposal to conduct a study of the educational changes to be expected in view of future societal developments. Their aim is to discuss with their management teams the concrete impact of these developments on the current education system. In order to further develop educational materials and tools, the management of the research institutes needs to make explicit the importance of cooperation between education and research. In this particular case, the researchers have had several meetings with the board of directors who made available the time and resources to allow the researches to contribute to the knowledge creation process. Further integration and cooperation between research and education is a focal point in the research institute's new strategy (Strategy Social Sciences Group Wageningen UR 2007-2010, expected in September 2006).

## 4. Success factors for knowledge arrangements

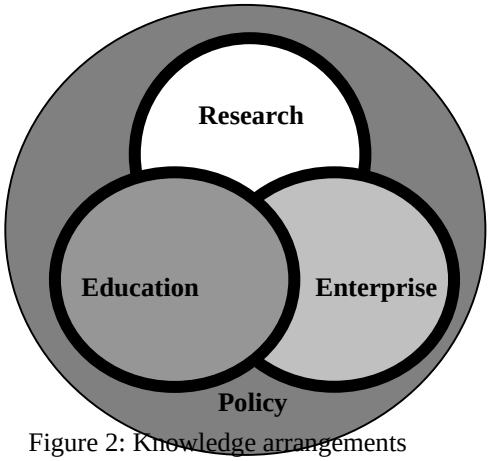

Figure 2: Knowledge arrangements

Since 2003 Wageningen UR has conducted several studies on the three types of knowledge arrangements in the green sector which were commissioned by the Dutch ministry of Agriculture, Nature and Food quality (Figure 2). In addition to the study discussed in section 3, 11 other exemplary knowledge arrangements were studied by conducting semi-structured (group) interviews (n=64), questionnaires (n=42) and (participative) observations (n=16). The cases were situated within the domains of horticulture, animal husbandry, food/nutrition and the environment (Geerling-Eiff et al., 2006; Lans et al., 2006). Based on the case studies, an instrument is being developed for monitoring and evaluating (M&E) knowledge arrangements. Initially, the instrument consisted of eight critical success factors (CSFs) that showed similarities with studies on quality management in large companies (Ehms and Langen, 2001; European Foundation for Quality Management: www.ink.nl). During the course of the study, the eight factors were reduced to the following four main factors:

1. Vision: comprises the shared and individual objectives which focus on the meaning and effect of shared and developed knowledge regarding ambitions and strategic choices for innovation;
2. Competencies: the different experiences, motivations and skills of individuals and organizations that are combined within the knowledge arrangement;
3. Culture: the explicit vision (hardware) among individuals and organizations participating in the knowledge arrangement can diverge from actual attitudes (software) towards collective norms and values for knowledge;
4. Support: this factor relates to the pragmatic effect of vision and culture. Both individuals and organizations need to truly support the knowledge that is being developed within a knowledge arrangement in order for this knowledge to be efficiently transferred, communicated to target groups, and embedded. Support relates to both moral and financial means, both human and ICT oriented.

As we are studying knowledge processes between organizations, it is important to note that these factors can be studied at (1) individual, (2) organizational and (3) knowledge arrangement level. The discussion of the co-creative knowledge arrangement in section 3 illustrated the importance of the four factors. The participants in the arrangement sought to

develop a shared vision on bringing entrepreneurship into sharper focus in education. Both researchers and educators need to develop the necessary competencies to realize this vision. Therefore a culture of co-partnership based on mutual trust has to be cultivated. Finally, management teams of both educators and researchers should support this development to make structural reforms in education happen.

## 5. Discussion

Since 2003 researchers of Wageningen UR have been studying a number of knowledge arrangements which lead to the first steps being taken to develop a common language for monitoring and evaluation. We formulated four main CSFs for different knowledge arrangements to be innovative: vision, competencies, culture and support. Although at this moment many educators, researchers, entrepreneurs and/or policy makers work together efficiently, it seems that there are still many questions and uncertainties about the true meaning of these success factors in knowledge arrangements. Moreover, the term knowledge arrangement may suggest that the primary focus is on knowledge instead of innovation. Awareness of the CSFs can support practitioners in planning and risk-analysis, self-evaluation, monitoring the arrangement, adjustment and self-reflection (lessons learnt). However, three important questions remain for further discussion and research:

1. How can we optimize the use of CSFs as instruments for monitoring (adaptation) and evaluating (measuring results and effects) knowledge arrangements?
2. Are specific CSFs more relevant to some knowledge arrangements than others? E.g. transfer knowledge arrangements could require more specific focus on infrastructural dimensions like support (e.g. budget for ICT) for communication, whereas co-creation knowledge arrangements could require more focus on creating a stimulating culture and developing the right competencies in the network.
3. How can the CSFs be translated into concrete instruments for different research purposes such as surveys, but also workshops and group interviews?

Our team is currently conducting research into these questions and publication of the findings is forthcoming.

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# Students' Perceptions of Learning and Teaching in Ukraine and Russia

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*Abstract*

Throughout the 20th century, Soviet education was shaped and controlled by central authorities in the Kremlin (Stetar, 1995). In the last few years, European Higher Education has initiated an educational reform known as the "Bologna Process." The main objectives of the Bologna declaration are to increase the mobility and employability of graduates to ensure the competitiveness of European higher education in the world market (UNESCO, 2004). There is a need to modify curriculum and policies in order to address market expectations of future professionals in agriculture.

Russia and Ukraine are two of the countries that declared their interest in the Bologna Process and asked for criteria and procedures for admission. As new members of the Bologna process, countries are forced to improve the quality of their higher education system and meet societal expectations of graduates. Russia and Ukraine have started to transform their education from a top down and teacher-centered system to a student-centered approach (Nyborg, 2004). The purpose of this study was to provide an overview of the perceived quality of education from the perspective of students by analyzing areas of instruction at Lviv State Agricultural University (LSAU) and Moscow State Agroengineering University (MSAU). To evaluate the quality of education in Ukraine and Russia three hundred agricultural undergraduate students in their third year of study were purposefully selected to participate in the research.

In general, students from Russia and Ukraine tended to agree that teachers use a variety of teaching methods, more resources are needed for teachers to do an adequate job, teachers should use more computers, and teachers need to improve the quality of teaching. Although Ukrainian students tend to agree that teachers should use the Internet (WWW) to teach Russian students are not certain whether the internet should be used by teachers. Russian and Ukrainian students are uncertain whether teachers know how they learn best and if the used teaching methods prepare them to for the workforce. In order to increase the quality of teaching and to better equip students to enter the workforce, the data suggest that LSAU and MSAU teachers should increase the variety of instructional materials and technologies, and structure learning in ways that learners would be actively involved. LSAU and MSAU teachers currently use little technology in their instruction; and teachers need more technology training. Therefore to increase the quality of teaching and promote student-centered initiatives, MSAU and LSAU need to develop programs and strategies to evaluate the scholarship of teaching by establishing a reward system for teaching improvement, merit salary for teaching excellence, and or expanding teacher training in technology. All of these efforts will better prepare students to enter a common workforce, meet the requirements of the modern rural enterprises, and meet the standards of a global economy.

## Introduction

Throughout the 20th century, Soviet education was shaped and controlled by central authorities in the Kremlin (Stetar, 1995). During the Soviet era, teacher-centered educational systems developed strong basic education in science and math. Ukrainian and Russian

universities prepared specialists not only for their own needs but also for other Soviet republics according to the dictates of the central planners in Moscow. The end of the Soviet block provided the freedom to independent countries to reform education and to form new systems to educate Ukrainian and Russian citizens (Stetar et al, 2003).

In the last few years, European Higher Education has initiated an educational reform known as the "Bologna Process." In 1999, 29 European higher education ministers signed a joint declaration (the Bologna Declaration) to establish a European area of higher education by 2010. The main objectives of the Bologna declaration are to increase the mobility and employability of graduates to ensure the competitiveness of European higher education in the world market (UNESCO, 2004).

The declaration involves six actions relating to the: 1) adoption of a system of easily readable and comparable degrees; 2) adoption of a system based on two main cycles, undergraduate and graduate education; 3) establishment of a credit system; 4) promotion of mobility by increasing students accessibility to study and training opportunities, and recognition of teachers, researchers and administrative staff regarding periods spent researching, teaching, and training; 5) promotion of European cooperation in quality assurance by developing comparable criteria and methodologies; and 6) promotion of the European dimensions in higher education, by developing curricula, inter-institutional cooperation, integrated programs of study, training, and research (Bologna Declaration, 2000).

There were approximately 60 agricultural higher education institutions in Russia, consisting of 8 universities, 2 national academies, and 53 institutes (Mudahar et al, 1998). In the late 1980s, there were roughly 156 public post secondary institutions throughout Ukraine and approximately 880,000 students were enrolled (Stetar, 1995); 25 years later there are about 1000 institutions and approximately 2,500,000 students enrolled. In the 1990s, private education started to flourish. Today, twelve percent of the universities in Ukraine are private (ECHE, 2005). In their brief existence, the private sector appears to be highly innovative and responsive to changing educational needs. While state universities are beset with financial problems and have a relatively inflexible curriculum (Stetar, 1995). There is a need to modify curriculum and policies in order to address market expectations of future professionals in agriculture.

Ukraine and Russia are two of the counties that declared their interest in the Bologna Process and asked for criteria and procedures for admission. As new members of the Bologna process, countries are forced to modernize, up-date, improve the quality of their higher education system, and meet societal expectations of graduates. Ukraine and Russia have started to transform their education from a top down and teacher-centered system to a student-centered approach (Nyborg, 2004).

## Theoretical Framework

According to Glassick et al (1997) and Boyer (1990) in order to improve teaching competence, professors should be verified by rigorous peer review, self-teaching reflections, and students' evaluations. Marsh (2001) noted that students' evaluations of teaching effectiveness were commonly used in U.S. and Canadian universities; however, this was not true in many other countries. Fortunately, evaluations are increasingly being applied in universities throughout the world and are becoming widely endorsed by teachers, students, and administrators. Teaching evaluations provide diagnostic feedback to faculty for improving teaching, a measure of teaching effectiveness for personnel decisions, information

for students for the selection of courses and instructors; and an outcome or a process description for research on teaching.

In order to promote good teaching practices, universities should develop coherent, systematic plans for evaluating the scholarship of teaching. Some of the practices used to reward good teaching are travel funds, special awards for teaching excellence, sabbaticals for teaching improvement, grants for course development, merit increases for teaching excellence, and using distinguished teachers as mentors (Glassick et al, 1997).

## Purpose and Objectives

The purpose of this study was to provide an overview regarding the perceived quality of education from the perspective of students by analyzing areas of instruction at Lviv State Agricultural University (LSAU) and Moscow State Agroengineering University (MSAU). The objectives were: 1. identify students' perceptions regarding strengths and weaknesses of instruction; and; 2. identify students' perceptions regarding the use of modern technologies and equipment used to teach.

## Methods

To evaluate the quality of education in Ukraine and Russia, an instrument was adapted from one developed by Bruening et al (2005). The questionnaire was translated into Ukrainian and Russian by native speakers. The instrument was validated by professors and students at LSAU and MSAU and no changes were made to the instrument. In order to better describe the quality of education, agricultural undergraduate students in their third year of study were purposefully selected to participate in the research. Three hundred students were purposed sampled in both countries. Perceptions were measured using a Likert-type scale where 5=Strongly Agree, 4=Agree, 3= Uncertain, 2=Disagree, 1=Strongly Disagree and 1=Always, 2=Often, 3=Sometimes, 4=Seldom, 5=Rarely. The data were analyzed using SPSS 12 statistical software package.

## Results

### *Perceptions about instruction at the LSAU and MSAU*

In general, students from Russia and Ukraine tended to agree that more resources are needed for teachers to do an adequate job, teachers should use more computers, and teachers need to improve the quality of teaching. Students also agreed that the lack of financial governmental support for the university is lowering the quality of education and improving the quality of teaching should be a higher priority. Russian students are uncertain whether the quality of teaching has declined over the last three years ($m$=2.7). On the other hand, Ukrainian students tended to agree that the quality of teaching has decreased ($m$=4.4) and but are uncertain if professors use a variety of teaching methods ($m$=3.4). Students in both institutions are uncertain whether teachers at the university use old-fashioned teaching methods.

Table 1
*Students' perceptions regarding teaching*

| Statements | *LSAU* *N=300* *M* | *M* | *MSAU* *N=300* *M* | SD |
|---|---|---|---|---|
| Teachers at the University use old-fashioned teaching methods | 2.9* | 1.05 | 3.3 | **0.96** |
| Teachers at the University use a variety of teaching methods | 3.4 | 0.99 | 3.8 | 0.90 |
| The lack of government financial support for the University is lowering the quality of education | 4.1 | 0.90 | 4.1 | 0.90 |
| More teaching resources are needed to do an adequate job of teaching | 4.2 | 0.74 | 4.1 | 0.92 |
| Improving the quality of teaching should be a higher priority at the University | 4.3 | 0.93 | 4.3 | 0.75 |
| Teachers need to improve the quality of their teaching methods | 4.4 | 0.65 | 4.0 | 0.71 |
| Quality teaching has declined over the last three years at the University | 4.4 | 0.82 | 2.7 | 0.90 |
| Teachers should use more computers and computer applications to teach | 4.5 | 0.87 | 4.2 | 0.96 |

**Note:* 5=Strongly Agree, 4=Agree, 3= Uncertain, 2=Disagree, 1=Strongly Disagree

***Equipment and technologies used to teach***

Students from both countries are uncertain whether the equipments used at the university gets in the way of learning. Ukrainian students are also uncertain if teachers at the university should learn how to incorporate the use of computers in their teaching ($m$=2.8) on the other hand Russian students tended to agree with this statement ($M$=4.3). Russian and Ukrainian students tended to agree that there is not enough money for the universities to adequately provide the needed equipment, teachers need more training on using equipment and that professors should use more the Internet (WWW) in their teaching. Russian students are not certain whether the internet should be used by teachers.

Table 2.
*Students' perceptions regarding equipment used to teach*

| Statements | *LSAU* *N=300* *M* | *M* | *MSAU* *N=300* *M* | *SD* |
|---|---|---|---|---|
| Teachers at the University should learn how to incorporate the use of computers in their teaching | 2.8 | 1.10 | 4.3 | 0.79 |
| The teaching equipment used at the University gets in the way of learning | 2.8 | 1.20 | 3.5 | 0.91 |
| There is not enough money in the University to adequately provide the equipment that teachers need | 3.9 | 1.04 | 4.1 | 0.93 |
| Teachers need to be trained to use new teaching equipment | 4.1 | 0.78 | 3.8 | 0.86 |
| Teachers at the University should use more the Internet (WWW) in their teaching | 4.5 | 0.67 | 3.9 | 1.07 |

*Scale.* 5=Strongly Agree, 4=Agree, 3= Uncertain, 2=Disagree, 1=Strongly Disagree

***Perceptions regarding methods used to teach***

Russian and Ukrainian students are uncertain whether professors lecture too much, teachers know how they learn best. Ukrainian (*m*=3.4) and Russian (*m*=3.5) students are uncertain whether the teaching methods used prepare them for real work settings. Students from both institutions tended to agree that they have heard that other universities use more progressive teaching methods, and that most teachers have a good background in technical skills. Ukrainian and Russian students tended to agree teachers should experiment with teaching methods and students should practice more the concepts taught in class.

Table 3.
*Students' perceptions regarding methods used to teach at the University*

| | *LSAU* | | *MSAU* | |
|---|---|---|---|---|
| | *N=300* | | *N=300* | |
| Statements | *M* | *SD* | *M* | *SD* |
| Teachers use lectures too much | 2.8 | 1.01 | 3.3 | 1.02 |
| Teachers know how students learn best | 3.3 | 0.95 | 3.1 | 0.94 |
| Teaching methods used don't prepare me for real work settings | 3.4 | 1.10 | 3.5 | 1.00 |
| I have heard that other universities use more progressive teaching methods | 3.7 | 1.00 | 3.7 | 1.05 |
| Most teachers have a good background in technical skills but lack good teaching methods | 3.9 | 0.83 | 3.9 | 0.83 |
| Teachers should to experiment with new teaching methods | 4.1 | 0.77 | 4.0 | 0.83 |
| Students should practice more of the concepts taught in class | 4.4 | 0.70 | 4.0 | 0.70 |

*Scale.* 5=Strongly Agree, 4=Agree, 3= Uncertain, 2=Disagree, 1=Strongly Disagree

## Conclusions and Recommendations

In order to increase the quality of teaching and to better equip students to enter the workforce, the data suggest that LSAU and MSAU professors should increase the variety of instructional materials and technologies, and structure learning in ways that learners would be actively involved. LSAU and MSAU professors currently use little technology in their instruction; and teachers need more technology training. However, students would less likely to pay a small amount of money in order to have better equipment (Harder et al 2006)

Society has high expectations regarding computer literacy of recent college graduates. In United States, more than 80% of the employers rated computer skills as either an "important" or "very important" factor considered in making employment decisions (Johnson & Wardlow, 2004). In addition to the high demand on computer skills by employers, most agricultural students often experience word processing throughout their academic program (Johnson et al, 2000). Universities should encourage professors to compete for technology grants and should gradually introduce technology fees so students would have greater access to better equipment.

Students at LSAU perceived that the quality of teaching has declined in the last three years and teachers need more resources to teach. In order to increase the quality of teaching and promote student-centered initiatives, LSAU needs to develop programs and strategies to evaluate the scholarship of teaching. To demonstrate its commitment to the scholarship of

teaching, the university could establish a reward system to provide travel funds for teaching improvement, teaching awards, grants for course development and technology, merit salary for teaching excellence, and expand teacher training. All of these efforts will better prepare students to enter a common workforce, meet the requirements of the modern rural enterprises, and meet the standards of a global economy and meet the expectations of the Bologna process.

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# Can videoconferencing help to rural development?

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*Abstract*
This contribution has three parts. The first part focuses on the analysis of the technological potentials in the arranging of videoconferences (VC). The second part presents two practical experiences in using different videoconference systems in the European NOODES project and in the ELLS network. The third part shortly describes the CUA's "Support of electronic education" project and provides several recommendations for the practical use of VC.

*Keywords*
Videoconferencing, e-learning, rural development

## Introduction

Today, computers and the Internet are key resources for communication and for access to information by millions of people all over the world. In the modern world we have an obligation not to permit anyone to create differences among people. We try to use the new Information and Communication Technologies (ICT), especially videoconferencing (VC) as a support for learning. Videoconferencing is a general term used to cover synchronous audiovisual communication between two or more persons.

Videoconferences generally serve as a support for a variety of different types of virtual meetings. The support of virtual participation at meetings is the most basic but also the most widespread type of videoconferences usage. In this case this concerns not only a substitute for direct personal contact, which significantly lowers the costs and time spent on travel, but it also makes it possible for such meetings to take place much more often than would be the case in real life.

## Aims and Methodology

The aim of this paper is to analyse the current technological possibilities in the arranging of videoconferences and to show their potential for practical usage in regional development.

## Results

### Standards in videoconferencing

Videoconferencing generally works on two basic standards depending on which transmission medium is being used for the implementation of the videoconference:

- Standard H.323 provides videoconferencing over IP networks such as LAN, the Intranet, or the Internet.
- Standard H.320 supports videoconferencing over ISDN and other circuit-switched media.

There are common principles held between these two types of standards, but the main difference is in providing the Quality of Services (QoS) and in the practical usage. ISDN or some other circuit switched networks are based on the infrastructure of the telephone network and work in a circuit-switched mode. This means that if two or more sites are connected in a videoconference by ISDN, the lines are used only for the purpose of videoconferencing so that the rate and quality are guaranteed (QoS) [3]. In reality, the ISDN system is not widespread in rural areas, and the connection via ISDN is more expensive than via ADSL.

On the other hand, the IP net works the same as the Internet does, in a virtual circuit mode (message mode). This means that during the videoconference the network is not reserved only for its usual purpose but part of it can serve the users and provide them with other services such as surfing the Web, and using the FTP to transfer the files at the same time.

**The basic functionalities of a videoconference system**

Every VC system assures minimally these functionalities:

- **Audio and video conference – video and voice over the Internet Protocol**.
- Text chat - sending and receiving instant text messages.
- **Whiteboard – sharing documents, images or any application**.
- List of participants – enables seeing who is connected.
- Recording - all participants can record and playback an entire videoconference.

**Example of usage of a desktop VC – the NODES Project**

The European NODES Project, which has been planned for the 2006-2008 period, is aimed at lifelong learning. The participants of the project are as follows: ENESA Dijon - (coordinator), UCC Cork, Debrecen University, UPM Madrid, ULB Sibiu and CUA Prague.

NODES is mainly aimed at certain "disadvantaged" groups of public: those living in the rural world or in isolated areas ("the distance handicapped"), those who are victims of physical or sensorial handicaps (visual, sound for instance) and victims of language handicap (immigrants and migrant workers) – this explains the development of specialized interfaces.

Implementation of the project is spread over 6 semesters. Every month (at 11:00 am, on the first Monday of the month), a video conference is held with the participation of all partners. The videoconference usually lasts for 60 to 90 minutes and is conducted according to a script prepared by the coordinator. Individual participants exchange their experiences and are asked to comment on specific items of the programme. This method will be also used in new Nodes training centres, which are being planned for for rural areas.

The Marratech system, which was purchased by the coordination team in Dijon and installed in the server, is used for videoconferences. Other participants of the videoconference – the clients – need a PC with a fast Internet connection, a videocamera and a headset with a microphone. The user can login into the Marratech system via a browser using his user name and a password. After the login is completed a dialog windows appears. It has three parts of which the most important is the Whiteboard, which displays shared documents, e.g. the Fig. 1 shows the videoconference Agenda. [1].

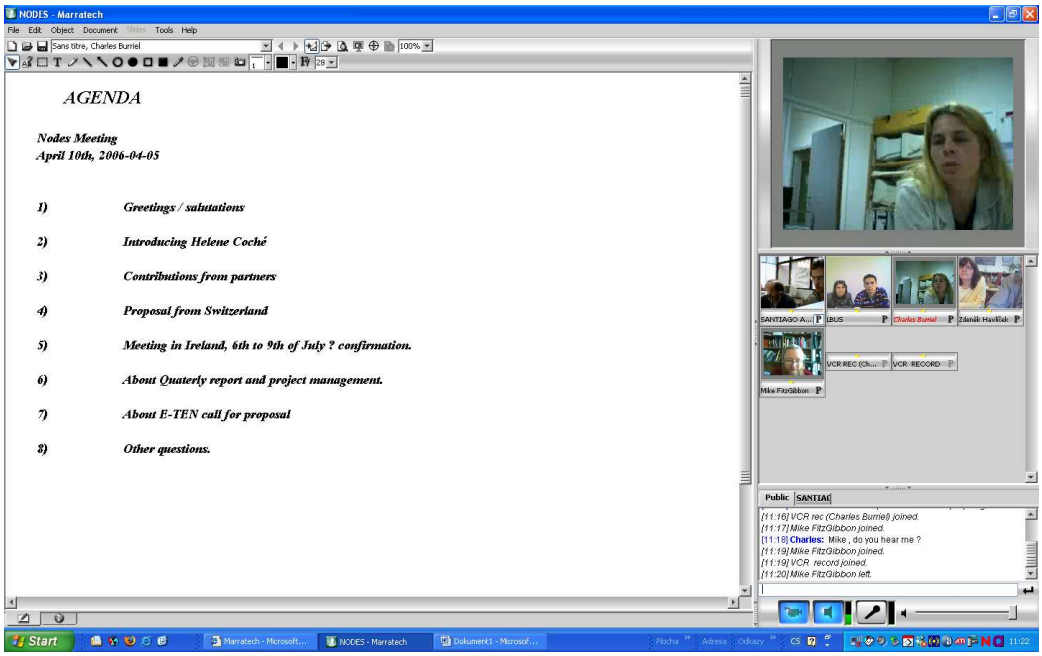


Fig. No. 1. Example of a Marratech system videoconference.

**Videoconferences within the framework of the ELLS universities network**

The Euroleague for Life Sciences (ELLS) represents a network of elite universities, which collaborate in the following areas: management of natural resources, agricultural and forest sciences, veterinary sciences, environmental sciences, social sciences and others.

At present the ELLS members are:

- The Royal Veterinary and Agricultural University (KVL), Copenhagen, Denmark
- University of Hohenheim (UHOH), Stuttgart, Germany
- Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden
- University of Natural Resources and Applied Life Sciences (BOKU), Vienna, Austria
- Wageningen University and Research Centre (WUR), Wageningen, The Netherlands

Two member universities have an observer status:

- Czech University of Agriculture Prague (CUA)
- Warsaw Agricultural University, Poland (SGGW)

ELLS aims, first of all, at joint teaching – summer schools, joint courses, student and teacher mobility, and also at assuring an overall high quality of teaching. A Codian system was used within the framework of the directed "Quality in International Horticultural Production Chains 2006" course, during the defence of student projects [2]. This course was intended for the students in the Socrates/Erasmus programme and had four parts:

1. The preparatory phase (selection of a topic), in which the students prepare a poster and an oral presentation.

2. An intensive two-week study programme at the Warsaw University.

3. Designing a group project according to a given assignment, in which the students use modern ICT – Desktop Videoconference.

4. Defence of the final project by the means of a videoconference. All participants watch and evaluate the projects which are presented by students at their own universities.

**Support of electronic education at the CUA Prague**

Based on the objectives of the ELLS working group and the current situation at the CUA Prague, the short-term aims are as follows:

- Analysis of the current videoconference systems and preparation of the proposal for the technical and programme facilities that are essential for the distant participation of staff (as well as of students) in international virtual teams (workshops), and for the support of distant teaching in consultation centres.
- Analysis of e-learning systems at partner universities and preparation of the proposal for implementation of an all-university LMS (Learning Management System).

## Conclusion

Videoconference systems are becoming a reality in the university life and are bringing a considerable progress in solving a variety of projects. The end user (teacher, research worker or a student) does not need any special software to participate in a videoconference. All they need is a PC with a videocamera (webcam) and a headset with a microphone.

The use of videoconference systems in teaching can contribute both towards better utilization of lectures and towards higher quality preparation of student projects. Quality lectures can be transmitted on-line to consultation centres. Students can use videoconference systems for easier communication in preparation of joint projects. Defence of projects before a large virtual forum is also possible by means of a managed videoconference in a lecture hall.

Our initial experience is very positive. Actual equipment for videoconferencing is not expensive. Anybody can use the Internet connection anywhere and can thus participate in a videoconference. We can, therefore, conclude that sharing information in this way can help in rural development.

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# The Strengthening Agricultural Research in the Field of Alternative Resources

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*Abstract*

This paper focuses on the current development and future potential of the agricultural research in the field of alternative resources conducted by the Institute of Tropics and Subtropics. These research activities are the base for quality teaching students in the field of tropical and subtropical agriculture and represent a part of integrated natural resources protection.

Results of the above research are put into practice by means of their applications within development projects specifically orientated towards the use and conservation of natural resources in the field of plant and animal resources and production of biomass as an important source of alternative energy. The research is especially directed to support the "sustainable development of less developed countries". That is to say "Concept of Sustainability" addresses to a large extent the environmental issues and conservation of natural resources.

Firstly, "alternative energy resources", which focus on providing less developed countries with cheaper renewable energy produced from biomass were addressed. The main research objective is production of biomass and its conversion into energy through different processes using solid, liquid or gaseous fuel forms. The research is conducted on selected biomass resources such as agricultural and forest residues, and targeted towards growing energy crops of wooden and herbal character with regard to natural, economic and energetic conditions of chosen localities.

Secondly, the main objective of research in the field of "alternative plant resources" includes selection of genetic material, conception of technologies for growing and processing alternative species with a good potential for improving agricultural and food production in less developed countries. The research will focus on crops coming from the South-American genetic centre, mainly from Peru, Bolivia and Equator. These are important for their large participation in the group of cereals (including pseudo-cereals), leguminous, root-crops and oil plants and also fruit, vegetable and medicinal species. In the field of "alternative animal resources" possibilities of alternative antelope breeding and their use for production of meat and (eventually) milk on marginal lands in the Czech Republic are researched.

The research is conducted on welfare, nutrition, growth, environmental impact and health risk prevention. Possibilities and circumstances of antelope keeping in Sub-Saharan Africa for improving "Food Security" by reducing ecologic burdens in dry pastoral areas are examined and analyzed. The research itself creates a base for a competent management of natural resources. However, the participation of students (both graduate and doctoral) in the research and use of results in specific subjects creates conditions for competence building of future experts in tropical and subtropical agriculture or related sectors.

## I. IMPORTANCE OF ALTERNATIVE RESOURCES RESEARCH

Agricultural research is cardinal for encouraging environmentally sound and sustainable agricultural growth. For example, research outputs include higher-yielding plant species, better methods for controlling pests and diseases, increased knowledge about methods for manipulating plant or animal genes, and designs for improved agricultural policies. Research creates the potential for increased agricultural production, reduced pressure on the natural resource base, and many other positive results.

## II. IDENTIFICATION OF ALTERNATIVE RESOURCES

There are different alternative resources of agricultural (natural) provenience. Renewable raw materials derived from agricultural crops are used to manufacture bioproducts in energy, replace chemicals and material industries. Renewable feedstocks address a double need. On the one hand, they offer alternatives to fossil resources, and on the other hand, they are a response to today's environmental changes: mitigation of the greenhouse effect, reduction of air, soil and water pollution, and biodegradability of products.

The research effort implies an active coordination of all the various actors involved: multidisciplinary research teams, agri-industrial enterprises, user industries and specific agricultural branches or institutions.

## III. PRESENT STATE OF RESEARCH ACTIVITY IN THE PARTICULAR PHASES

From more possible branches of alternative resources the research is especially of good prospects in 3 thematic fields: alternative energy sources through biomass production, alternative crops for both material and food production and alternative animal sources for non-traditional animal protein production.

### 1. Research of alternative energy resources

The contribution of the Czech Republic to the efforts of the EU for sustainable energy is at present about 23 PJ biomass energy yearly. Exploitation of energy mainly from biomass from agriculture in the Czech Republic is rapidly growing as it brings also other benefits for environment, for the agrarian sector, for the growth of wealth of country villages and more job opportunities (*Váňa, 2003*).

The research in the Czech Republic concentrates on crops of the temperate zone, mainly *Spartina spp., Sorghum bicolor, Polygonum spp., Cannabis sativa, Hibiscus cannabinus, Linum usitatissimum, Miscanthus x giganteus, Brassica napus, Phalaris arundinaces, Silphium perfoliatum, Carthamus tinctorius, Glycine max, Helianthus annus, Panicum virgatum, Helianthus tuberosus.* Specially cultivated clones *Populus spp.* and *Salix spp* are among the woody plants.

The research concentrates not only on growing and rational harvest of energy plants, but also on methods of energy utilization (combustion, pyrolysis, gasification, production of engine bio fuel).

Only specialized institutions including the institution of the investigator of this research programme concentrate on research of energy plants for arid and semi-arid climates. These are especially A*rgania spinosa, Ginestra, Spartium junceum, Canara cardunculus, Phoenix dactylifera, Eucalyptus spp., Arundo donax, Arachis hypoganea, Simmondsia chinensis, Olea europaea, Populus spp., Brassica napus, Carthamus tinctorius, Salicornia bigelovii.*

There are institutions that also investigate the conditions for growing other potentially energy plants in the tropics and subtropics *Echinochloa polystachya, Orbignya elifera, Bambusa spp. Musa x paradisiaca, Leptochloa fusca, Manihot esculenta, Ricinus communis, Cocos nucifera, Eucalyptus spp., Jatropha curcas, Crocurus spp., Leucaena leucoceohala, Azadirachta indica, Elaeis guineensis, Carica papaya, Acacia senegal, Agave sisalana, Sorhgum bicolor, Glycine max, Saccharum officinarum.*

In the temperate zone the yield of dry phytomass 10 - 15 t. $ha^{-1}$ yearly is satisfactory, in arid climate conditions the expected yield may be 8 - 10 t. $ha^{-1}$ of dry phytomass yearly. The selection of a suitable energy plant respecting the local climate conditions will decide about the success of the given project. The right choice is more complicated by the fact that particular species of energy plants have different demands on soil hydro limits, agrotechnics, harvesting technology and eventually on method of processing to bio fuel. Perennial plants are more suitable as they form more resistant energy plantations.

## 2. Research of alternative plant resources

According to FAO *(1996*) estimate the number of higher plant species in the world includes 300-500 thousand species. From these about 250 thousand species (*FAO, 1996a*), roughly 7,000 are considered as cultivated plants (excluding ornamental plants and woody plants). From this number only 30 species are considered significant food crops worldwide. Only 3 “main” crops, that are rice, wheat and corn, cover at present almost 50% of the world food energy consumption. Together with another 6 crops (sorghum, millet, potatoes, batatas, soya, sugar cane, sugar beat) they cover as much as 75% of this consumption. These crops have been for a long time and are now in the centre of attention of the world market and scientific research (*Hammer, 2003*).

Other species with promising economic potential, so called minority crops were for cultivation or economic reasons replaced by more suitable crops, in the better case they kept their importance in regions of their origin, nevertheless the market and scientific research interest they receive remains marginal (*Padulosi, et al., 1999*).

Because of this situation, in the year 1996 in the frame of 4$^{th}$ International FAO Conference about plant and genetic resources, an international agreement about protection and utilization of plant genetic resources for nutrition and agriculture, the so called “Leipzig Declaration” has been signed. The declaration was signed by representatives of 150 world countries and these committed themselves to fulfill the international programme for protection and sustainable utilization of plant genetic resources. This fully accords with the international agreement about biological diversity. The “Leipzig Declaration” has determined 4 basic directions of research of plant and genetic resources, based on a multidisciplinary approach (*FAO, 1996b*).

The system approach expects a research of alternative crops, which should enrich food, eventually raw material resources in some target countries. Introduction of some crops into domestic (Czech) agricultural production is also possible.

South American Genetic Centre is the originator of many crops of world significance as potatoes (S*olanum tuberosum*), manioc (*Manihot esculenta*), vegetable and root paprika (*Capsicum* sp.), pinneaple (*Ananas comosus*) and cocoa (*Theobroma cacao*), but also their minor species with unique genetic properties and other less known species with promising economic potential. To these less known species belongs for instance ‘quinoa‘(*Chenopodium quinoa*), a basic food crop of the original inhabitants of high mountainous areas of Peru, Bolivia and Ecuador. Seeds of this pseudo-cereal, rich in proteins, with balanced ratio of amino acids, could become a better source of protein than most of classic cereals (*Mujica, et al., 2003*).

In the group of oliphereous plants stands out at present ‘sacha inchi‘ (*Plukenetia volubilis*), a perennial liana belonging to the family *Euphorbiaceae*, having 54% of oil with high content of unsaturated fatty acids and 27% proteins in its seeds (*Guillen, et al., 2003; Hamaker, et al., 1992*). However environmental needs, neither technology of cultivation, nor intraspecific variability of this species were not a subject of scientific research so far.

Another perspective species namely for agro forestry systems in the Amazonian region is a perennial fruit species *Inga edulis*, it presents many possibilities of utilization, mainly from the viewpoint of ecologic stability of the agro forestry systems. (*Alegre, et al., 2005*). Most of Amazonian economic species is also used in local traditional medicine. Although many of these species are traditionally used to cure different infection diseases, inflammations and injuries, so far only several studies dealing with their antibacterial, antifungal and ant oxidative activity were published. (*Jovel, et al., 1996; Pierre-Canel, et al., 2000; Neto, et al., 2002; Dohas, et al., 2003; Kloucek, et al., 2005*). For this research are the perspective species namely ‘sangre de drago‘(*Croton lechleri*) and ‘uña de gato‘(*Uncaria tomentosa*).

## 3. Research of alternative animal resources

Breeding of antelopes in capture is known on the African continent already in the year 2400 B.C. Only in the first half of the 2Oth century, with increasing demand for meat, first farms for antelope breeding were established, for instance in Zimbabwe *(Posselt, 1963).* Outside the African continent, the breeding of eland in Ukraine station Askania Nova is notable, the breeding of the given species is going on since the year 1892 *(Treus a Kravchenko, 1968).* Eland has managed to adapt itself to conditions of the temperate zone and it prospers well *(Treus, 1971);* and as it physiologically resembles cattle, FAO commission made a proposal to domesticate it *(Scherf, 2000).* In the Czech Republic so far welfare of farm breeding of deer *(Soják, et al., 2002)* and selected species of runners *(Council of Europe, 1995)* were investigated.

Farm breeding of eland may bring new possibilities to farmers in conditions of the Czech Republic, for instance utilization of meat and animal products, maintenance of the country or agrotouristics. *(Kotrba, et al., 2004, Kotrba a Ščevlíková, 2002).*

Successful farm breeding of eland in the conditions of the Czech Republic is based on adequate stalling and the ability of animals to adapt themselves to local conditions. To make

sure about the physiological and adaptation abilities of the given type of antelope it is absolutely necessary a research of effects of temperature and humidity characteristics of the barn, namely in the winter period. For non-invasive representation of the temperature profile of animals a termographic method is used*(Knížková et al., 2002)*. It was established, that the eland is able at temperatures above 0°C to prevent the loss of body heat on the same level as cattle *(Kotrba et al., 2006).* Generation of heat and intensity of metabolism at lower temperatures for elands have not been so far made clear. Also seasonal changes in the quality of coat of eland remain unknown.

An important role in farm breeding of wild animals plays appropriate nutrition, quantity and quality of food, optimum ratio of fibre and proteins, presence of toxins. In natural conditions eland is a grazing animal and may browse by chance (*Cerling et al. 2003).*

The quality and digestibility of fodder has an effect on the growth of animals *(Pavlů, et al., 2006).* Optimization of the amount of fodder and its influence on the progress of growth during ontogenesis of eland is still unknown.

A contribution which can not be neglected is the grazing of antelopes on vast areas and its positive effects on growth of grass and therefore on the maintenance of the country *(Hejtman, et al., 2002a).* At present more than 50% of grass growth in the Czech Republic is not cultivated for fodder *(Kvapilík, 2002).* Lasting grass growths without regular defoliation are degrading or are endangered by the succession of woody plants.

Another problem presents the expansion of weed species, which decrease the utilization of growth for fodder as well as aesthetic perception of the country *(Hejtman, et al. 2002b),* for example sorrel (*Rumex obtusifolius, R. crispus*), thistle (*Cirsium arvense*) or common nettle (*Urtica dioica*), (Novák a Slamka, 2003). Elands are grazing on these weed species in the temperate zone and are able to reduce their quantity successfully on the grazing land. *(Kotrba, et al., 2005).* The grazing of elands may mean one of the possibilities how to prevent the degradation and expansion of weed and woody plants to unused areas.

Not only the type and quality of stalling *(Bowel, et al., 2003),* but also the handling of animals by the keeper *(Rousing a Waiblinger, 2004)* is closely reflected in the welfare of the animals. A substantial signal of welfare of animal breeding in capture is the possibility to show natural mother's feeling. From the point of view of the relation between mother and calf, an interesting phenomenon presents the suckling of other animal's calves (allosuckling), which has been observed on many kinds of hoofed animals *(Packej, et al., 1992),* so far it has not been definitely explained. Optimization of the problematic as a whole for eland in capture will optimize the proposed technology of breeding *(Bartoš, et al., 2001a, 2001b, Víchová a Bartoš, 2002).* This has to be based on the needs of the animals and it has a basic importance for welfare and increased production ability.

According to estimates more than 90% of breeding lines, which used to be in the in the breeds of world zoological gardens had disappeared. The problems of breeding are not only keeping of clean lines, but also the danger of inbreeding in small populations, without improving the population by import of non-relative animals *(Benirschke a Kumamoto, 1991).* Determining the genetic variability of the population, taxonomic identification or determining the sex of antelopes will help to broaden the breeding of small populations in capture.

Economic losses are a result of drop in weight gains and metabolic defects. Then follow increased costs for keeping, prevention, curing and breeding selection of animals *(Sovják, 1998).* Monitoring of the metabolic profile, acidobasic balance, biochemical and hematological parameters plays an important role in the prevention of illness. A role which can't be neglected play the studies of resources and routes of spreading the infection sources in Africa *(Nápravník a Antonínová, 2002, Lukešová, et al., 2006)* and also for wild and domesticated ruminants in the conditions of the EU *(Pavlik, et al., 2002).*

The meat of African antelopes is according to its organoleptic and dietetic specifications unique, *(Bothma, 1996),* and thus it becomes one of the basic targets of research and utilization to secure food resources in Africa. In this area eland has gained success not only in natural conditions, but also in the farm breeding system, where it is possible to reach meat yield up to 63% *(Hrouz, 2003, Momany, et al., 2001).* Qualitative evaluation of meat before and after the maturing process makes possible to compare the quality of meat with meat of other non –domesticated and domesticated animal species *(Cordain, et al., 2002).*

## IV. PROPOSAL FOR RESEARCH OF ALTERNATIVE RESOURCES

### 1. General Objective

The objective of the proposed Research Programme will be "**Research on Utilization of Alternative Resources for Sustainable Development of Less Developed Countries Considering the Interests of the Czech Economy".** The research will therefore deal with alternative resources existing in agriculture of less developed countries. These resources should enrich the food basket as well as improve access to energy of inhabitants of the target countries and possibly also of the Czech Republic. It is basically a security research in case we shall consider this research from the viewpoint of increasing the food security and rural energy supply. The proposed research is in tune with the Institute of Tropics and Subtropics mission as specialized workplace of the Czech university of Agriculture Prague for the less developed.

### 2. Specific Objectives

Specific objectives fulfill the General Objective when the particular topics, as characterized above, are completed:

1. After survey of the conditions (soil, climate and economic) determine the suitability of proposed energy plants and economy of energy utilization of available agricultural waste for selected countries. Select at least one energy plant and rapidly growing woody plant for these areas, propose suitable agrotechnics for cultivation, including harvest, after harvest handling, technology of production of phytofuel, efficiency of production of heat energy and suitability of some equipment for energy upgrading of biomass from selected resources. During the research we shall try to find other alternatives (species of potential energy crops), which could eventually become a research target. Eventually also propose other methods of energy utilization, with a good economic potential. The aim also will be to offer for practical purposes proven technologies for exploitation of energy plants. Their use will be verified by exact calculations of economic and energy effectiveness, including the pay-back period of investments, eco-audit and calculation of exposure.

**2.** Select the genetic material and prepare technologies of cultivation and utilization of alternative species of agricultural crops. Make an inventory of the genetic material in areas of interest, select the species of economic plants with a promising economic potential, determine the genetic variability of the particular species, determine nutrition values, chemical composition and biologic activity of selected species, prepare the technology of cultivating the selected species, including cultures in vitro and their implementation into agro forestry systems. Finally conduct the evaluation and rating of these systems.

**3.** A partial target of the realization of Phase III. will be the research of conditions of farm breeding of eland in the conditions of the Czech Republic and in less developed countries for meat and milk production, based on their physiology, adaptability, nutrition needs, meat characteristics and quality of meat and milk. The research will proceed in phases and will be directed to: description of seasonal and temperature adaptation mechanisms of the eland and optimization of stalling conditions with respect to welfare, fodder quantity and its impact on growth, the impact of grazing on botanical composition of grazing vegetation; social relations of hoofed animals in capture and influence of the presence of man, quality of maternal behaviour and its changes in different breeding systems, verification of genetic methods to determine relationship and genetic variability of populations for antelopes in capture; monitoring the level of nutrition and metabolic profile of antelope breeds in capture and quality and health of meat and meat yield of the antelope. The aim will be to offer practically approved technology for utilization of farm breeding of eland, its exploitation will be supported by exact calculations of economic effectiveness, including the pay-back period of investments and calculation of exposure.

## 3. Expected results

**3.1 The expected results of the phase "alternative energy resources"** will be at least one energy plant and rapidly growing woody plant, suitable for the given areas, selected from proposed alternatives. The advantage of energy utilization of available agricultural waste will be exactly determined on the basis of suitable agrotechnology of cultivation including harvest, post harvest treatment and technology of phytofuel production. The effectivity of producing thermal energy and suitability of some devices for biomass exploitation from the investigated resources will be established. The results will also include other eventual alternatives (species of potential energy plants), which could become an object of research and a proposal of other methods of energy utilization of investigated alternative resources with a good economic potential. Verified technologies of utilization of energy plants will also include calculations of economic and energy efficiency including the pay-back period of investments, eco-audit and calculation of exposure.

**3.2 The expected results of the phase "alternative plant resources"** will be preparing of technology for cultivation and utilization of new species of alternative crops, suitable for nutrition of people or animals, eventually which could be used as a source of raw materials for food, pharmaceutical or woodworking industry. Species in the inventory list will be overviewed, for species with a promising economic potential, genetic variability and detailed nutrition values will be determined; and for medicinal plants possibly

biological activity. Recommended technologies for cultivation of these species should be the results.

**3.3 The expected results of the phase "alternative animal resources"** will be an objectively documented suitability of farm breeding of eland, based on utility, health and welfare (etological factors) and also based on methodical recommendations for technological procedures for eland breeding, taking care of the welfare of animals, bred in groups. An outstanding result should be the setting of a standard for the metabolic profile of eland, based on hematologic and biochemical characteristics, acidobasic balance in field conditions and of the slaughter standard of eland in the conditions of Czech environment set at the foothills together with the guidelines for storing and distribution of eland meat.

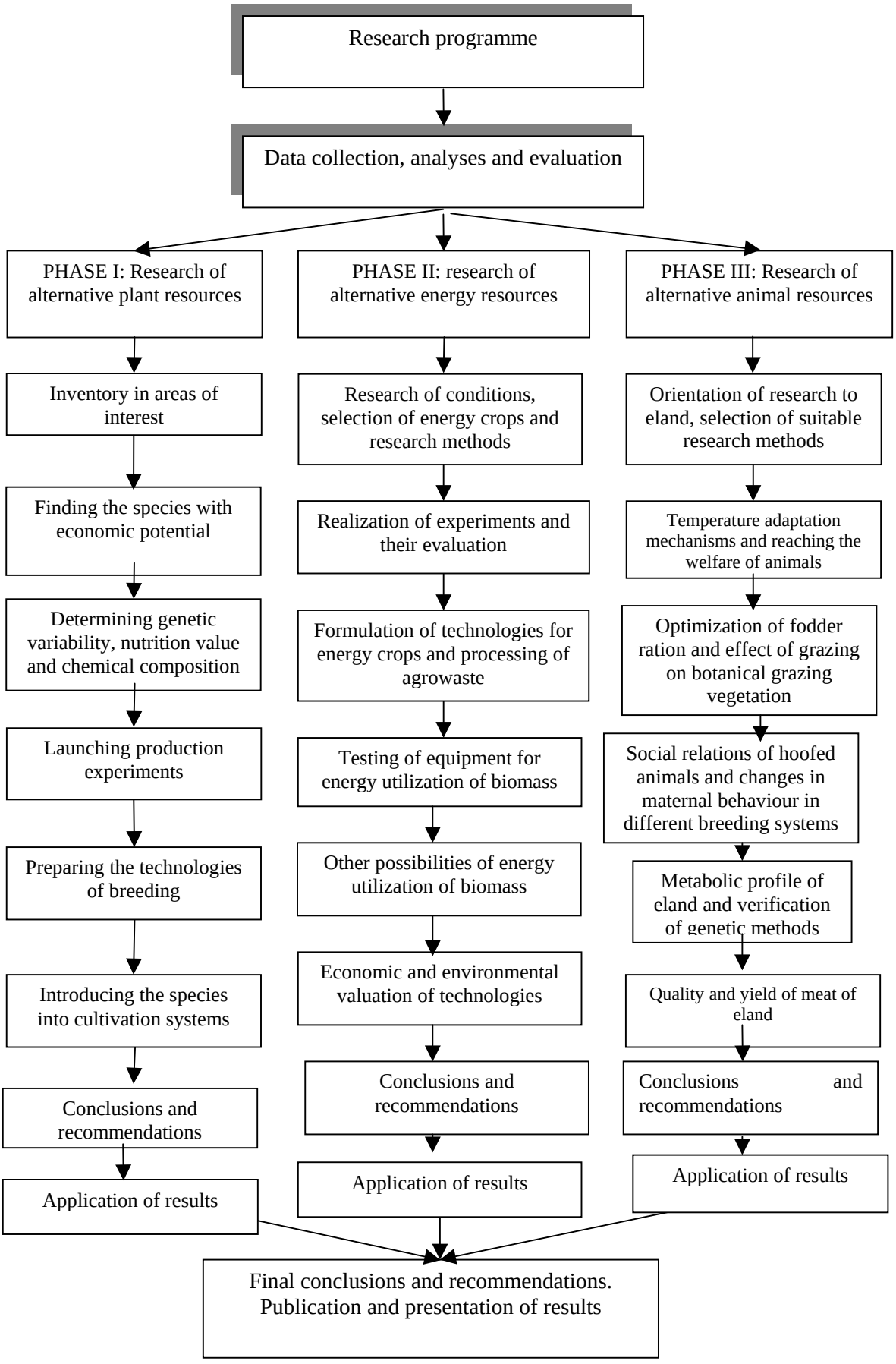
## 4. Strategy and methods

### 1. Strategy

The strategy of research of alternative resources for sustainable rural development of less developed countries is due to the character of solution based on a multidisciplinary approach with participation of biological, technical, economic and sociological disciplines. From this point it is then rather an applied research with an interdisciplinary character. Nevertheless, many steps of the research of all topics in all phases will have outputs of basic research. The thematic areas are generally considered as very important for rural development and also for strengthening the foreign policy orientation of the Czech Republic on countries, which are considered as a priority. Strategic orientation of research activity will deal with rural development in agricultural primary production as the economic basis with added value in food processing and energy production and (eventually) other alternative sub-sectors.

### 2. Approach

The methodological approach is described by the layout as included in the chart.


Research programme
Data collection, analyses and evaluation
PHASE I: Research of alternative plant resources
PHASE II: research of alternative energy resources
PHASE III: Research of alternative animal resources
Inventory in areas of interest
Finding the species with economic potential
Determining genetic variability, nutrition value and chemical composition
Launching production experiments
Preparing the technologies of breeding
Introducing the species into cultivation systems
Conclusions and recommendations
Application of results
Research of conditions, selection of energy crops and research methods
Realization of experiments and their evaluation
Formulation of technologies for energy crops and processing of agrowaste
Testing of equipment for energy utilization of biomass
Other possibilities of energy utilization of biomass
Economic and environmental valuation of technologies
Conclusions and recommendations
Application of results
Orientation of research to eland, selection of suitable research methods
Temperature adaptation mechanisms and reaching the welfare of animals
Optimization of fodder ration and effect of grazing on botanical grazing vegetation
Social relations of hoofed animals and changes in maternal behaviour in different breeding systems
Metabolic profile of eland and verification of genetic methods
Quality and yield of meat of eland
Conclusions and recommendations
Application of results
Final conclusions and recommendations. Publication and presentation of results

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# Perceptions and expectations of the local people in regard to agriculture and agricultural education in Angola

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*Abstract*
The article summarises the actual situation of agriculture and agricultural education system in Angola. Many of the key constraints to country development and food security result from the physical, political and humanitarian impact of the 27-year long civil war. The consequences are tremendous and have affected all aspects of economic and social life, resulting in widespread poverty, dissemination of landmines, massive displacement of persons, isolation of vast areas of the country, civil insecurity, weak governance, and misallocation of resources among others.

During the years of conflict, agriculture fell to an almost subsistence level in many areas, with little or no marketable surpluses and very limited trade activity. Consequently, the country has for many years relied on food imports and food aid provided from other countries. Agricultural and rural development has a high potential for reducing poverty and facilitates the problem of food supplies.

Increasing of qualification of human recourses is crucial for long-term development of the country. Education system was destroyed during the civil war and rehabilitation of education system is inevitable for reconstruction of other sectors. The main interventions which are necessary to improve include to provide continuity and sustainability of training new primary teachers and extend training to second and third level teachers; to provide professional training, including in agriculture; to build and rehabilitate schools, including equipment and educational material; to reintegrate street children into general education; to provide institutional support for the formulation and implementation of policies to improve general education and develop education.

*Key words*
Angola, agriculture, education, food security, rural development.

## 1. Introduction

The need for education is particularly great in a country like Angola especially in the field of agriculture which is essential for the food production. Due to years of civil war several generations have grown up with only a minimum approach to education and information. Education plays a crucial role in economic, social and cultural development and is fundamental for the eradication of poverty. Agricultural production in Angola is low and establishment of quality agricultural education system is indispensable for a reconstruction of agricultural sector.

The paper is based on one year personal experience with agricultural education system in the Bié Province through coordination of the bilateral development project "Establishment of the Centre of Agricultural Education in Bié Province (Angola)". The project was realized by the Institute of Tropics and Subtropics, Czech University of Agriculture Prague from 2003 to 2005 and was financed by the Ministry of Education, Youth and Sports of the Czech Republic.

The principal aim of the project was to establish the secondary school of agriculture and to develop training services for local farmers in the central province of Angola which is the most destroyed province due to the civil war. On the other hand, the province has a huge agricultural potential and the reconstruction of the agricultural education is one of the essential step which must be achieved to the post-war reconstruction and development of the region.

## 2. Socio-economic context

The civil war that began after independence in 1975 and continued up to April 2002 caused massive destruction of the country's infrastructure, disruption of markets, interruptions in the transfer of knowledge, social instability and economic disorder (FAO, 2004). According to the World Bank, approximately 70 % of Angola's population lives below the poverty line. By the end of the war, there were over 4 million internally displaced people (IDPs), the majority of whom were children and women. Angola is one of the most mine-infested countries in the world and this is hampering the country's rural development.

Social reintegration, safety and civil protection, food security and rural development, fight against HIV/AIDS, development of education, health, basic infrastructures, work opportunities and professional training, government and macroeconomic management are main areas which should be improved as a part of a fight against poverty in the country. These priorities were identified by the Angolan Government in the Poverty Reduction Strategy Paper (Estratégia de Combate à Pobreza, 2003).

## 3. Overview of Agricultural situation

Prior to independence in 1975, Angola was self–sufficient in all key food crops except wheat and agricultural exports accounted for nearly 60% of total exports. The decades of civil war, and a failure to reactivate the agricultural sector production during the 80s and 90s led to a drastic fall in agricultural output, and made Angola largely dependent on food imports (CAADP, 2005). Presently, agricultural production including forestry and fisheries contributes to the total GDP with around 9%, of comparison with the oil and gas which remains 54 % of GDP. The percentage share of inhabitants working in agriculture is 42 % and 70% of the labour force is provided by women.

Almost 65 % of inhabitants live in rural areas where farming is the main source of livelihood and own agricultural production is indispensable for their food security. Agriculture is predominately a family-labour activity for millions of smallholders. Most farmers practise traditional agriculture using hand tools for land preparation and wedding, planting local seeds held over from the previous harvest (FAO, 2004).

Public perception of agriculture is different than in the developed countries. Agricultural production is key element for local people. “Farmers with little land are highly risk averse, in general, because they have so little flexibility. For them, the difference between a good harvest and a bad one can be the difference between subsistence and hunger. Those small-scale farmers with higher levels of education, however, even with a few years difference in schooling, are better able to adapt innovations to local conditions and therefore more likely to assume risks in changing production techniques” (Edwards, 1999). Establishment of quality agricultural education system is essential for a reconstruction of agricultural sector.

The recovery of agricultural sector is seriously hampered by following factors: the isolation of the countryside due to the collapse of the roads system and bridges; reduced access to cultivable land due to the widespread presence of unmapped landmines; the collapse of the internal trade and distribution network; insignificant levels of domestic credit available to agriculture and livestock sectors; and weak institutional support (CAADP, 2005). On the other hand a former Portuguese colony has a huge agricultural potential because of climatic and natural conditions are relatively favourable.

## 4. Agricultural education

Education presents a number of challenges, beginning with the fact that 44 % of children do not attend primary school (UNICEF, 2004). With an estimated illiteracy rate of 58 % (as against 38 % for the rest of Africa), Angola’s educational indicators rank among the lowest in the world. Educational system does not respond to the needs of local population and to actual situation from the both quality and quantity points of view. System of formal agricultural education is very poor in the country where agriculture played, play and will play very important role for the local people**.** There are only two secondary schools of agriculture in the whole country. The only public higher agricultural oriented institution is the Faculty of Agricultural Sciences located in Huambo Province, which is a part of the University of Agostinho Neto. The Faculty offers a master program of agronomy (agricultural production, agricultural biology, rural engineering) and veterinary, a post-graduate programme is lacking.

The securing of high-quality basic and secondary education ensuring the literacy of the local people is the first step which precedes the improvement of higher education system. Following factors were observed as the most problematic areas influencing formal educational system including also agricultural education.

Majority of school infrastructure has been damaged by war, vandalism or by lack of maintains. Students of basic schools are often taught outside because adequate classrooms are lacking. Lots of schools teach three times per day, students are divided into morning, afternoon and evening courses to fully utilize of school’s classrooms. The quality of teaching is negatively impacted by the high number of pupils in classroom; the average number of students in class is around 60, but it is possible to find professor: student rates of 1: 70 or even higher. Rate between boys and girls in classroom is unfavourable to girls; the same gender inequality is also evident between teaching staff. An access to education is different in each province; generally better situation is in cities than in rural areas where especially secondary schools are completely lacking.

Basic and secondary schools, particularly rural schools, do not function properly due to lack of qualified teachers. The teacher is a key factor. Due to lack of qualified teaching staff,

students in the lower years are taught by students who are in the higher year. Low salary levels and delays in salary payments have made teaching in the public sector an unattractive profession.

Curricula of agricultural schools do not properly relate to needs of local conditions and to sustainable rural development. Learning materials and technical tools are not sufficient in the both quality and quantity. Textbooks and other supporting teaching materials are lacking, libraries were destroyed during the civil war, and access to Internet is scarce. Informal learning, which usually occurs through everyday interactions with the environment and offers new information e.g. through reading, radio, television broadcasts, communication, is very poor. Daily newspapers, books or television are not available for the vast majority of local people.

## 5. Recommendations for improving the quality of agricultural education

Following general approaches and suggestions are recommended to improve the quality of education agricultural system, especially higher agricultural education, aimed to rural environment:

*Redefine the objective and content of curricula*
A curriculum development is key area for intervention in agricultural education. National curriculum should be revised and should include new goals, structures, and roles for schools, teachers and students. Innovations of curriculum and teaching methods should be changed according the socio-economic environment, sustainable rural development and the results of the labour-market studies. The priorities are to take advantages of local labour market, to support an access to employment, to improve the quality of training, to form conditions of reduce poverty and to support sustainable economic and social development.

*Setting up of varied training systems*
The orientation teaching programs and topics of agricultural education should be diverse and reoriented to rural environmental topics. Training courses should cover areas as forestry, food security, water and soil management, sustainable use of natural resources, environmental conservation, agricultural management, marketing of agricultural products, etc.

*Teaching methods should be redesigned*
Traditional education is based on transfer of information to students, but participatory learning in groups and real-life problem including rural environmental topics are also useful. Teaching and learning strategies should be changed to dynamic learning system including different teaching models i.e. team teaching, group discussion, problem based learning, case studies, etc.

*Training support tools*
Printed and audio-visual training support materials (e.g. handouts, workbooks, journals, videotapes, slides) could be used to augment various training methods. Agricultural schools should have school farms which could serve as demonstration farms for students' practical exercises.

*Research oriented to rural areas*
Rural development topics should be based on actual needs of farming systems and include the

farmer's objectives. Universities could use the local knowledge and practices and ensure the participation of farmers and rural people in all process of problem analysis, technology development, adaptation and extension. Wider dissemination of research results and information about the successful implementation guarantees the access to knowledge for everybody.

*Need to identify new audiences*
The target groups which should also be involved into education system include primarily children from street, displaced people, rural people and women. Encouraging an increasing proportion of women into agricultural education is considered a possible solution to making technology transfer more effective, and also to transferring the benefits of social programmes to women in the villages (Rama Rao et al., 2000).

## 6. Conclusions

The establishment of quality agricultural education system is necessary precondition for a reconstruction of agricultural sector and increasing of agricultural production in Angola, which is fundamental for local people. The above mentioned recommendations for improving the quality of agricultural education are possible to achieve only with support from research institutions, local organizations, non-governmental organizations and especially foreign universities and institutions. This integrated system of cooperation and mutual exchanges of information is essential for local development. However, the improvement of the agricultural sector can only be achieved in parallel with reconstruction of all services as health, trade, basic infrastructures etc.

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# Improving knowledge generation and information transfer in the rural areas

**Jiří Husa**

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*Abstract*

New and future members states are currently adapting their rural area information system in order to comply with the EU policies, to improve responsiveness to farmers needs and to deal with ecological impact. Transfer of information should become more efficient and effective. Innovative approaches in the field of knowledge generation and information transfer for the rural area were studied in the Transfer Project. Comparative methods were used for the rural information systems in the Netherland, Czech Republic, Poland and Hungary. The role of educational institutions (particularly universities) in the information transfer varies from country to country. The objectives of the project were as follows:

- to make an inventory of experiences on innovative approaches related to decentralization participatory knowledge generation
- to explore the consequences for the information systems in each country
- to formulate initiatives and needs for the near future development in the rural areas

## Introduction

The new and prospective EU member states are currently adapting their agricultural industry system in order to comply with EU policies, to improve responsiveness to societal needs, and to become more efficient and effective.

A comparative study on the extension and transfer of knowledge in pre- and post-accession countries was held in the 2005. Its purpose was to explore and test alternative models for improving the effectiveness of the information transfer and generation for the rural areas (agriculture industry) in the new and prospective EU member states.

There is an increasing need to explore participatory and multi-stakeholder approaches for knowledge generation, where farmers, researchers, advisors, policy makers and others work together for innovation, for the environmental effects and for the level of information services in the whole agriculture industry. In practice, farmers and others working together to create practicable solutions for improved farming can achieve more than centrally organized individual farm advice.

**The objectives of the study were as follows:**

- To make an inventory of experiences on innovative approaches related to decentralized, participatory and multi-stakeholder knowledge generation and sharing in the EU member states.
- To explore consequences for the advisory systems in each country, including the roles of advisors, researchers, policy makers and farmers.
- To formulate pilot initiatives in each country that will be implemented in future.

**Particular questions were focused on:**

- Integrating participatory approaches for agricultural innovation into the existing advisory and research system,
- The role of cost-sharing principles for improving the performance of information services,
- Consequences of conducting research and giving advice in the field of organic farming,
- Introducing the market chain concept (including the consumers view) into agricultural industry information system

**Knowledge generation and circulation**

World wide, the ***transfer of technology (TOT) model*** has been introduced as an important policy instrument to agricultural innovation and to agricultural production and income (especially the World Bank). According to the TOT model, agricultural innovation starts at universities and research centers, and is then being transferred to farmers by extension workers and advisors. Farmers adopt new technologies and new policy regulations in their farm practice. The communication flow starts within ministries and research stations, who have found the solution to a problem they formulated.

As a reaction the ***advisory model***, based on problem solving processes at the farm level has been introduced. In this model, both farmer and advisor jointly analyze the situation, farm experiences and knowledge available at both levels in order to come to a practical solution to the problem. If necessary, the advisor provides information on new policies and research findings. The advisory model also opens opportunities to look at farm management in a larger and multi disciplinary perspective and does not limit advice to technological packages.

Other models are aimed at agricultural innovation which is not based on transferring information and adapting it on the farm level. They acknowledge that every stakeholder, based upon his own experiences, has **knowledge that needs to be shared with others**. Innovation is the result of what relevant actors do, what practices and experiences they have and how they communicate or "network" with each others and how they learn together.

Instead of transfer of knowledge the focus is on ***joint generation of knowledge***. Within this knowledge generation model, we will distinguish two methodologies. The first is focused upon ***knowledge generation amongst farmers;*** the second is focused upon ***knowledge generation between different stakeholders or societal learning***. These insights ask for more interactive and participatory approaches, in which knowledge is jointly generated or constructed, rather than transferred. They also require a more systemic approach, in which policy-makers, researchers, farmer representatives, input suppliers, sales men and advisory services work together in order to make a difference towards agricultural innovation.

Changing the agricultural innovation model from the Transfer of Technology model into the Advisory model or into multi-stakeholder joint learning models has important consequences for the ***role of advisors and researchers and their relations in the agricultural knowledge and information system.*** Extension workers in the TOT model are expected to come with clear messages and tell farmers what to do. ***Advisors are expected to assist farmers in defining their problems*** and then assisting farmers to make a choice out of different solutions provided. Interactive approaches with more stakeholders do need facilitators.

## Major findings of the Transfer project

- Most of the advisory and extension systems are based upon the Transfer of Technology model. Those countries that have a private advisory system try to shift the model into an advisory model. There is limited evidence of the existence of other models, such as the facilitation of knowledge generation amongst farmers as well as joint action between stakeholders in one sector.
- In all countries, policies are being formulated with a focus on both rural development and employment as well as on market-oriented agriculture. All countries make sure that advisory services can provide advice on a cost-recovery basis, by reviewing their legal position (Poland). All countries are subsidizing specific information services and events on EU legislation, on access to direct payment subsidies and other subsidies. All countries have public advisory services for Rural Development.
- The most important difference between the new and prospective member states is that the Czech and Slovak Republic do have a private advisory system, whereas Poland, Romania and Bulgaria have a public advisory system. Hungary seems to have a dual system. All countries invest a lot of resources in improving the quality of advisors and in setting up accreditation systems.
- Approaches for knowledge transfer are concentrated on providing farmers and the agro business sector with public information by the internet, or by sub national offices of the ministry of agriculture, agricultural chambers. At this moment, there is no evidence that the knowledge and information systems in place are oriented towards specific target groups, such as big farmers, small market oriented farmers and semi-subsistence farmers.
- The most important strengths of the advisory system are that are people working in the advisory system and in the Ministries of agriculture are highly knowledgeable and experienced resource persons. Also enough sources of information are available and accessible at all levels, even for farmers. Major weaknesses are weak performances of advisors working with farmers, poor organizational performance of public advisory organizations and poor linkages between all kind of stakeholders in the agricultural knowledge and information systems. A preliminary conclusion is that there are two parallel knowledge and information systems, one “informal” system used by small farmers and the ‘formal” systems put in place by the governments.

## Conclusions and recommendations

### 1. Articulation between the ‘formal” information system and the “informal” information system is needed.

National policies and information systems are currently being adjusted in order to comply with EU regulations. They aim at assisting farmers to get access to EU subsidies and do not have an answer to technological and marketing problems. Two parallel information systems exist with very weak mutual linkages. The first one is the”informal” system used by small farmers, the second one is the ‘formal’ system put in place by governments and EU.

Concrete figures are coming from Poland, where the formal system lost contact with the small farmers because it is too busy with EU rules and regulations. In this situation it is not possible to implement environmental measures and to promote environmentally complex agro-ecosystems that require highly specialized advice related to the local conditions of the individual farm.

**2. Farmers and people in the rural areas should be able to clearly articulate their needs**

As a consequence of the historical context the roles and responsibilities of farmers have changed. In some countries farmers were for a long time employees who did not bare any responsibility for farm outcomes and behaving. A farmer in the EU context is expected to behave as an entrepreneur and should be able to manage his farm not only from the economic point of view, but also from the environmental point of view.

**3. Establish relations built upon trust amongst all the elements of the information system and knowledge generation system.**

Trust amongst farmers in many former communist countries is missing as well as trust between farmers and information transfer system. As a result of the historical context, farmers are working in an isolated way and are not used to participation and working together. Underlying norms and values are based upon the belief that having knowledge is a source of power, which creates a distinct advantage versus `competitors`. It results in the fact that knowledge is rarely shared.

**The following solutions are proposed:**

- It is recommended to identify natural farm leaders or champions per sector or per crop or the environmentally friendly based groups. Jointly define common problems and ask assistance from advisory and research to address the key problems. On this basis of success you can build trust and the bases could be used as the board for mutual problem solving.
- In order to attract farmers one can start with sharing information on technical aspects- rather than financial and economic aspects. Use specific problems as an entry point to start collaboration that has a potential in providing solutions and benefits.
- **External facilitators** can introduce topics, invite participants who have interesting topics to discuss, propose experts on important topics. The meeting place should be on neutral ground, for instance a study or demonstration plot.
- Facilitators should make sure that they address the questions proposed by participants. They should avoid quick fit answers and solutions. It is recommended to do field discovery studies, joint testing of solutions and joint formulation of group.
- On the process side; it takes time to develop trust, you need transparency, respect, honesty, you need to meet expectations, create mutual learning and you can grow into other activities when there is trust.

**4. Institutional arrangements that make advisory services and research more responsive to the needs of small farmers**

The most important is to acknowledge that the actor who has money is the one who decides upon research agendas and upon advisory services to be provided. The following solutions have been discussed in order to give small farmers more decision-making power:

- First of all they should start to organize themselves and start fundraising to finance research programs.
- Boards of farmer experts or temporary working groups can be established that decide upon research agendas.
- Farmer boards and farmer organizations should assess research and advisory proposals issued by tender procedures.

## 5. Training is needed for farmers, researchers and advisors

Researchers and advisors **should receive training on facilitation skills**. Training programs that advisors need to follow in order to get accreditation should incorporate modules on facilitation, participatory approaches and advisory skills. These skills-trainings should also be included in the university programs for students and in secondary schools.

The knowledge generation and circulation models that are based upon group learning and societal learning are more cost-efficient in the sense that advisors or extension workers reach a group of farmers rather than individual farmers. The role of the universities should be also aimed at improving the communication and social skills all the links in the rural chain.

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# The importance of multi-disciplinarity in education of future agriculture economists - some practical experience

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*Abstract*

The demands of contemporary global and fast growing society create the need of multi-disciplinarity in pre-graduate education of all branches of science.

Therefore at FEM CUA psychological subjects are included into curriculum of future agriculture managers and economists. In this perspective is subject Psychology and business ethics one of the most vivid illustrations. The training in social competences, communication skills and leadership is necessary part of education of future managers.

This paper refers to the practical experiences with e-learning application to this subject. This virtual support provides better and more intensive study mean for higher number of students and furthermore offers easy access for the external students. Authors will offer the experience with using this method in teaching of 600 full time students in this academic year.

*Keywords*

Multi-disciplinarity, education, agriculture, economy

## Introduction

Statistics cite that up to 88% of Czech Republic territory is suitable for various agriculture and forestry purposes depending on the fertility of land (Zagata, 2004). Rural economy has therefore an important relation towards the environment and the issue of permanently sustainable development within this frame is of the utmost importance.

From this viewpoint is clearly visible the significant position of pre-graduate education of future experts responsible for the agriculture sector as managers or as specialists (eg. forestry engineer). This pre-graduate education can not consider only agriculture and forestry, taking into account that future CUA graduates will work on managerial positions, will be connected with various groups of interest, will be the representatives of companies and will lead relations with the public. In regard to these tasks it is important to train social and presentation competencies as well as work and business ethics.

This is exactly the trend followed by the authors of this paper on teaching Psychology and business ethics subject. The aim of this paper is to offer practical experiences with virtual support used on teaching Psychology and business ethics subject. In the first part authors mention the need of multi-disciplinarity in pre-graduate education o CUA students, in the second part Psychology and business ethics subject and its pedagogical aims and goals are described. Closing part is devoted to the practical experiences from the classes and further directions which will be of use in next academic year. The most important findings will be cited in the very end of the paper.

## Need for multi-disciplinarity

The process of European integration of separate states claims for the integration of separate economies above all. However not only this – this process must honor the specific needs of

individual societies and its environment, within which these cultures exist and which they use. Therefore the need for intensified research, integrating the physical, economic, and social sciences, to improve understanding of the impacts of economic and social behavior on the environment and of environmental degradation on local and global economics arises. Not only the research, but from it emerging education of young graduates and successive implementation of the knowledge into the practice represents a chain, which should be followed in order to maintain efficient functioning of the society

At FEM CUA graduate every year a considerable number of students in economic branches, who will be responsible for agrarian sector. The Psychology and business ethics is included into compulsory subjects for students of Business and administration and Public services and regional development.

**E-learning**

The traditional approach to the higher and university educations is getting insufficient in regard to the increasing mobility and the acceleration of requests for the acquirement of knowledge (Ježek, 2006), therefore different kind of e-learning are used at universities in increasing measure.

There has been some discussion whether to use E-learning, e-learning or online education terms when describing a particular virtual tool. According to Dytrt (2006) term E-learning stands usually for an on-line education, which can be described as distant form of study in virtual environment via internet.

This form of study usually involves tools, which enable to plan and control the study procedure, to prepare and present study materials, to lead mutual communication between student and tutor, to set tasks and accept their solutions, to activate students, to monitor student's work, to check student's knowledge non-stop, to keep files of student's study results, to set the level of access rights for different user categories etc. (Milková, 2004).

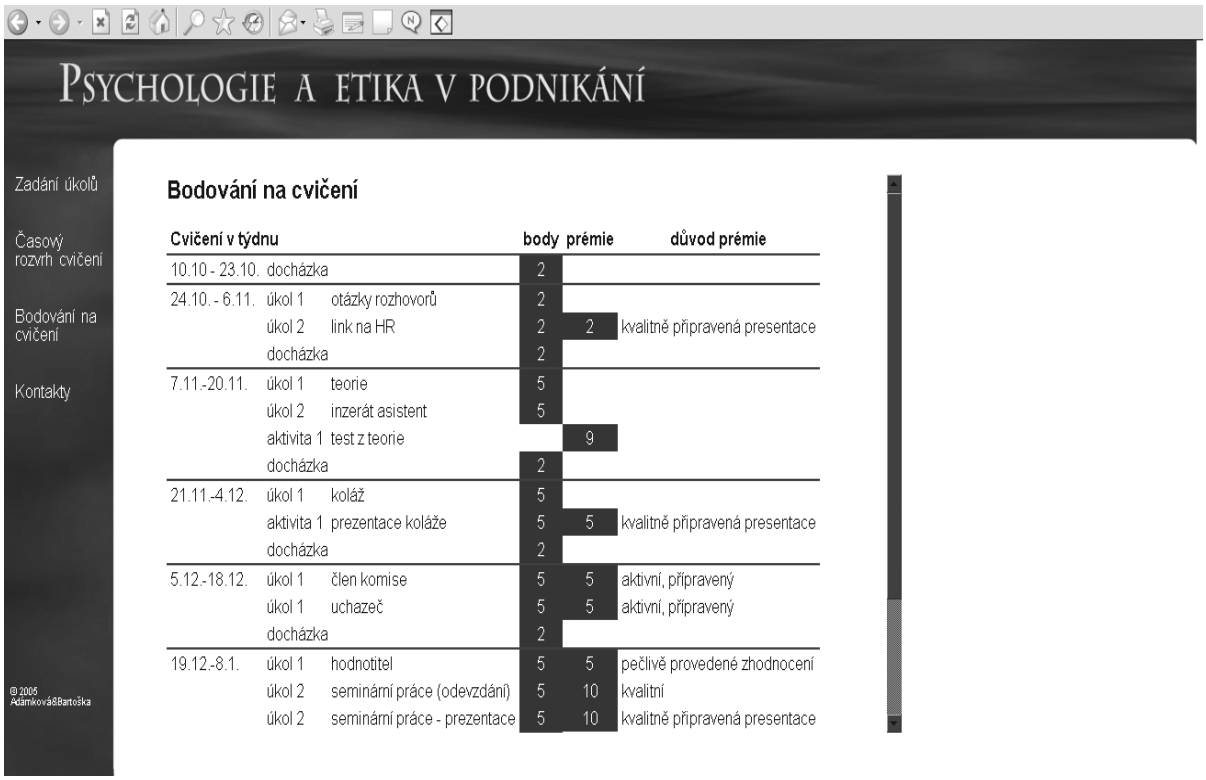
There are many advantages of above described method, especially on behalf of the requirements of providing broad and easy access to the higher education to the public. After boom of E-learning few years ago, also its potential disadvantages are considered. Nevertheless, for the need of our university is the virtual support the mere necessity.

**Practical experience**

At the Department of psychology at FEM CUA the need for the E-learning education was indicated as a result of permanently increasing number of students at the University. During the academic year 2005/2006 there was 600 full time students in the course of Psychology and Business ethics enrolled. In order to satisfy this extremely high number of students by only small group of tutors our department designed a virtual support for the subject. This teaching support has its own web pages, presently moved under the shelter of department's guidepost, with the view of easier access to all the virtual subjects taught by the Department of psychology. The access to the pages of described subject was provided by www.pef.czu.cz/kps/pep.

To gain the full access rights students should use a given password (announced on the first lecture). In order to fulfil all the demands of the subject, to obtain enough points for a final credit, students were obliged to attend the lectures, the practicals held every second week, complete homeworks and projects in extent stated on a web pages. The pages contained important dates of lectures and tutorials, contact and dialog window for direct web mail to the tutors, the projects' demands and their deadlines, the system of points awarding (see picture I.).

This new system showed itself very helpful in many ways: last year's complaints on a students' side on poor clarity of explanation of overall subject demands and the diminished. The tendency to bargain over the deadlines of projects submission disappeared completely. However, it is natural, that every system and method has its minor flaws as well as there will always be students who will try not to follow the stated rules and conditions. In spite of detailed explanation of the system accompanied by real time show of the web page and completed by all the conditions for successful completion of the subject few students even by the half of the semester hadn't found out that there are any web pages at all.
Overall impression from the new tool was positive, not only among tutors, but also most of the students found it very useful, in a way of offering higher flexibility of time spent on projects, easy access to all important information any time a day and fast up date of information.




Picture I. *The view at the web page of the subject Psychology and business ethics*

**Conclusion**

As it was stated above, there can be found numerous advantages of the described tool.
Despite some minor difficulties the new tool proved itself passable in given conditions and demands.
It may be concluded, that another way of ensuring multi-disciplinarity on a grounds of Department of psychology at Faculty of management and economics at Czech University of Agriculture was opened up and can be further develop.
This paper refers to the practical experiences with e-learning application to this subject. This virtual support provides better and more intensive study mean for higher number of students and furthermore offers easy access for the external students
There is a definite intention to set up the testing via internet, possibly complete the text materials with video sequences illustrating the most important and difficult to imagine parts

of the subject (eg.: training in social competences, communication skills etc.). Authors plan to add the links to the pages containing Psychology and business ethics issues to ensure constant update of the findings.
Authors hope for extension of the tool in a way to make it more interactive. It would also be suitable to create a space for discussion group with the students.
It is worth considering constructing the virtual version of the subject divided into respective thematic sections including relevant tests and homeworks.
Undoubtedly, the experience with the first year of the use of this virtual support should be valuable for further improvement of the tool.
Improvement of quality of teaching and its enlargement into the internet environment is one of the important issues, which leads towards the stimulation of students' interest in Psychology and business ethics subject.
Students' interest in broadening of their own knowledge base should be the presumption for arousing an awareness of larger context connected with environment and society they live in.

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# The first thing that universities should be doing is to equip students to address societal expectations

**Kateřina Chamoutová, H. Chýlová**

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*Abstract*
The role of the university is to prepare students for responsible approach towards the rural environment. The fundamental aim of the university is to line up different initial attitudes of the students of different study programmes with regard to their attitudes and to improve their future effectiveness in agriculture and forestry industry. Only graduates with responsible attitude towards rural environment could assess the public's expectations and perception of it.

*Keywords*
Students, attitudes, applied ecology, rural environment

## Introduction

New image of agriculture in the beginning of new millennium is closely connected with changes in public's attitudes towards agriculture. Many of these changes are clearly visible within students of Czech University of Agriculture – the future agriculture and forestry managers.
Some students have fully formed their attitude towards the agriculture before the beginning of their University studies. They expect to study the agricultural management to be able to continue in running of their family farm, or to fulfill their lifelong interested in nature, agriculture or forestry. These students are therefore satisfied at CUA, think highly of it, have clear goals and visions - thus after graduation they are ready to flexibly and fully address societal expectations and requirements of the rural environment.

Unfortunately numbers of students enter CUA with no particular notion about the domain they going to study, so they are taken aback by the agriculture subjects. This fact leads very often into leaving the university or leaving the field they studied straight after graduation.

The role of the university in preparing these different groups of students for responsible approach towards the rural environment differs greatly. For the first group it is sufficient enough to support their own interest in contrast to the second group, which requires complete turn over towards this responsibility. The fundamental aim of the university is to line up different initial attitudes of the students of different faculties and study programmes.
With the use of such data outcomes an effective multidisciplinary support could be designed, with regard to attitudes towards the study field improvement and its utilization in agriculture and forestry.

## Empirical Part

Faculty of Forestry and Environment /FFE/ of CUA, where our data were collected, went through a relatively long development since 1919 as a member of Technical University and since 1990 of CUA. The main branches of studies, research and academic progress were set in

the fields: forestry, wood processing, landscape management, and ecology.
This paper offers the report of a current state ascertained by the mean of questionnaire-research.

Data were collected during Mai and June 2006 within 160 the students of some of the basic study programmes of FFE. The questionnaire had more sentences and the students had to agree or disagree with them. In this paper are demonstrated only reaction on questions, concerning attitudes to study and future goals.
Data from below stated groups of student were processesed, in following study programmes:

| | | | |
|---|---|---|---|
| Applied Ecology /**AE/** | 46 women | and | 23 men |
| Landscape Engineering /**LE**/ | 23 women | and | 13 men |
| Forestry Engineering **/FE**/ | 12 women | and | 43 men |
| Forestry Engineering – /**FEdis**/ /distance study programme/ | 9 women | and | 11 men |

It seams /Tab.1/ that with sentence: „Academic title is very important for me," do agree more women then men, especially within forest engineers, where women are rare.

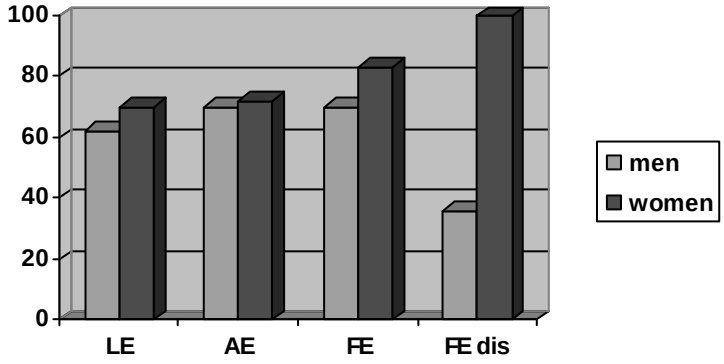


**Table 1 - Students agreement with sentence "Academic title is very important for me" in %**

Sentence /Tab.2/: „I have a clear idea about my future goals in a job".

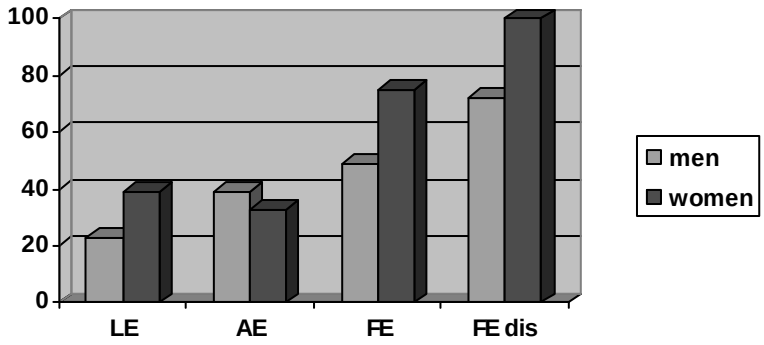


**Table 2 - Students agreament with sentence "I have a cler idea about my future goals in a job".**

In answers to this question mentioned distinctiveness of the forestry students, who often follow with the family business traditions and therefore they know what and why they study,

is indicated. In contrary, students of LE and AE curricula have mainly vague conception about their future assertion. This should be of an inspiring nature for future education design.

Sentence: “I hope, that I will use in practical life knowledge gained at the university”

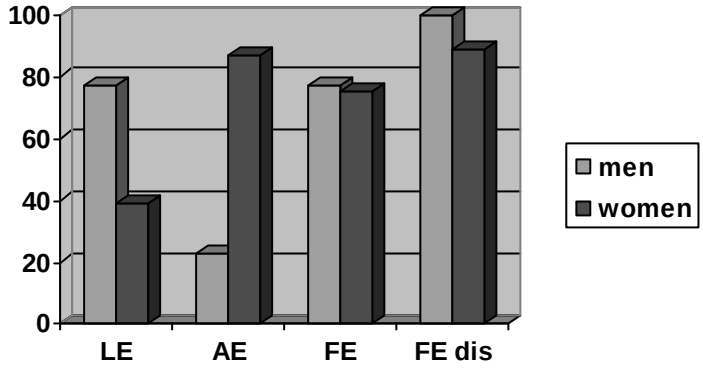


**Table 3 - I hope, that I´ll use in job knowledge gained at the university.**

In these answers /Tab.3/ it is again indicated, that there exist certain differences between students concerning the attitudes towards the practical use of the knowledge gained. Least of all value the knowledge men-students of AE curriculum. This finding should be alarming as these students frequently find their placements on a positions, where from they can influence the ecological behaviour of given region and with a lack of sufficient knowledge it should be a difficult task to complete.
Reaction to the statement /Tab.4/: “I do study this University in order to improve qualification in my specialization” are also surprising – only a part of students perceive University as a source of increase of their qualification as specialists. Once again it seems, that forestry students of FE and FEdis understand the necessity of extending of their knowledge and qualification, therefore they value the University, whereas LE students do only very poorly.

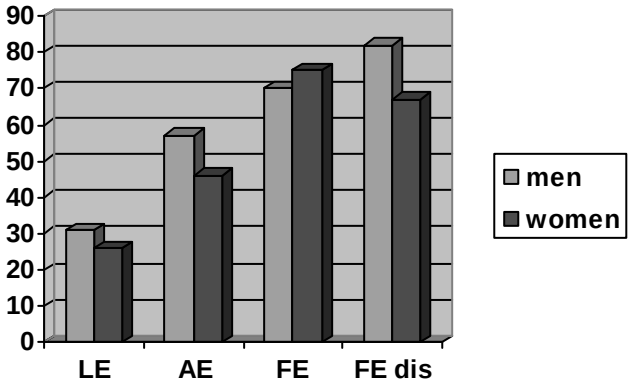


**Table 4 – „I do study this university in order to improve qualification in my specialization“**

## Conclusion

The results of our survey let indicate that the students in forest orientated study program have more clear goals, appreciate the importance of education and of increase of qualification within their specialization and therefore they are able to better conceive of their future placement. Whereas numerous students LE and AE haven’t settled their goals very clearly

yet, just few of them are able to imagine that they will try to make use of their education in a practice and thus we may fear that some of the future agricultural managers long solely for the University degree itself.

With the use of such data outcomes an effective multidisciplinary support could be designed, with regard to attitudes towards the study field improvement and its utilization in agriculture and forestry. For the first group it is sufficient enough to support their own interest in contrast to the second group, which requires complete turn over towards this responsibility.

It should enable the tutors to reveal the groups of students with a high branch-leaving risk, who are about to distract the public's attitudes towards the agriculture by their own impaired attitude.

# Is motivation to learn influenced by cross-cultural differences?

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*Abstract*

This paper tries to put forward a rather general question which the present authors deem to be important whenever and anywhere teaching and/or learning take place. In the past teaching and learning were bound to culture and if somebody has arrived from afar, it was his (of course, not her, at those times) own affair and problem. Nowadays people from far lands and diverse cultural backgrounds mix freely and quite often share teaching facilities and opportunities to learn. At least in the developed countries it seems to be assumed that the aims and learning needs of those who arrive at the Western Universities to study are very similar. However, teaching and learning does not have to mean the same thing to the students from diverse countries and different nations, and the same might hold for their respective processes and contends of motivation to take part in these kinds of activities. If such differences exist, and we are going to argue they do, they should be taken into account and be dealt with. Knowledge on cross-cultural differences in motivation to learn might be used to advantage, to facilitate teaching and learning in multi-cultural classes, and even, perhaps, it might help to deal with some specific problems. In this paper we will try (i) to explain why we hold cross-cultural differences in motivation to learn as important and in which way the knowledge on the matter might be important; (ii) to support our claim by citing authorities in cross-cultural psychology field; and (iii) to further the argument by research data.

*Keywords*

motivation, cross-cultural differences, learning

## Culture, learning, motivation

Teaching and learning are activities which could be proclaimed vital to any human society. Human beings have to learn, to acquire an amount of knowledge, to be able to live in their social, as well as physical and biological environ. However, what should be learned, what knowledge it is necessary to acquire, differs from time to time, place to place, and specifically, from culture to culture. To live an Intuits life in Greenland or a Bushmen life in Kalahari would not be possible without knowledge attained through generations. It means that every culture determines what knowledge people should learn. Not only the amount and kind of knowledge is determined by culture, though. Culture determines the ways and means of teaching and learning. While in traditional cultures most of the learning is done by imitation, more modern cultures expect study, reading, writing of essays or project homework to be used. Learning by imitation seems to be easy. It does not ask for conscious concentration on the task and the energy the subject expends on it does not feel as arduous. Intentional learning, on the other hand, is regularly felt like strain. Traditional societies used intentional learning, as well, of course. However, it seems that the less traditional and more modern the learning situation is, the more laborious for a subject it becomes. In any case learning asks for expenditure of time and energy, and so it should be supported by motivation. It is quite reasonable, the present authors deem, to assume that different ways and methods of learning are maintained by different kinds of motives and/or processes.

Besides the argument put forward in the preceding lines one more thing should be mentioned. Even in cases where learning means some conscious expenditure of effort, people are generally better prepared to it, if the ways and aims of learning are accepted as a rule in the social group in question. Learning Koran or Old Testament by heart is highly prized by some people and the effort put in the learning might be appreciated as sacred. For others it might be hardly more as toil without a sense. It is culture which determines what should be learned and to what end. People of non-Western cultural background might arrive at Western Universities, study there and acquire diplomas. However, if they do not accept Western outlook and Western cultural values at the same time, they might find all the Western learning and knowledge as futile, even as a threat, rather as an instrument which could help to alleviate the many ailments of the present world.

The knowledge on the differences mentioned could be taken in the account not only in multi-cultural classes. This knowledge might be of help there, but it will be even more important in case of socially disadvantaged groups and ethnic minorities, who might be helped by learning and acquiring new knowledge and skills. In this connection East European Roma population and Western European Muslims might serve as an example. As is widely known, however, teaching these groups is quite often inefficient. So, understanding of cultural characteristics underlying teaching and learning would help to find out what factors hinder learning and what might be done to attain the objectives of these processes more efficiently. It should be held in mind, however, that the objectives of teaching and learning are, again, determined by culture in the first place.

Another way how the connection between learning and culture might be understood starts with needs and values. It is generally accepted that cross-cultural differences are grounded in the differences of cultural values shared by the cultural groups in question. At first glance it might seem not to concern needs, as many of the needs are active on the physiological level of the subject. However, even basic needs accommodation, like in the case of the alimentary need, is often deployed in rich cultural framework. With few exceptions (one of the first was Bond, 1992; more could be found in Hofstede & Hofstede, 2005), most of the research on needs, values and cross-cultural differences, as well as on human motivation, was conducted in the First World countries of the North America and the European West. For this reason our knowledge of those complex fields might easily be culturally biased. This is, of course, one reason more to study the thing more deeply.

Connection of cross-cultural differences and motivation was emphasized by Hofstede (see Hofstede & Hofstede, 2005, pp.108, 186-9, 264-8, 275). In the first place Hofstede argues that conceptions like Maslow's hierarchy of needs and, especially, his *self-actualization* stem from the individualistic values shared by most Western societies. In collectivist societies, like China, self is inseparable from the in-group a person belongs to. So, actualizing one's own self would be (and is) taken for a shameful disregard of things most important in human life. Besides this Hofstede in his studies has found that McClelland's findings on cross-cultural differences in *achievement motivation* in the 1960s were strongly associated to two cultural dimensions, namely to uncertainty avoidance and masculinity. McClelland believed that the need for achievement and the corresponding motive were learned. If Hofstede is true, they really are, but in a quite another way, as McClelland envisioned. Hofstede's critique of motivation theories touches on other conceptions, as well, and is well founded. Not all the critics of the psychological theories of motivation would consider the cultural connection as the most important. However, it seems that this connection is firmly established nowadays.

Concise and critical rendition of psychological theories of motivation could be found in Arnold *et al.* (2005, pp. 311ff). Account of motivational theory in Arnold *et al.* does not deal with cross-cultural issues specifically. However, in the previous edition of the same book from the year 1998 some mentions bearing on the issue might be found. Arnold *et al.* quote there a paper by Sagie *et al.* (1996), which supports the view that the concept of *need for achievement* "might be a very Western concept of little relevance to other cultures".

Sagie *et al.* reported a five countries study of levels of achievement motivation. In accord with the above-mentioned observation of Hofstede, Americans scored higher on most of the achievement motivation components as any other nationals involved in the study. With the exception of one component Japanese scored the lowest from the groups tested. As Japan is highly successful economically it seems difficult to uphold the original McClelland's position that achievement motivation is the only way to performance and economic success. This finding, again, seems to support Hofstede's claim.

**The surveys**

The two surveys we introduced here do not touch on learning and/or teaching in any relevant way. However, we try to use them to support our claim that motivation, its processes and contends, might and most probably are contingent to culture. Both the surveys employed the same research instrument, namely the Extended Delft Measurement Kit questionnaire.

The first survey was conducted some number of years ago by the authors of the EDMK. The results of their survey could be found in Roe *et al.* (2000). This survey was a study in the antecedents and consequences of job involvement and organizational commitment of workers in Bulgaria, Hungary, and the Netherlands and was implemented by an international team of researchers. The team has developed a general model of work motivation and tested it on the data from all the three countries. The data were analysed by path analysis and it was found that the model has a modest fit when data from all the countries were used. However, much better fit was achieved when path analysis was applied to the three samples separately. Further, as the authors quoted related, they developed models of work motivation specific to every one of the three countries surveyed. They have arrived at models which differed in the number, as well as, the kind of variables involved.

The second survey was conducted by the first author of this paper and a team of collaborators (Kolman, 2005; Kolman *et al.* 2004, 2005). This survey was aimed at finding not on country-specific, but on region-specific motivational patterns. In this study motivational characteristics of two widely defined groups of the Czech population were contrasted. The first group was people dwelling in the Prague metropolitan area, where business continues to develop at quite a fast rate; the second was composed from country dwellers (i. e. people from more marginal regions of the country. In the central part of the country there is practically no unemployment, things move fast and wages go up for several years now. To the contrary, countryside seems to be sleepy, unemployment figures high, wages low and people quite often report feeling unhappy and without prospects it might make sense for them to extend effort. Again, in this case, statistically significant differences in motivational factors between those two groups emerged. The methods of analysis employed in this study were ANOVA, correlation and factor analyses. The differences identified were connected to expected outcomes of work activity.

**Discussion and conclusions**

Both the studies described in the preceding part of the paper make it quite clear that local condition should be taken into account when studying motivation (Roe *et all.*, 2000). Based

on it, the present paper authors are of the persuasion that national and/or social group specificities make an influence on the processes of teaching and learning. The problem should be studied in more depth, of course, before any practical conclusions could be achieved, especially such that might be used to advantage in the many situations mentioned in this paper's introduction.

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# Comparison of public's and CUA student's attitudes towards rural environment

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*Abstract*

Perceptions and expectations of public towards rural environment are influenced through their attitudes to the issue. Attitudes can be learned through direct reinforcement or may be acquired by means of social learning. This paper refers about differences in attitudes of public and CUA students to rural environment. In our research we used the semantic differential technique, which relies on a series of items matched on adjective scales. This format can be used to rate any concept – a person, a political issue, attitudes to anything. Scales represent three distinct bipolar dimensions: evaluation (good-bad, clean-dirty), potency (week-strong) and activity (active-passive). Research was carried on three groups of respondents: 30 full-time students of CUA in first group, 30 external students in second group and 30 participants with no connection to agriculture. Authors of this study consider these three groups of participants to be reasonable representatives of different attitudes towards rural environment in Czech society. The outcomes of this study are of the multidisciplinary character and therefore they will be incorporated into various classes at Department of Psychology taught not only at Faculty of Economics and Management, but also at Faculty of Agrobiology, Food and Natural Resources and Faculty of Forestry and Environment CUA.

***Keywords***

Attitudes, rural environment, public, CUA students

## Introduction

Professionals involved in agricultures all around the world (eg. Agunga, 2005) remind agricultural organizers that they must pay attention to broader environmental and social contexts. Quality of the environment is important to rural and urban areas alike but rural distinctiveness is found in the landscape and biodiversity value of the rural environment (The Countryside Agency, 2006).

The role of higher education in questioning assumptions and matching expectations of the public is stated to be the main purpose of the Echae conference, corresponding well with this trend. To elicit the expectations it is necessary to identify the attitudes of town and gown to the conception of the environment. One of the most frequently used research and analysis of attitudes is Osgood method of semantic differential, used mostly in social-psychology research.

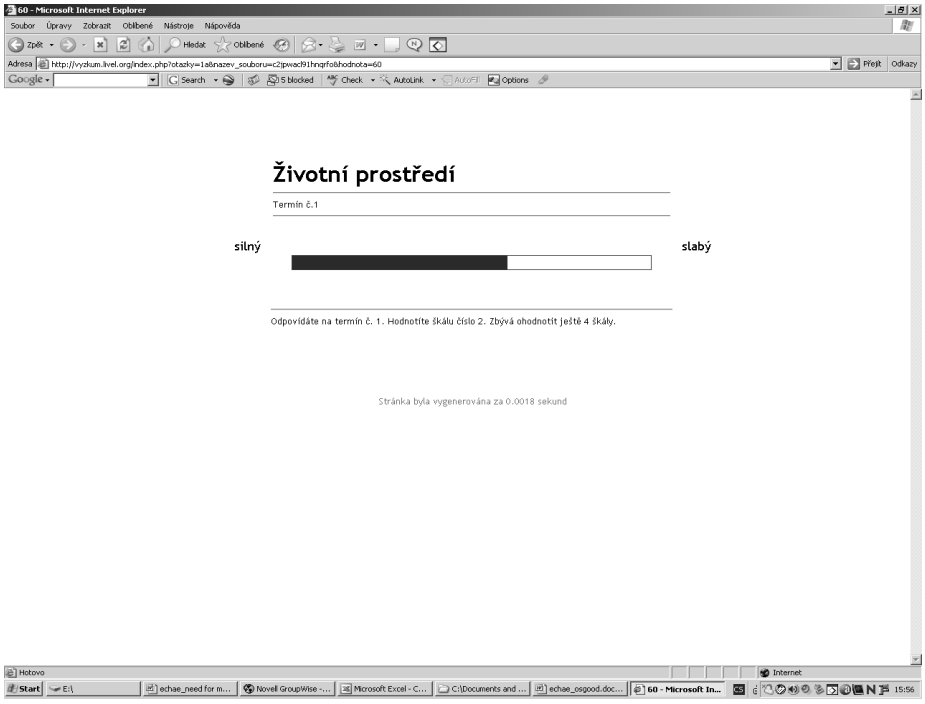
## Aim

The aim of this study is to describe and analyse potential differences in attitudes towards rural environment of groups involved in agriculture and none-involved ones. Authors expect the students of CUA to have their hierarchy of values directed closely towards the rural environment and agrarian sector and so it was expected to receive more environment-friendly

attitudes as an outcome from the questionnaire from this sample group than from the group of respondents non-involved in agriculture in any way. Public's attitudes should provide important part of the education of future agricultural managers in order to prepare them for the efficient contact and relations with the public within their acting in rural sector.
This paper refers about the pilot study, which was held in order to prove the equivalency and easy comprehension of both given forms of method designed especially for this survey in a pen-paper and also in electronic version.

**Method**

The survey was carried out on a sample of 30 full time CUA students to be compared with sample of 30 external CUA students and a sample of 30 respondents non-involved in agriculture in any way. The age of all respondents was ranging between 20-30 years. Authors consider it beneficial in order to asset perceived differences at the new coming generation of agriculture managers and public attitudes of the same generation.
According to Deaux (1988) the semantic differential technique is method originally developed to measure the meaning of an object, it requires a person to rate a given concept on a series of bipolar rating scales. This format can be used to rate any concept. Přibová (1996) alleges the above mentioned method as proven and frequently used for image measurement.
The questionnaire used in this survey was designed especially for the purpose of this particular survey and consists of three main groups of dimensions – evaluation factors, potency factors, activity factors. Each factor is divided into two rating scales. The scales were chosen in order to obtain the most predicative results for intended purpose possible. The whole questionnaire therefore consists of six rating scales designed for seven stimulus words connected with the rural environment issues.
The questionnaire itself is made in two forms – in a pen/paper form and also in an electronic version of it on http: //vyzkum.livel.org. The advantage of the electronic version is the easier access to by respondents, faster and more convenient way in analysis of the data. The more attractive colourful design should be also mention as not the least important motivation factor for its completion for the respondents; example is shown on picture 1.

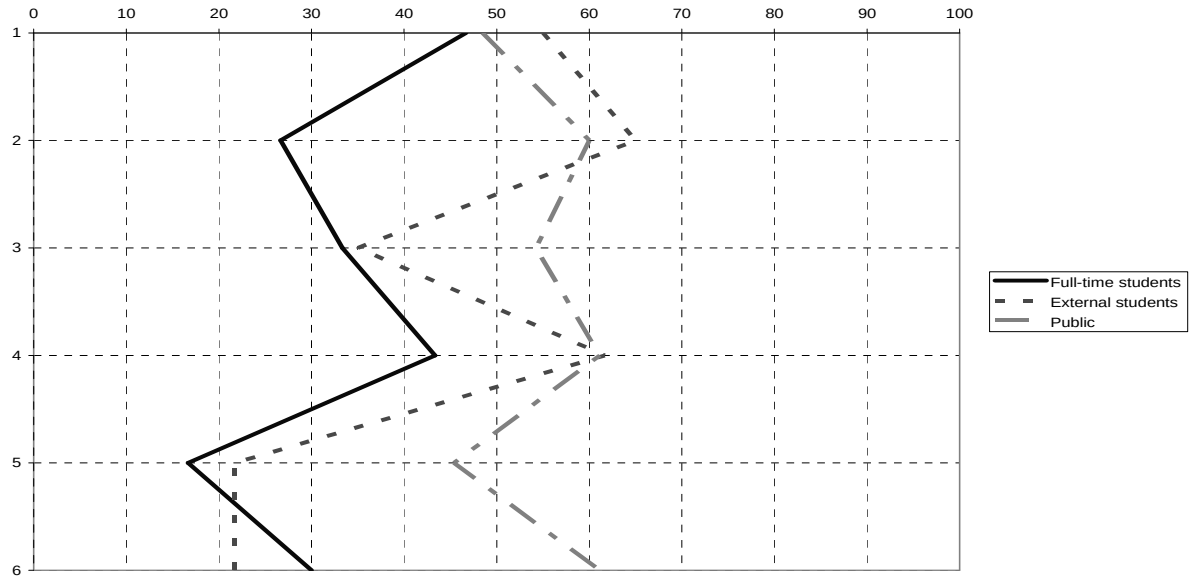


Picture 1: *Example of electronic version of the bipolar Scale for "Environment"*

The average outcomes of each scale for each stimulus for each of the three groups of respondents were counted out and are described in a section Outcomes below.

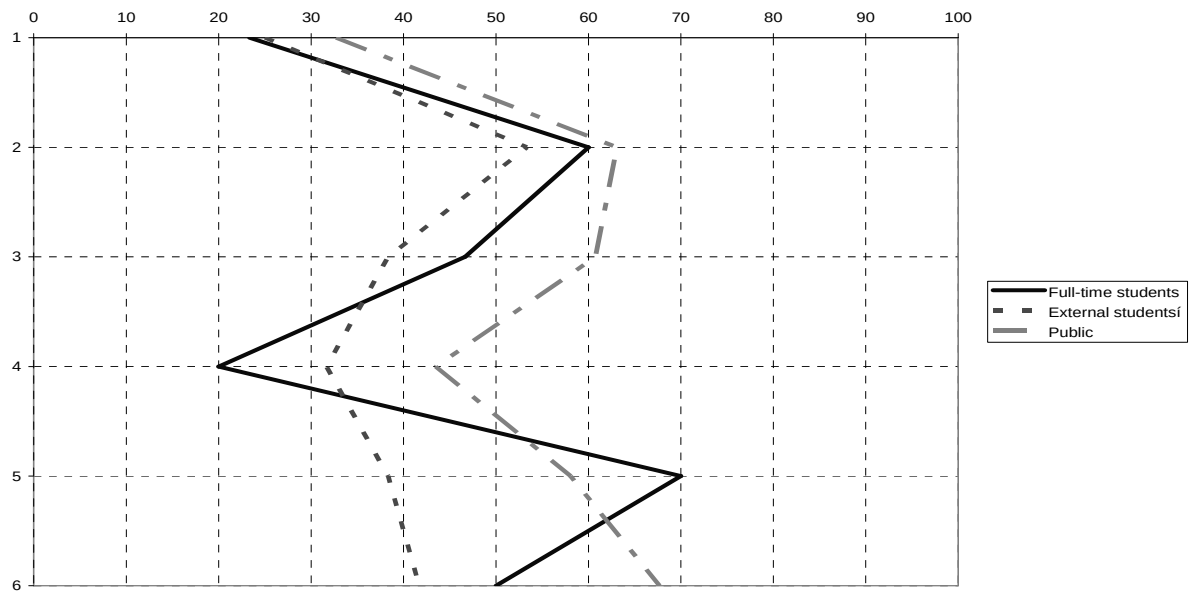
**Outcomes**

Introduced outcomes are merely preliminary within the scope of a pilot study. The rest of collected data are being processed.
The outcomes are represented by the authors according to the respective stimulus word in relation to the assessment made by each group of respondents.
Authors are of the opinion, that to choose the University connected with rural environment proves itself certain activity towards this direction and so the dimension of activity in the semantic differential method should be rated higher than within the participants with no connection to agriculture.
The term "environment" was on all scales assessed more positively by the group of full time students than by the public. External students were according to their assessment somewhere at the boundaries of both previously mentioned groups of respondents. Assessment is shown on picture 2.



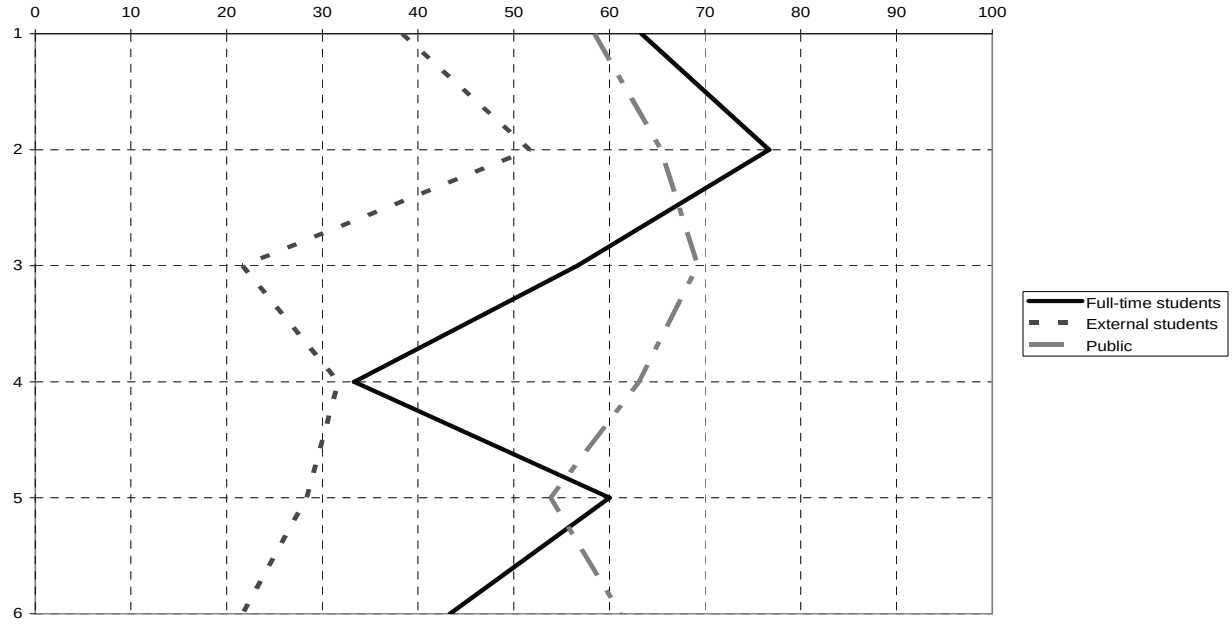

Picture 2: *Semantic differential of the term "Environment"*

The term "countryside" was assessed very much alike by all three groups of respondents. The assessment of "countryside" as rather weak but comparatively clear is worth a consideration. The scale of attitudes towards this stimulus word illustrates picture number 3.




Picture 3: *Semantic differential of the term "Countryside"*

When term agriculture is being considered it is important to mention the differences in assessment of this concept by external students. The most interesting is the assessment of the last scale, where external students mark agriculture as rather effective while public consider the rural environment to be mostly non-effective, full time students place their attitudes somewhere in the middle. For more details on this issue see Picture number 4.




Picture 4: *Semantic differential of the term "Agriculture"*

In connection with stimulus word „Myself" are the external students the most optimistics ones – thy picture themselves as active, strong and efficient in the highest measure. This situation

could possibly be explained by the parallel full time job and university studies attendance, while the other two groups of respondents have each one only one respective attendance.
Interesting characteristics could be found also in connection with the term „Society“. At this point considerable distinctness of the public group of respondents could be seen – this group is mostly of the middle way attitudes, while both students groups rank into more positive directions. This characteristic should be further addressed in extended research.
Similar assessments of full time and external students can be seen within the term “Protection of the nature”. At this point are the assessments of these two groups significantly more positive than the assessment of publics. Alike characteristic apply also to the assessments of term “City” by both groups of students, which differ to the one from the group of public.

**Conclusion**

As a conclusion we would like to draw the attention to some of the most important findings. Assessments concerning the environment, agriculture and protection of the nature are significantly more positive from both groups of students, than the one from public. The stimulus word “agriculture” is seen as efficient by the external students, while public sees it as non-efficient. This diversity might be possibly explained by the fact, that many of the external students are employed in prosperous agricultural companies. They work in an agrarian sector and therefore perceive it as an efficient one, whereas in public opinion this sector is perceived as non-efficient one.
Presented pilot study brought forward some interesting findings and authors are in a stage of analysing of the data acquired. The insight into the public attitude towards the concepts of environment must not be omitted in a training of specialists for the agrarian sector. The aim of this survey was to broaden the knowledge base and bring in a contribution to the public discussion on this issue. The detected differences, mainly those between the public and Czech University of Agriculture students, provide vast field of future education directions, in order to be able to match the public expectations by the rural environment.

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# The Development of Information Skills in relation to Multi-disciplinarity in Teaching and Learning

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*Abstract*

One of the fundamental components of the didactic system of vocational subjects is the multi-disciplinarity and knowledge integration in relation to the content of education. Its quality is dependent not only on the availability and level of information sources, and on the teacher´s ability to work with these information sources, but mainly on the teacher´s talent to delegate information competence to students and to teach them how to work effectively with information and on their own. Information and communication technologies (ICT) are major instruments when working with information. Information competence is one of the priorities of the Government Information Policy in Education which also defines functional and information literacy. Lessons following the new conception should not only focus on information and knowledge but mainly on the student skills of an individual/independent and on productive work with the growing number of data. Students should know how to work with information, how to select relevant information and use it effectively. That is why there is a tendency to implement ICT into educational programmes of our schools. From the teachers view point this does not only mean the updating and innovation of curriculums, but also includes changes in the creation and application of educational goals, in methods of implementation of material and non-material didactic means and in methods of teaching. All students at secondary and tertiary levels of education should achieve information literacy, and teachers must be able to create conditions for this implementation. A good information infrastructure and teaching ability and motivation for using ICT will create the basic conditions for a successful implementation of ICT. This paper submits concrete research results of the internal research activities, and also of the VEGA project - with the title "Pedagogical and Psychological Aspects of Using Information and Communication Technologies in Higher Education".

## Introduction

The speed and level of the preparation to enter the information society is becoming a priority and economic necessity for the Czech Republic according to the whole world's development. The system alteration and mastering of depending changes by the public are principally based on education. The integration of the demanded level of information literacy and progress ional creation of consequential information skills in education demand a fulfilling of certain predispositions:

1. schools should be equipped with adequate information infrastructure which enables access to the Internet-connected computers to both teachers and pupils,
2. the teachers themselves should be information-literate, they should be at a high level of the computer literacy and they should perform methodological and didactic dispositions to develop information skills in their pupils, they should be motivated to perform these activities as well as to integrate the subject-matter of education and to use modern teaching methods and forms,

3. the style of teaching should be differentiated, didactic stereotypes should become changed in lessons lead in a monologue way by the teacher, pupils should be active and independent at work with information, just controlled by the teacher.

**Function and Information Literacy**

Function literacy means the complex ability of a person to orientate themselves in the world of information, ability to find and use information necessary for creation of knowledge and skills. Function literacy is divided to three units: literature literacy – ability to find and understand information from a text, document literacy – ability to seek and use exactly defined information, numerical literacy –ability to perform mathematical calculations. As the information society is characterized by progressive – dynamically developing – information infrastructure and its functioning is connected with the routine use of computers and computer nets, the need of computer literacy as the ability to use information from the Internet and to apply it in concrete situations follows the function literacy. Czech information policy takes information literacy as the ability to realize and formulate one's own information needs to be orientated in information sources, to seek information via information and communication technologies, and as the ability to sort out the found information and make use of the information in concrete life's situations or in special tasks. Information literate people have learnt how to study; they are always ready to find information necessary for a good decision and task solution. They are people ready to study life-long. This is the direction which must be followed in education and schooling of the young generation.

**Information skills**

Information literacy assumes that a person masters the whole range of information skills. There is a great number of classifications and interpretations of information skills. "The Big Six" conception, which takes information skills as information literacy curriculum, belongs to the most pregnant ones for the support of information literacy in education. "The Big Six" conception is a systematic process of solving information problems pursuant to work with information. The strategy of six basic information skills is applicable in a great number of situations when the pupils have a task without complete information and the "hidden" information must be obtained without any help. "The Big Six" means the following six information skills classified according to the logical progress of solving the task:

1. task definition - forethought of the problem; what to look for, what information will be necessary, so the information need comes into being and it is possible to set targets,
2. information seeking strategies - consideration of available sources of necessary information and the selection of the most promising and accessible,
3. location and access of information - location and access of information from different information sources: textbooks, specialized literature, newspapers and journals, manuals, handbooks, laws, norms available at school or from catalogues in libraries, seeking and selecting information from multimedia encyclopaedias and catalogues, dictionaries, atlases, databases, browsing through web-sites, seeking and down-loading via protocol FTP, newsgroups and so on,
4. use of information - a selection of trustful, current and relevant information, and an ability to choose " the right information" from plenty of information,
5. synthesis – use of found and abstracted information to produce news – processing and printing of a document, presentation of results, e.g. electronic presentation in MS Power Point or presentation of results at the web-site, stating cases and conclusions,

6. Evaluation – evaluation and verification of the result and the level of reaching its target, whether the course was effective and whether there is no better solution, what is the submitter's opinion, self-reflexion, the ability to learn their lesson from eventual drawbacks.

The given approach is consistent. It leads to really complex and effective work with information sources. Its application in education seems to be relatively demanding from the beginning, particularly if pupils are used to being lead in their activities by the teacher, who mostly uses monologue-teaching methods and offers accomplished knowledge. There is an advantage – clear arrangement and logical process as well as its applicability to pedagogical practice.

**Factors of information skills implementation**

It is necessary to have certain conditions and parameters of the education environment to develop information skills in pupils.

The first significant group of factors is formed by technical and information infrastructure and system conditions at the school. It means the state and level of information and communication technologies in particular. It is important whether there are enough computer classrooms, whether they are equipped with quality technique, with the Internet connection, whether the technique can be currently used both by teachers and pupils, whether the computer classrooms are available during lessons of professional subjects, whether there are computers in teachers´ offices or just in a staffroom and so on. It is also important whether there is a school library, what is its equipment like, the size of the collection and its accessibility. A significant role belongs to the organization of lessons, creation of timetables in the way that enables the optimal use of computer classrooms. There must be a chance for the teachers who are interested to get there easily.

The second very important group of factors is that of information competences, interest and teachers´ motivation. Pupils´ information skills can be developed only by teachers who master work with information sources excellently, which means making use of information and communication techniques for information needs nowadays. It anticipates not only function literacy but also computer literacy and internet literacy. The routine style of leading the education is also important. The support of information skills requires certain experience with the application of activating teaching methods and problem teaching and at least a clear theoretical image what access mode to use in such teaching.

The third group of factors is linked to the subject matter of education. It is sure that information skills should be supported in a parallel and sectional way, so if possible in all lessons. Nevertheless, it is evident that some lessons have a specific teaching process supporting the information skills, which are more effective and usable, than other lessons do. Above all not every topic that is just in progress is ideal for education on the bases of information skill support, in some cases, it has a bigger purpose, and in others, it has a smaller one.

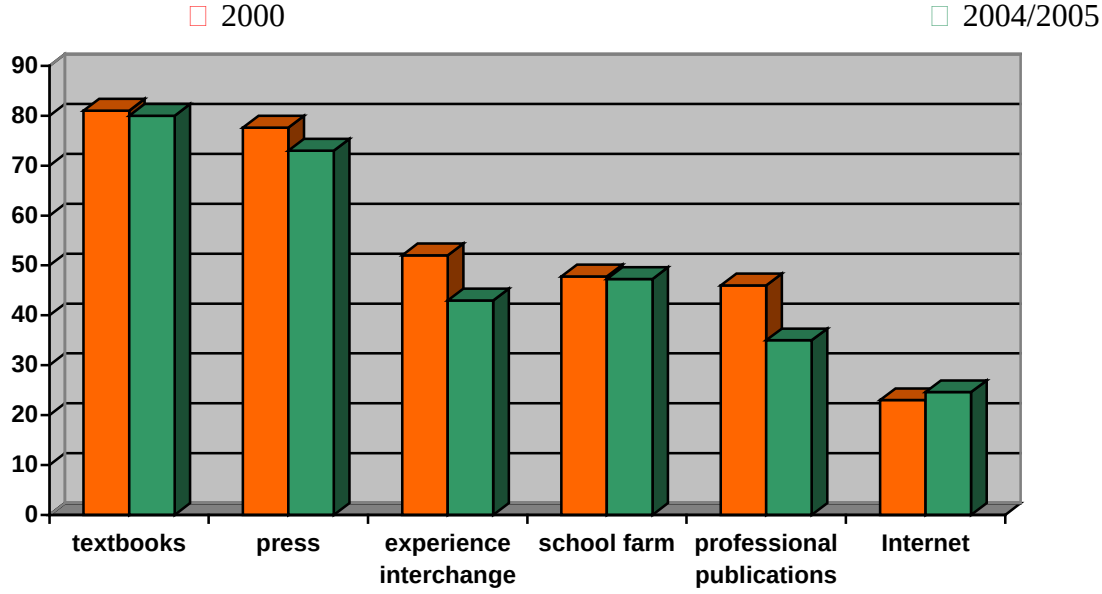
The fourth group of factors is linked with pupils and their interaction with the teacher. It depends on abilities of the students, their activity, how independent and creative they are. We can see a certain influence of the pupils and their characteristics in the whole class collective, it means whether they are motivated enough, whether the teacher gets a natural authority and the communication of the teacher and the pupils works well. Pupils must learn the new style of work in a lesson gradually.

## Research in the sphere of information skills

Presented research is based on the results of a research project of the University Development Fund (UDF) called " Use of information technologies by professional subjects teachers" realized at the the Institute of Education and Communication of the Czech University of Agriculture in Prague. Further on, it uses data from the following questionnaire investigation concerning the identification of changes that took place in the years 2004 – 2005 and was called "Use of information and Communication technologies in secondary education".

Even the first research from 2000 aimed at finding and evaluating of the level of application of information and communication technologies and use of information sources at secondary schools of agriculture, it was mainly interested in information infrastructure and the level at which professional subject teachers use it. The questionnaire investigation from 2004 – 2005 ran in a direct concurrence with a research project of the Scientific grant agency of the Slovak Republic VEGA called "Pedagogical – psychological Aspects of Information and Communication Technologies Using at Universities". The goal of the investigation was not only the development of the situation in a segment of secondary training schools of agriculture but also a comparison of the conditions and level of the information and communication technologies application in tertiary and secondary education. The main idea was to get data for the analysis of changes, which have occurred at the monitored secondary schools in this sphere since 2000. Following graph in picture 1 shows the comparison of information sources from the point of view of their use by the professional subject teachers in both the monitored periods, it also brings the most used sources of information and compares them with the use of the Internet, which is still not a completely accessible source of information.

Picture 1: **The most often used information sources and the position of the Internet**

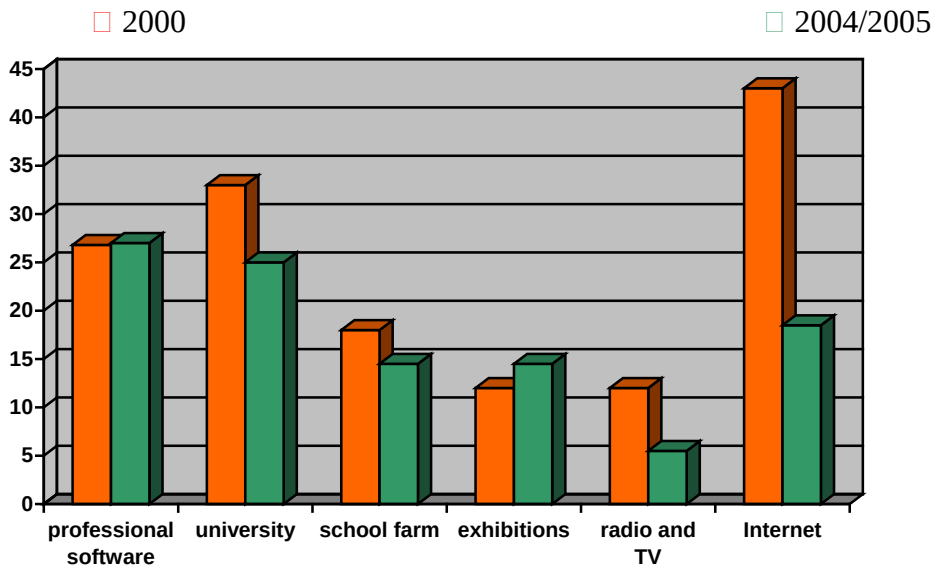



Textbooks, which are in common use – according to the findings from the years 2004 – 2005 – of 80% respondents and 20% respondents use them occasionally, remain the basic information source at work of professional subject teachers. These data are only slightly different from the findings in 2000. Similarly, a significant place is that of periodicals as a

source of information (professional press), that is currently read by about 73% respondents (77, 6% in 2000). On the list of the most often used information sources the experience interchange among colleagues and professional publications study follow. With the exception of the experience interchange among colleagues, we can follow a certain decline of the interest of the respondents. As there is a better chance to use the Internet at school and there are information literacy campaigns for teachers, it seems that the interest is moving towards electronic media. It confirms the increase of the use of the Internet as an information source. It is interesting that the increase of a routine use (by 1.6%) is much more modest than the increase of the occasional use (by 23.5%). It reflexes the situation that not all the teachers of professional subjects have the Internet connected computer at their disposal "on their writing desk". If so, they visit the common rooms with centrally placed computers just on the occasion when they really need to find out some information – so just "occasionally".

The increase of interest can be seen with mass- media as well, with the radio and TVbroadcasting. The use of these information sources is of a specific importance. They do not serve as an exclusive prime source of information, they mainly call attention to important events and to changes and the informed person can find details about them in classical prime information sources (current professional publications, laws and so on) afterwards. Therefore, the significance of mass media as the basic source of information cannot be underestimated. Even the interest of the respondents who use this source of information in a routine way (43.6% cases) agrees with it. Compared to the year 2000 it means the increase by 10.8% and such a trend is positive. As the sample of the respondents came from schools of agriculture, a school farm had a significant position among commonly used information sources. The position of this information source did not almost change between the two monitored periods (47.8% in 2000, 47.3% in 2004/20005). The said information source is a classical and well-established information source at schools of agriculture. Interesting pieces of knowledge turned up from the opposite point of view of the use of information sources, it means from the point of view of the information sources that are not used at pedagogical work of the respondents. In the following picture 2 you can see graphs of mutual relations of the information sources that are not used at the monitored schools at all (according to the respondents).

Picture 2: **The least used information sources and the position of the Internet**



If we look at the graph we come to quite a positive result that there are no cases of teachers (besides minor exceptions) who would not use textbooks, professional literature and professional periodicals, or who would not use a communication with their colleagues as a information source at all. Inconsiderable part of the respondents (43.3%) stated in the questionnaire in 2000 that they do not take the Internet as an information source at all. The situation in 2004/2005 changed, the questionnaires proved that the number of professional subject teachers who do not use the Internet as an information source at all is 18:2%, so by 25:1% fewer than found in 2000.

## Conclusion

The basic information source of professional subject teachers are still textbooks, which are used by 80% addressed teachers and remaining 20% teachers use textbooks at least occasionally. These data have almost not changed according to the latest findings. Periodicals (professional press) read by 73% respondents (77.6% in 2000) have kept their significant position of an information source. On the list of the most often used information sources the first two are followed by the experience interchange among colleagues and study of professional publications. Frequency of using the Internet as an information source has been rising. The problem of motivation of professional subject teachers to use the Internet in a routine way and so to cover their information need is proved by findings that the increase of its routine use in the period of 2000-2005 (by 1.6%) is much more modest than the increase of its occasional use (by 23.5%). It is obvious, that if the teachers have no chance to use the Internet on "their writing desk", they will not use the Internet unreservedly. The Internet activities of teachers, the transfer of necessary skills into direct teaching and to pupils are reduced by this situation.

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# Educational Kit for Continuing Education of Young Farmers

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*Abstract*

The economic and social changes which have been occurring in the present European rural areas are influenced by various forces. It is really essential to create an active attitude of young people working in rural areas towards education in order to fulfil the principles of continuing education. There is a need to develop and support all activities which would lead towards a maximum openness of educational system. The educational systems are mainly aimed at young generation. The high speed and range of change call for periodic up-dating of knowledge of recent graduates of secondary schools and universities.

There are five areas which have been set, in which the up-dating of knowledge is really essential. An educational set for young farmers has been conceptualised by the partners of Leonardo da Vinci project. The educational set for young farmers covers the following topics: EU and common agricultural policy, agriculture and environment, work safety and health protection in agriculture, quality and safety of food production, non-agricultural supplementary economic activities. The educational set includes five textbooks and CD ROM in six languages and has been tested in all the participating countries. The paper discusses the implementation of the chosen modules within the system of continuing education.

*Key words*

continuing education, educational set, food quality, non-agricultural activities

## 1. Introduction

The Institute of Education and Communication of the Czech University of Agriculture in Prague has taken part in a sub-project "Educational kit for young farmers in candidate countries (nowadays full members) of European Union (YOUNG FARMERS)" under the project LEONARDO II. The partners have been eminent European institutions from the United Kingdom, Cyprus, Greece, Italy, Poland, Slovenia and the Czech Republic. The project coordinator has been *The Research and Development Center – Intercollege at Unit of Environmental Studies in Nicosia*. The subject matter has included five topics - EU and common agricultural policy, agriculture and environment, work safety and health protection in agriculture, quality and safety of food production, non-agricultural supplementary economic activities. Five handbooks (one for each country) and a CD ROM, including general information, sources of information and a list of study courses offered by the new member countries of the European Union, have been published. A questionnaire survey concerning all the five topics has taken place in Cyprus, Slovenia, the Czech Republic and Poland. The paper presents and comments some interesting results of the survey of the two chosen topics – *Quality and safety of food production* and *Non-agricultural supplementary economic activities*.

## 2. Results of the questionnaire survey

The questionnaire has been answered by 34 young farmers from Cyprus, by 33 from Slovenia, 36 from the Czech Republic and by 50 young farmers from Poland. They have been asked to answer four questions of *Quality and safety of food production* topic and two questions of *Non-agricultural supplementary economic activities* topic.

### Quality and safety of food production

Question No. 1: Do you apply suitable methods of growing crops (EUREPGAP) and in production of agricultural products (HACCP)?

Question No. 2: Have you or your employees (if you have any) been educated in the principles and regulations of maintaining the quality and safety of food production?

Question No. 3: Are you aware of the quality and safety of the required methods in food production?

Question No. 4: Would you be interested in taking part in a course concerning the quality and safety of food production?

Table No. 1: Figures (in %) corresponding to the answers in all four countries

| | **Question No. 1** | | | **Question No. 2** | | **Question No. 3** | | **Question No. 4** | |
|---|---|---|---|---|---|---|---|---|---|
| **Country** | Yes | No | Int. | Yes | No | Yes | No | Yes | No |
| Cyprus | 17 | 14 | 66 | 66 | 20 | 83 | 14 | 83 | 14 |
| Slovenia | 24 | 27 | 48 | 54 | 45 | 39 | 60 | 72 | 27 |
| Czech Rep. | 33 | 11 | 56 | 44 | 56 | 94 | 6 | 67 | 33 |
| Poland | 22 | 26 | 48 | 74 | 22 | 36 | 62 | 74 | 24 |

Ad 1)
The figures illustrating the application of suitable methods of growing crops (EUREPGAP) and in production of agricultural products (HACCP) are relatively low in all four countries. The figures range between 17% and 33%. A positive result is that the intention to do so is relatively very high. The figures range between 48% (Poland and Slovenia) and 56% (Czech Republic) up to 66% (Cyprus).

Ad 2)
The awareness of the importance of being educated in the principles and regulations of maintaining the quality and safety of food production is very different in the four countries. The figures range between 44% and 74%. Farmers in the Czech Republic (44%) have declared insufficient education and awareness of the principles of quality and safety of food production. On the other hand, young farmers in Poland have had the highest number of positive answers (74%) which illustrates their good education and knowledge in this topic.

Ad 3)
The answers to the question No. 3 contrast with the answers to the question No. 2. The percent figures of Poland and Slovenia (36% and 39%) are relatively low, while Cyprus and the Czech Republic have shown extremely high figures (83% and 94%).

Ad 4)
The answers to the question No. 4 are very optimistic. Farmers from all four countries are interested in further education (figures ranging between 67% and 83%). Young farmers in Cyprus are willing to take part in seminars the most, while farmers from the Czech Republic have declared the lowest figure.

**Supplementary economic non-agricultural activities**

Question No. 1: Do you practice, apart from farming, any supplementary non-agricultural activities?

Question No. 2: Which of the supplementary non-agricultural activities would you like to practice?

Ad 1)

Table No. 2: Absolute figures in all four countries

| **Country** | **Yes** | **No** | **Total** |
|---|---|---|---|
| Cyprus | 0 | 34 | 34 |
| Slovenia | 8 | 25 | 33 |
| Czech Rep. | 20 | 16 | 36 |
| Poland | 1 | 49 | 50 |

Cyprus – the fact that not a single farmer practices any supplementary non-agricultural activity is quite striking. However, it does not illustrate the real situation in the country, as we have not included old farmers in our survey.

Slovenia – eight farmers (24%) is quite a low figure. In this case, the sample is illustrating the real situation in the country.

Czech Rep. – twenty farmers (56%) is quite a high figure. It is a pity that the young farmers have not stated more details about the type of their non-agricultural activity.

Poland – only one farmer practices non-agricultural activity. It seems that most farmers in Poland practice only agricultural activity.

Ad 2)

Table No. 3: The most common supplementary activities of young farmers (stated in %)

| **Country** | **Agro-tourism** | **Family restaurant** | **Local guide** | **Food production on the farm** | **Other** |
|---|---|---|---|---|---|
| Cyprus | 16,6 | 3,4 | 10,0 | 66,6 | 3,4 |
| Slovenia | 12,0 | 0,0 | 6,0 | 27,0 | 3,0 |
| Czech Rep. | 33,0 | 28,0 | 6,0 | 56,0 | 0,0 |
| Poland | 12,0 | 8,0 | 0,0 | 16,0 | 10,0 |

Cyprus – a high figure of 66,6% young farmers would like to produce agricultural products directly on their farm. 16,6% would like to run agro-tourism. It is probably caused by the fact

that *Cyprus Tourism Organisation* has been in the last 15 years supporting this type of tourism.
Slovenia – 52% respondents have not answered. 27% have stated that they would be interested in the production of agricultural products on their farm.

Czech Rep. – 56% of young farmers would like to produce agricultural products on their farm. A positive result is that 33% respondents run agro-tourism and 28% run a family restaurant, which is the highest figure compared to other countries.

Poland – 56% respondents have not answered. Only 16% of young farmers would be interested in production of agricultural products on their farm.

## 3. Conclusion

The presented results are surely interesting. Some answers might be slightly misleading; some respondents have not answered all questions. The reason for this might be lack of interest and time or malfunction of cooperation between the participating institutions and young farmers in the particular country.
The staff of the Institute of Education and Communication of the Czech University of Agriculture in Prague have been pleased that most Czech young farmers were interested in the survey. These young people run business in the sphere which has been quite demanding in recent years. However, they have paid a close attention to the questionnaire.
The results of the survey and a two-year processing have been summoned and published in five handbooks (one for each topic) and a CD ROM. The results are a valuable source of information not only for the staff of the Institute of Education and Communication of CUA in Prague but mainly for young farmers who can use them in their work.
Last year, the coordinator of the project in Nicosia organised a seminar for lectors. They were the experienced people from the sphere of education and consultancy. These lectors were trained in all the five topics mentioned above. They should pass their knowledge and experience to young farmers in all possible transfer of information.

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# Research in photovoltaic at the CUA in Prague

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*Keywords*
Solar energy, solar tracker, PV panel, photovoltaic

## 1. INTRODUCTION

The solar energy is not yet a concurrent of the high capacity power stations, but it is effectively used as an additional energy source. The solar energy is used more and more nowadays and we can see the rapid increase of the world production of the solar photovoltaic (PV) panels. PV conversion of the solar energy should be the most important energy source after the year 2040.

The direct energy transformation in semiconductor photovoltaic cells is the most widely used transformation of the solar energy. The photovoltaic solar power plants (and small solar PV systems) are installed all over the world. There are existing small PV systems with maximum power of few kilowatts or even less and on other hand there are existing big PV power plants with maximum power of few megawatts. It is possible to use the direct current for appliances supply or for storage batteries charging. It is also possible to produce hydrogen by water electrolysis and the energy can be accumulated in this form. The direct current can be transformed electronically into alternating current in DC/AC inverter and then it can be connected to the grid (for example $U$ = 230V AC).

**Fig. 1** Small PV system in the year 2005

**Fig. 2** Larger PV system in the year 2006

The photovoltaic systems can be constructed as an off-grid or on-grid system. Figs. 1,2 show our PV systems, the scheme of our down described on-grid configuration is shown on Fig. 3. Off-grid systems are not connected to the grid and they supply only a small surroundings or only one appliance sometimes. The energy consumption is limited by the amount of produced energy. It is necessary to know the local average values of the Sun radiation and the efficiency of the PV system. Then we can calculate the dimension of the PV system.

The on-grid PV systems are connected to the grid. They can supply the grid during the higher energy production. During the lower energy production the electricity can be consumed from the grid. The modern DC/AC inverters synchronize the phase automatically with the grid and they are also automatically disconnected from safety reasons when there is no voltage in the grid. The data output allows monitoring and data saving of the instantaneous power or other parameters by the computer.

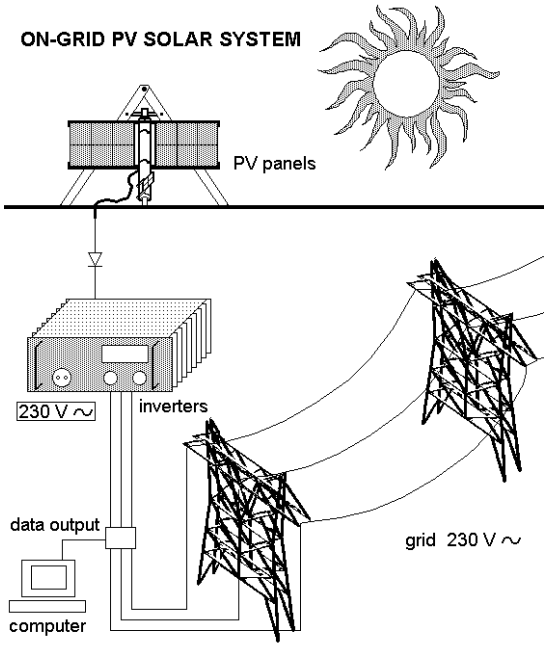


**Fig. 3** PV on-grid solar system – scheme

## 2. THEORETICAL ASPECTS

The tracking strategy is following. The Sun is moving across the sky during the day. In the case of fixed solar collectors the projection of the collector area into the plane, which is perpendicular to the radiation direction, is given by the function of cosine of the angle of incidence (Fig. 4). The higher is the angle of incidence $\varphi$, the lower is the power. The solar tracker, a device that keeps photovoltaic or photothermal panels in an optimum position perpendicularly to the solar radiation during daylight hours, can increase the collected energy by up to 40%. Theoretical calculation of the energy surplus in the case of tracking collectors is as follows: We assume the maximum radiation intensity $I = 1100\ \mathrm{W.m^{-2}}$ is falling on the area which is oriented perpendicularly to the direction of radiation. We assume the day length $t = 12\ \mathrm{h} = 43200\ \mathrm{s}$ as well as the night length and we compare the tracking collector which is all the time optimally oriented to the sun and the fixed collector which is oriented perpendicularly to the direction of radiation only at noon. We mark the collector area $S_o$.

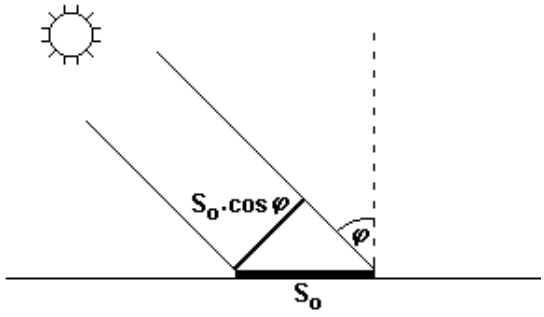


**Fig. 4** Angle of incidence $\varphi$

a) *For fixed collector we calculate*: The projection of this area on the area which is oriented perpendicularly to the radiation direction is equal $S = S_o\,.\cos\varphi$ and the angle $\varphi$ is changing in the interval $\varphi \in \left\langle \frac{-\pi}{2}; \frac{+\pi}{2} \right\rangle$ during the day. The angular velocity of the sun moving across the sky is equal to $\omega = 2\pi / T = 7{,}27\,.10^{-5}\ \mathrm{s^{-1}}$ and the differential of the acting energy is equal to $\mathrm{d}W = I\,S\,\mathrm{d}t$. When we do not consider the atmosphere influence, we can calculate the energy, which has fallen on the collector area $S_o = 1\,\mathrm{m^2}$ during one day as

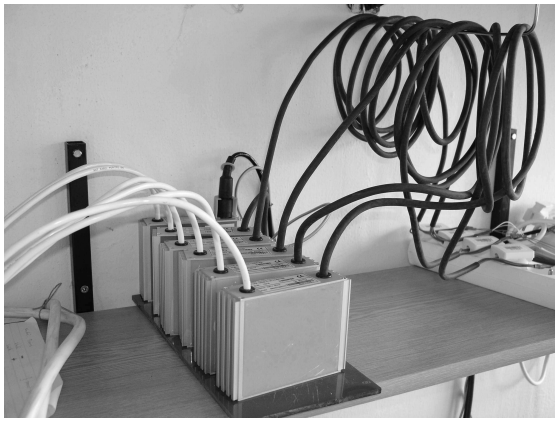

**Fig. 5** Arrangement of the inverters

$$W = \int_{-21600}^{+21600} I\, S_o \cos\omega t \,\mathrm{d}t = I\, S_o \left[\frac{\sin\omega t}{\omega}\right]_{-21600}^{+21600} = \frac{2\, I\, S_o}{\omega} = 3{,}03\,.\,10^7 \text{ W.s} = 8{,}41 \text{ kW.h} \qquad (1)$$

b) *For the tracking collector which is all the time optimally oriented with respect to the sun,* and when the atmospheric influence is not considered, we can calculate the energy, which has fallen on the collector area $S_o = 1\,\mathrm{m}^2$ during one day as

$$W = I\, S_o\, t = 4{,}75\,.\,10^7 \text{ W.s} = 13{,}2 \text{ kW.h}. \qquad (2)$$

Comparison between Eq.(1) and Eq.(2) shows the energy surplus of 57% when we do not consider the atmosphere influence. We would really obtain this surplus for example on the Moon surface. On the Earth surface the sun is shining through a thick atmosphere layer after sunrise and before sunset. In the morning and in the evening, the radiation intensity acting on the area which is oriented perpendicularly to the radiation direction is much lower than at noon. On the other hand, the day can be longer than 12 h at higher latitude. That is the reason, that the energy surplus can be really as much as 40% on the Earth surface. The obtained power decreases when the angle of incidence of the radiation increases. The higher amount of the produced energy corresponds with the lower price of the energy.

## 3. PHOTOVOLTAIC SYSTEM AT THE CUA IN PRAGUE

The authors designed and constructed the solar PV system. We would like to increase the amount of produced energy from PV panels. The usage of the tracking stand TRAXLE$^{TM}$ was appropriate for our requirement. Passive solar tracker TRAXLE$^{TM}$ was developed in co-operation of the CUA in Prague and fa. Poulek Solar, Ltd. and it was described in detail in the past [1-3]. The construction of this tracker is original and simple. It does not need complicated electronic components and external energy source. The solar energy move with the system, if the system is good balanced.

In the autumn 2004 a small PV solar system was installed in the Technical Faculty, Czech Univ. of Agric. in Prague. This PV system (Fig. 1) involved three PV panels where two of them were placed on the automatic tracking stand TRAXLE$^{TM}$. The first PV panel was standard based on thin layers of amorphous silicon with maximum power 40W$_p$. The second panel was bifacial [2,4] based on polycrystalline silicon with maximum power 100 W$_p$. The last standard panel based on thin layers of amorphous silicon with maximum power 40 W$_p$ was placed on a fixed stand and it is used as a reference panel. Both versions (on-grid, off-grid) were tested.

In the case of on-grid version the direct currents from the PV panels were changed to the alternating currents in DC/AC inverters OK4E-100 (NKF-Electronics); the inverters were connected directly to the grid. The data output to the computer allowed to read and save data about instantaneous power from the PV panels, about amount of produced energy and about instantaneous direct voltage of the panels and alternating voltage in the grid. The DC/AC inverters synchronise the alternating voltage with the grid and they automatically disconnect this connection for the safety reason in the case of power failure in the grid. We compared mainly two above mentioned identical PV panels based on thin layers of amorphous silicon with maximum power 40 W$_p$. One panel was placed on the fixed stand and the second panel was placed on the tracking stand. The third PV panel based on polycrystalline silicon was used in off-grid configuration for charging of the storage batteries.

In the autumn 2005 a larger PV solar system was installed (Fig. 2). The PV panels were based on monocrystalline silicon. In this case we compared two identical standard PV

panels (tracking and fixed) with maximum power 110 $W_p$ and one bifacial panel (tracking) with maximum power 100 $W_p$. Fig. 5 shows arrangement of the inverters.

## 4. ENERGY SURPLUS IN THE SOLAR TRACKING SYSTEM

The monitoring and measurement in this solar PV systems has been running during the years 2005 and 2006. The instantaneous power and the quantity of produced energy were compared in the local conditions of the Prague 6 – Suchdol. The results from the autumntime and wintertime are not assumed as objective because of short daytime and small angles range of the Sun moving cross the sky. Also the higher quantity of the produced energy in the local conditions of 50° north latitude in the case of the tracking system in comparison with the fixed system was observed during the spring and summer. The differences more than 30% in the amount of the produced energy were observed in sunny days. Fig. 6 shows examples of our measurements in the case of PV panels based on thin layers of amorphous silicon, Fig. 7 shows examples of our measurements in the case of PV panels based on monocrystalline silicon. There are graphs of the dependence of instantaneous power of compared PV panels on the daytime during the selected days. The produced energy is equal to the integral

$$E = \int_{\Delta t} P.dt\,, \qquad (3)$$

where $P$ is the instantaneous power and $t$ is the daytime.

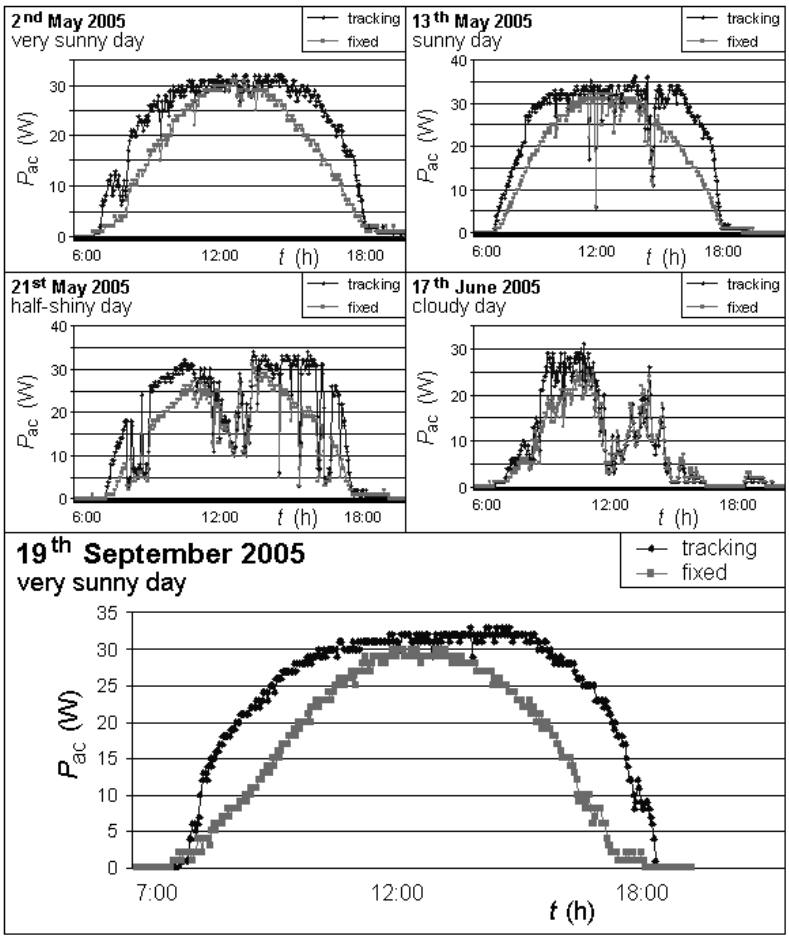


**Fig. 6** Examples of our measurement during selected days in the year 2005. Dependences of the instantaneous power on the daytime for PV panels based on thin layers of amorphous silicon

## 5. CONCLUSION

The solar PV systems were constructed and installed at the Czech University of Agriculture in Prague. There were tested both versions - on-grid, off-grid. Identical PV panels were compared in the on-grid version, one panel was fixed and the second panel was located on the tracking stand TRAXLE$^{TM}$ developed in cooperation of the CUA in Prague and fa. Poulek Solar, Ltd.

The solar tracking system yields the energy surplus more then 30% during sunny days in the local conditions of Prague (50° of north latitude). Results of our experiments with the small PV solar system correspond with theoretical calculation [1,2].

The energy surplus corresponds with the lower price of the solar energy. Economic calculation shows, that the solar system with tracking stand is cheaper, when we compare two systems which produce the some amount of the energy - one system with tracking stand and one system with fixed stand. The tracking stand is more expensive than fixed, but we can save some PV panels, and the price of the PV panels is the most significant part of the price of the whole solar PV system [2].

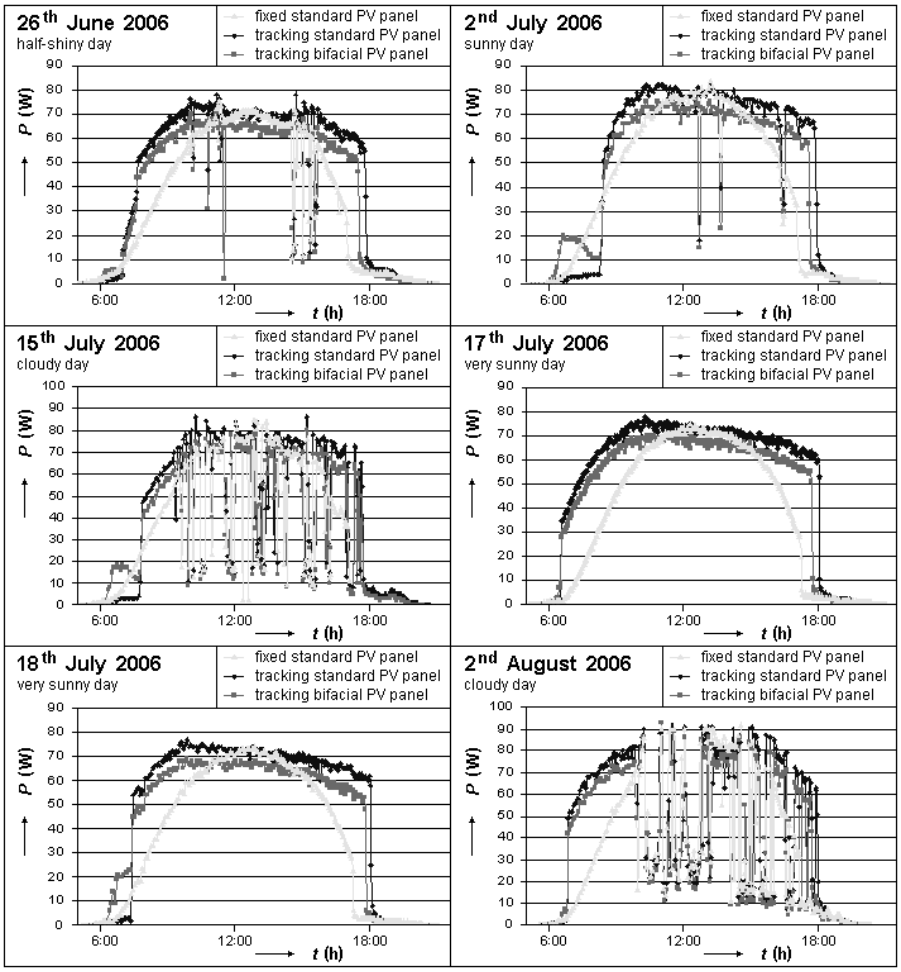


**Fig. 7** Examples of our measurement during selected days in the year 2006. Dependences of the instantaneous power on the daytime for PV panels based on monocrystalline silicon

The work was supported by research project MSM 6046070905.

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# Class teaching/learning models in projects of internal courses for employees at Mendel University of Agriculture and Forestry in Brno

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*Abstract*
The contribution discusses both the theoretical aspect and practical experience of the ICV MZLU (Institute of Lifelong Learning at Mendel University of Agriculture and Forestry in Brno) in the sphere of education of the adult. The attention is paid primarily to the class teaching/learning models provided by MZLU in Brno within the framework of the employees' internal education projects.

*Key words*
Education of the adult, lector, participant, educational programme, class teaching/learning model, objective, contents, teaching method, theory and practice

## Introduction

The conditions of the present society call for the application of the principal attributes of social being into the life. This is the challenge of today that is impossible to ignore. The implementation of these aspects into the everyday life of social structures members can bring significant competitive advantages.

The development of the democratic society after 1989 in relation to the social transformation based on the democratic principles and the market economy considers the adult education important means of the human resources development.

Knowledge undoubtedly creates a company's capital. The world managers claim that the value of the successful company depends mainly on the knowledge capital and less on the accounting value. The well oriented companies know that the competitive advantage can be reached by the higher quality personnel, and if they have a positive relationship to their employees and do not only try to exploit them, they understand that the investments into their further education are inevitable.

In 2006 – 2008 the Mendel University of Agriculture and Forestry in Brno (further MZLU) has been the bearer of the project Operational Programme of Human Resources Development (further OP RLZ) named "By higher qualification against impacts of structural and technological changes", financed by the European Social Fund. Its primary objective is providing various activities to selected groups of the University employees. The target group is the administrative workers, research and service officials as well as the University managers.

They all can participate in the Lifelong Learning courses offered in four categories: IT courses, general education courses for the administrative workers, courses for managers and development of English communication.

Within the above-mentioned project the Institute of Lifelong Learning (further ICV) MZLU in Brno provides supervision and holds 11 courses. The ICV personnel attempt to provide the

inspiring educational activities from the point of view of both contents and methodology for the University employees.

**Objective and methodology**

The contribution wants to share the experience that is being gained by the ICV MZLU staff in the process of teaching in the educational programmes for selected groups of MZLU workers to pedagogical professionals. In this respect the authors want to discuss some theoretical aspects of adult education.

Working on the contents of the theoretical part of he contribution the authors chose the genetic methodological approach and used certain rational methods e.g. analysis, synthesis, comparison, generalization and sorting. The authors worked with the documents and selected primary sources so that the crucial scientific message could be effectively determined and critically assessed. This enables the explanation of the fundamental standpoints and terminology of a given topic. The references were made by means of abstract technique and the quotations were always marked in accordance with the Czech State Norm 690.

In the application part the methods of description and analysis of the authors' own experience was used. A lot of inspiring ideas applicable for the adult education can be found there.

**Theoretical aspects**

According to J. Malach and B. Zapletal (2005), the adult education can be perceived as a process in which an individual acquires pieces of knowledge and activities which they, by means of internal processing - primarily interiorization, turn into knowledge, skills and routines. This process exists between two agents, educator – lector and educated - participant in the educational programme. From the point of view of the educator it's a process of teaching, from the point of view of educated it is a process of learning.

The teaching process can be characterized as an educator's activity when they initiative, motivate and direct the learning process so that the target given before the beginning of the educational activity can be reached. In the process of teaching the educator is relatively more active and, undoubtedly, more controlling agent.

The process of learning is perceived as an activity of educated agent based on the quantitative as well as qualitative increase of knowledge obtained, but also on the transfer and possibly change of values, attitudes and other personality components influencing the development. Thus we can say that the process of learning becomes a part of the development of an individual and their professional and social engagement.

W. Glaserfeld (1998) deals with learning strategies defining 4 principal parts of the process of adult learning:

1. What do we know? Do we know it?
2. What don't we know?
3. What do we need to know?
4. Where can we get the knowledge?

In the process of the adult learning we can trace 4 of its basic phases:

1. involuntary unfamiliarity (I don't know that I don't know it);
2. deliberate unfamiliarity (I know that I don't know it);
3. deliberate knowledge (I know that I know it);
4. involuntary knowledge (I don't know that I know it);

To sum up we can say that the process of teaching and learning can be characterized as the process of individual and group enhancement and improvement of its participants.

It is necessary to realize that the present andragogic theory does not contain any generally accepted concept of teaching the adult. Frequently in this respect the three-dimensional class model of teaching the adult is discussed where the significant parts are 3 dimensions: cognitive (the process of teaching is perceived as a hybrid process aimed at gaining knowledge, skills and routines), pragmatic (where this process is perceived as gaining new quality of acting and behaving), and finally creative (where this process is perceived as a creative modification of knowledge and experience).

From the lector's point of view the didactic method should be perceived as a complex of approaches by which they give the knowledge to the class participants and shapes their knowledge and possibly routines. Form the class participant's point of view the didactic method contains the approaches by which they learn new knowledge, skills and routines.

The didactic methods in the adult teaching/learning can be divided into 3 groups according to J. Mužík (2004):

a) Didactic methods according to their relationship to professional practice (theoretical, theoretical-practical and practical methods),

b) Didactic methods according to the way they enhance the participants' process of learning (methods of transfer and facilitation),

c) Didactic methods according to the participants' educational needs (methods focused on realization of problems and their solution).

Theoretical methods are the most appropriate for giving the theoretical knowledge, clearing up the terms, principles and theories. They are primarily the classical lecture, lecture and discussion, seminar and exercise.

The theoretical-practical methods provides not only knowledge, they also focus on obtaining conditions for successful work in practice. They are mainly the methods of discussion, problem, programme, diagnostic and classification and project.

The practical methods focus on enhancement of perception and observation of the run of working process and help develop the skills and routines shaping the behaviour at work. They are instructions, coaching, mentoring, counselling, work rotation, study visit and excursion.

The purpose of the method of transfer is that the lector transfers the knowledge, skills and routines to the class participants. It is done by means of lecturing, seminar, consultation, dialogical methods or excursion. If the lector uses the method of facilitation, they focus more on the support of learning activities and the entire participants' learning process. These methods contain instructing,coaching, workshop, but also fictive company or e-learning.

The methods focused on realization of problems contain lecturing, exercise, seminar, discussion, situation and performance methods, while the problems solution methods contain economic role-plays, systematic observation, straight training, methods of functional employment, excursion and study visits.

**Application part**

The Project OP RLP "With higher qualification against impacts of structural and technological changes" is guaranteed by the ICV MZLU workers who are in lecturing and administrative charge of running 11 courses. They are the following study programmes: Assertiveness in Practice (3 lessons/3 terms), Effective Managing of Meetings (4 lessons/2

terms), Financial Management and Control (6 lessons/ 2 terms), Company Culture and Etiquette (4 lessons/1 term), Communication (5 lessons/4 terms), Managers' Psychology (40 lessons/1 term), Communicative Skills in English (14 lessons/1 term), Communicative Skills in Czech (10 lessons/1 term), Project Management (30 lessons/2 terms), Telephoning (3 lessons/3 terms), Managing Working Teams (4 lessons/1 term). The significant objective of ICV MZLU realization team is to provide the courses participants in the study programmes new, inspiring knowledge and skills by means of non-traditional class models.

To fulfil this objective, the guarantor of the study programmes has decided to carry out most of the educating activities in a dual way. Essentially the teaching is provided by means of two lectors, where each of them has an independent role in their classes. The first one is so-called "deliverer" of the knowledge and the other one is a facilitator.

The primary deliverer's objective is to provide the course participants, by means of transfer, adequate lots of knowledge that are commented and possibly completed mainly by activity techniques by the facilitator in the course of the teaching process. Their duty is to motivate and encourage the course participants' activities, and work on forming the open climate at the study group.

The concrete facilitator's approaches must root from the programme objectives and be modified in respect to its contents. They can use the whole range of mobilizing teaching methods such as discussion, performance, problem, or choose the techniques of the active social teaching methods or interactive psychosocial teaching. For example, during the Course on Project Management, at the beginning of the first session, the facilitator discussed the participants' expectations, worries of their participation in the course, carried out the deciding role-play, commented on the deliverer's lecture, gave the concrete examples of theoretical problems and summed up the pieces of knowledge of particular topical units of the programme.

The role of facilitator was designed in a different way in the Course on Communication. There they will guide the learners in the course of lessons and 3 short tests and 7 practical exercises.

The condition for the dual lessons is the ability of a team-work of both lectors which means to respect the partner, follow their thinking processes and immediately respond to the carried out activities. This does not mean the stereotype activities planned in advance, but the spontaneous reaction of both lectors within the given scenario.

It is obvious that the structure of educating programmes must be designed in accordance with the didactic needs. The introduction has to determine the concrete aims and contents of the course. The conclusion contains summing up, and at the very end of the course the control questions are asked.

From the point of view of formal requirements it is useful to support the deliverer's process of teaching with the power point presentation and the handouts.

For better quality of the teaching process it is necessary to complete each programme with an application of a selected diagnostic method. We consider the appropriate technique the course participants' feedback where they give their opinions about pros and cons of the course because we can get useful information which can help improve our work.

The feedback that we obtained after the first part of one of our courses we found out that the learners positively accepted the model of dual teaching but considered the contents too difficult and the pace inadequately fast.

This information is very useful and we will take it into consideration in the future courses.

**Conclusion**

The decisive role of the educators in the adult education is preparation of the programmes which the best reflect the needs of their potential participants and the proper design of their methodological aspect. The attractive educational activities for the adult population can be prepared only when they match up the content, forms and methods. The courses' graduates create the necessary preconditions for the development of well-educated society in our conditions.

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# A Market Analysis of Terroir Product (Leon Beans) as a part of Rural Development based on Promotion of High Quality Food Products

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*Abstract*

Multi-disciplinarity in teaching and learning has been encouraged involving the graduate students from a depressed area in northwest *Castilla y Leon* (Spain) in a market analysis of the terroir product beans from "La Bañeza-Leon". The objective was to promote rural development on the basis of the exploitation of such high quality local food product. To reach this objective an analyses of the beans market were proposed to the students. They prepared the questions and selected de parameters asking to the consumers involved. Endly they treated the results and give some solutions to improve the market of Leon La Bañeza kindey beans. The analyses revealed that beans from Leon-La Bañeza are well kown by the consumers. If the imported beans are cheaper, the consumers would choose them because they do not recognize the Leon-La Bañeza beans as a quality product. The consumers in Leon, prefer dry beans instead pre cooked beans. The consumers do not care about the material of the package, use to buy one kilogram packages, and prefer spanish origin. The consumers care of the price combined with origin or trademark specially, in the buying process of beans. To inform the consumers about the high quality of La Bañeza-Leon beans, is the primary strategy to contribute to the rural development based in this traditional product. This teaching experience has helped the students in the following ways: i) to know better the situation of the region; ii) to participate on the strategies for the economic development of the region; iii) to face a real professional situation; iv) to know how to manage in the sector; v) to open relationships with other proffesionals and Autorities.

*Key words*

Rural development; integration of students in market analyses; terroir products.

## INTRODUCTION

Leon is a depressed in the northwest of Castilla and Leon, as a consequence of population decreasing because of the lack of economic activity that it is the mostly reduced to agriculture. The kidney beans were introduced in Leon in the XVIII century (Rubio Pérez, 1987). Their quality is well known. At the beginning of XX century kidney beans from La Bañeza (Leon) were widely exported (Valderas Alonso, 1990).

At the end of the XX century beans from Argentina or EEUU were imported in Spain at lower prices than the local ones (Junta de Castilla y Leon, 2000). The consequence was several years of continuous decreasing of production and consumption. Nowadays, the consumers are revaluating the traditional food products (MAPA, 2004) and this scene give the opportunity of inverting the trends.

The traditional kidney beans producers, industries and market have to take advantage but having in mind the competence from other countries. The Leon-La Bañeza traditional beans

must be adapted to the consumers demand and to the market (Urbano *et al.*, 2004). In this sense the packages are changing (Valenciano *et al.*, 2000), the prices are getting competitive and the quality must be the highest.
In this moment is needed to identify the preferences of the consumers of traditional kidney beans of Leon-La Bañeza comparing with other beans of the market, to contribute to the development of that rural region.
To reach this objective an analyses of the beans market were proposed to graduate students. They prepared the questions and select de parameters asking to the consumers involved. Endly they treated the results and give some solutions to improve the market of Leon La Bañeza kindey beans. The experience and results of the market analyse are presented to de 8th ECHAE Conference.

## OBJECTIVES

The general objective was to promote rural development on the basis of the exploitation of high quality local food products. With this general objective, the specific objective of this work was to assess the knowledgement of the Leon-La Bañeza beans by local consumers and some parameters of buying decision, comparing with other beans in the market.

## MATERIAL AND METHODS

Nine variables were selected to analyse the knowledgement and buying preferences of the beans consumers in Leon (Spain). Three parameters about "knowledgement", if the consumers know the Leon-La Bañeza traditional kidney beans, if they feel them as a traditional quality product and the way to identifying the Leon-La Bañeza traditional kidney beans in the shops.
The other six parameters were about decision buying process. The consumers were asked about the package they prefer for quality beans, the size of the package, the type of preparation they look for and which characteristics are more important for buying decision like origin and price. This information was obtained by empirical methods. One hundred consumers of Leon were asked in the shops where they buy beans.

Then, the dependence between the knowledge and the buying process variables were analysed. The dependence between the variable to be explained, knowledgement of Leon-La Bañeza traditional kidney beans, and the explanatory variables was calculated by means of a chi-squared ($\chi^2$) test of significance between the variables. To accept or reject the null hypothesis $H_0$, which implies no relation between the variables, the value of the $\chi^2$ statistic and the respective *p-values* were considered and dependence was determined in the light of the frequencies expected and obtained and the corresponding residues.

## RESULTS AND DISCUSSION

About the knowledgement of Leon-La Bañeza kidney beans, the 73% of the asked consumers know them. But only the 51% of the consumers recognized the distinctive sign of this product in the market. That means that even they know the product, they probably could get confuse in the establishment to buy them. Even when they were asked if they know that the Leon-La Bañeza kidney beans are a quality product, only the 31% were able to recognize it. If the consumers do not recognize a product as better as the ones of those from competitors they would not be willing to pay a higher price (Urbano *et al.*, 2004). In this case it is possible to conclude that if the beans imported are cheaper, the consumer would choose them because they could not recognize the Leon-La Bañeza kidney beans as a quality product.
About the buying process it could be concluded that they prefer dry kidney beans than the cooked ones (table 1), even though it is proved that in Spain the demand of cooked dishes has

increased due to the change in the way of life (MAPA, 2004).
Most of the consumers (41%) did not mind the origin of the kidney beans when they bought them. The consumers that check the origin, preferred much the Leon origin beans (35,9%) and the other consumers (23,1%) looked that they were from Spain. As a conclusion more than the fifty percent of the consumers preferred spanish beans (table 2).

Table 1. Type of kidney beans prefer by consumers

| | *frequency* |
|---|---|
| dry beans | 0,59 |
| pre cooked beans | 0,28 |
| depend on the recipe | 0,13 |

Table 2. Origin of kidney beans prefer by consumers

| | *frequency* |
|---|---|
| don not mind | 0,41 |
| from Spain | 0,231 |
| from Leon | 0,359 |

The size and package preferred by the consumers, more than 50% used to buy the one kilogram format and followed by those that buys 250 grams format. As it is proved that the most frequent family size in Spain is one or four persons (MAPA, 2004) this would justify the size of the packages. Most of the consumers (48,5%) do not mind of the package, the rest consumers has chosen plastic (5,9%), paper (2,3%), cloth (5,2%) and cardboard (29,5%).

The consumers declare that in the kidney beans buying process the aspects that they look at are, prices, trademark and origin and the combination of some of them (table 3).

Table 3. Buying preferences by consumers

| | Origin | Price | Trademark | Origin Price | Trademark Price | Trademark Origin | Trademark Price/Origin | depend situation |
|---|---|---|---|---|---|---|---|---|
| *frequency* | 0,081 | 0,106 | 0,063 | 0,209 | 0,203 | 0,02 | 0,192 | 0,126 |

The relationship between the buying process variables selected and the knowledgement of the Leon-La Bañeza kidney beans shows that there is a significant dependence ($p$<0,05) between knowledgement and the type of beans, the origin and buying preferences (origin and price) (table 4).

Table 4. Chi-squared significance analysis between the knowledge of Leon-La Bañeza kidney beans and buying process variables.

| Buying process variables | Leon-La Bañeza kidney beans knowledgement |
|---|---|
| | *p-value* |
| 1. Type of kidney beans | 0,023 |
| 2. Origin of kidney beans | 0,000 |
| 3. Size of the package | 0,063 |
| 4. Package | 0,066 |
| 5. Buying preferences | 0,009 |

It is possible to conclude, the consumers that know and recognize the Leon-La Bañeza kidney beans, certainly prefer dry kidney beans coming from Leon and care about the prices. In this sense it is recommended for the Leon La Bañeza kidney beans producers to launch the product in Leon, to sell them at competitive prices and to offer dry better than precooked beans and under these conditions the consumer would prefer beans produced in Leon.

## CONCLUSIONS

1. The Leon-La Bañeza beans are well kown by the consumers.
2. If the beans imported are cheaper, the consumer would choose them because they would not recognize the Leon-La Bañeza kidney beans as a quality product.
3. The consumers in Leon, prefer dry beans instead pre cooked beans.
4. The consumers do not care about the material of the package and use to buy per kilogram and to look for beans from Spain.
5. The consumers care of the price combined with origin or trademark specially, in the buying process of beans.
6. To inform the consumers about the high quality of La Bañeza-Leon beans, is the primary strategy to contribute to the rural development based in this traditional product.

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# The perceptions and demands of the Czech Republic towards agriculture: reflections of multifunctional agriculture in education

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*Abstract*

The paper will address various perceptions of the Czech public as for the agriculture. Using this theoretical background in world-views concept, the perceptions are operationalised into the demands of the Czech consumers toward agriculture. To demonstrate them, the survey of these demands will be done using documentary research. Because the demands are various, the paper suggests the importance of addressing multifunctional agriculture and multifunctional rural areas. Paper outlines some of the consequences for the education when dealing with multifunctionality of agriculture and rural areas (the post-productivist model).

*Key words*

Multifunctional agriculture, rural areas, public demands, perceptions, education

## Introduction

Looking over the discussions about the concept of multifunctional agriculture (MFA), it is obvious that this concept is not accepted by all actors in the debates at all. It is enough just to mention the objections of the Cairn group of the large agricultural commodities exporters. The nature of disagreements about MFA is rooted in the clash between the views of the advocates of agriculture, which they see as reduced only to globalised food production and consumption, and those who see agriculture in broader sense as having also environmental and social functions (e.g. supporting beauty landscape in rural communities able to live their own independent economic, social and cultural lives). European Union emphasizes the model of MFA. It insets the farming is not only about the food production but also about environment, landscape, social norms and values, quality of life. However these ideas are criticized by those who favour unrestricted global free market as the tool to improve living standards through developing the economy. Cairn group and also USA suspect EU will use MFA concept to continue high subsidies for its farmers (Madeley 1999).

This text based on the findings from MULTAGRI project (Capitalisation of results on the multifunctionality of agriculture and rural areas) funded under the scheme of the 6 Framework programme. The paper aims to show that the concept of MFA is not about the intentions of EU to block free trade because of its farmers but it reflects the new demands of European citizens (in the case of the paper they will be represented by the Czech population) towards agriculture and rural areas. Once we can demonstrate the new demands are closely related to the concept of MFA we also can also address some issues in higher agricultural education: how far are the new public demands considered and articulated in our curricula? Does agricultural education reflect the needs of public or is lagging behind? Answering these and other similar questions might also highlight the future of higher agricultural education. This paper would like to promote the discussion about the issues outlined.

**Background of the paper**

The paper agrees that our activities (farming or education are the activities) are guided by certain world-views. The world-views have cognitive function for actors because they provide complex knowledge about surrounding world and about the actors themselves. They also have orientation function because world-views orient actors in the world and help to achieve stability and benefits for the society (Hubík 1999). Education is one of the main channels through which the world-views are formed. World-views have complicated structure. Developing the thoughts of Kuhn (1970) and Stepin (1979) abut the structure of scientific knowledge, world-view can be characterised by three elements: (1) philosophical (metaphysical) foundations, (2) ideals and norms of knowledge and cogitation and (3) pictures of the world (the perceptions, narrations and explanation of the world we are living in and we are part of it).

From the point of view of this paper, the pictures of the world are the most important. If people perceive, narrate and explain agriculture only as food production and global market oriented business, they will want agriculture to have such shape. It is because such world view influences their activities based on goals grounded in their needs and demands. Therefore it is necessary to look how do the people perceive, narrate and explain the agriculture. It will also tell as what are their demands toward farming. If agriculture is organised and shaped in the way which does not correspond with its perception, narration and explanation existing among public we can face problems. The public demands will mismatch the ways in which how farming is done. The question of the support for such forms of farming is obvious. If population demands from agriculture something different that it can offer or it offers, the transaction costs would grow which might erode the whole societal system. That is why the analysis of the views about agriculture is so important.

To analyze how people perceive, narrate and explain the world of farming, and to find what are their demands towards agriculture the documentary research as the systematic use of published materials (Giddens 1989) was used. Total 160 books, papers, research reports and students' works were analyzed to get the ideas what are the demands of the Czech public as for farming and rural areas. Students' thesis represented one quarter (43) of analyzed number of works. It suggests this issue is not marginal in the education at the Czech life science universities.

There were found three different types of the new demands toward agriculture and rural areas. They echo perceptions and interpretations (pictures of the world expressed in world view) in which Czech public also considers farming and rural areas. Because they are new, they should be also reflected in the university curricula in order to concert an education in these fields with contemporary public demands. These new types of demands and perceptions of agriculture are:

- New consumers' perceptions and demands for food products
- New consumers' perceptions and demands for landscape
- New perceptions and social demands for agriculture & rural areas

**New consumer perceptions and demands for food products: *reflections for education***

The attitudes of the consumers in Czechia started to be changed in more significant way after 1989. Very soon after 1989 (the demise of communism in former Czechoslovakia), a decline of the amount of consumed food in general and the changes in the consumed food preferences were indicated. The reasons of this change were not, however, the changes in value orientation despite the fact that people in Czechia have already in the 1980s figured out the importance of the right composition of the food consumption and the importance of the food quality in relation to their health (Zídek 1993). According to many economic studies

(e.g. Peterová 1995) the reasons accounting for the changes in the food consumption were of economic origin at the beginning of the 1990s. The changes in the food consumption (decline of certain foods and increase of others, re-orientation of preferences) were caused by economic factors (social and cultural influences, like the change in the values, entered the scene latter). Such an orientation suggests people want agriculture to produce cheap products. *Thinking about education, economics and economic analysis need to be incorporated into technological courses. Nevertheless also value orientation should be incorporated as well.*

A specific issue in Czechia is self-subsistence farming in the gardens. It is so popular not only due to economic reasons, because it is the way of spending leisure time and it brings the control over produced food (Hudečková, Lošťák 1993, Dvořáková-Janů 1999). These new demands have therefore also their social background. Although this type of farming is considered in negative way (as the old fashion one), it still generates relatively significant in-kind income in rural areas. *The universities should develop the approaches to this activity in modern sense as the leisure time activity and address some courses to this sector. Mass media have already started to portray this form of farming as hobby, why not to use this public discourse?*

The food quality is the most addressed in the interests in organic foods and in labelling the food products. Organic foods are considered to be clear without pesticides and chemicals and much better processed. However, there is not univocal agreement that organic foods are healthier than conventional ones (Czech press agency CTK, Sept. 18, 2003). Only 18.5% of the Czech population eats organic foods, although their knowledge is much higher. (Výsledky 2004). A typical consumer of organic food is a woman aged 35-45 with 1-2 children. She is educated, interested in environment and health and she is willing to pay more for the food (Green Marketing survey from 2002). The prices of organic foods in Czechia are higher than those of conventional foods (gap is 20%-300%), but some surveys indicate, that price is not in some cases the most decisive factor for buying the organic food. The main obstacles for the development of organic food market are less developed channels of distribution, lack of some organic staples and foods, low awareness of consumers about organic foods, lower market transparency (under organic logo, there are sold conventional foods which confuses the consumers), unfair price policy (Green marketing survey quoted by Mladá fronta Dnes, Czech Press Agency CTK Sept. 18. 2003). *It is obvious the public want quality food but the problem is with marketing. Therefore the universities should focus on marketing courses in the way how to promote the marketing of quality food products. Both farmers and customers would benefit.*

**New consumer perceptions and demands for landscape: *reflections for education***

The values related to the healthy environment are listed as ones of the top values of the Czech population (Rendlová 2002). Nevertheless there is evident the decline in the willingness to sacrifice something in the favour of better environment (Soukup 2001). Also the perception of the ecological danger decreased. The environmental behaviour is ascribed rather to elderly people, while the civic engagement in the field of environment is ascribed to young generation.

Among the weaknesses of farming in the second half of the 1990s the continuing disinterest of farmers in intentional improvement of their relation to environment was found (Doucha 1997). Therefore also the official documents orienting the Czech agrarian policy point out as global goal of the development of agriculture: to contribute to the protection of nature, to the sustainable development of the multifunctional rural areas based on sustainable agriculture in the way to restrain environment from the negative impacts of farming. Despite these goals and the fact that the payments for maintaining the landscape amount for the largest

part of the direct payments to farmers in 1999-2000, the support of non-production function of agriculture declined more than 1/3.

An important role in the relation to nature, landscape and environment is done by about 600 Czech NGOs. An interesting group (Librová 1994) is a group labelled as colourful (they are those whose life is ecologically beneficial indirectly, usually through low level of consumption; they are not the green). They are considered as the actors of ruralization.

There is the difference between the demands of the public expressed in their values echoed in official government documents and the behaviours of farmers. *The education should focus on building the links between farming, nature landscape and society. Their mutual dependence which is the outcome of human activities is not always obvious among the farmers and population. This is the filed the education should be targeted to. Relation to environment and society is not promoted enough in the communication between farmers and public. In this way agricultural education could play the role of the bridge due to its focus on life sciences. Farmers' extension in this sense is also needed to be developed. There still exist the gap between the universities and NGOs. They should work together instead of their parallel or opposite activities. More strengthened collaboration between universities and NGOs is needed (till now mostly collaboration with industries is emphasized).*

**New perceptions and social demands for farming & rural areas: *reflections for education***

Since the 1980's the great attention is given to the vision (image) of the countryside as an interesting economic place (for the people living there), attractive space and recreation area for the whole society. It is intended to support such rural development which protects natural resources and rural cultural heritage. Sustainability of the rural areas, determined by multifunctional agriculture, is therefore becoming the part of the public demand of urbanized society. This demand includes social and cultural aspects – the urban society re-discovers the countryside because of rural values of open space, healthy environment, closeness to nature, and less complicated social relations (Hudečková, Lošťák 2002).

The data about the development of the settlements suggest at least the end of the process of rural depopulation (end of rural exodus). The change started in the mid of the 1990s when the decline in population in municipalities till 1,999 inhabitants was replaced by their slow growth. It means population started to demand more housing in rural areas. It brings pressures on the rural nature and landscape but also echoes positive images about the countryside. The proximity to the urban centre and the convenient environment are the factors influencing the decision where to live as for the attractiveness of housing.

A specific phenomenon is the neo-ruralism (Hudečková 1997). It is the label for voluntary migration to the countryside. These people are aware of lowering the comfort of their housing and of risk being not accepted by old residents but thy want to achieve freedom of the space and the creativity. Therefore they want to be joined with rural values. This is not a large group of people but they continue the traditions of rural culture, they are of strong ecological attitudes, develop traditional rural practices and are involved in local civic life.

The tradition of rural tourism related to cultural demands dates back to the 19$^{th}$ century. Especially after 1990 a tendencies to establish the new forms of rural tourism such as green tourism (includes eco-tourism, village tourism, agri-tourism and agri-eco-tourism) are observed. It is supplemented by already established Czech form of rural tourism in the form of weekend houses (cottages) – there are 270,000 houses used by families for their recreation. Temporary rural dwellers in rural cottages are important group maintaining rural houses. *The new forms of green tourism develop slowly and lack the education dimension which is requested by society.* There is also a lack of information necessary for this kind of business,

therefore the weekend stays of families in cottages are the most typical way of consuming rural space.

Potential consumers of green tourism are very positive as for its relaxing nature, healthy food and non-organised activities and schedule. Its disadvantages are bad rural infrastructure and similarity to spending the leisure time in the rural cottages. The potential consumers are often the families with kids who have the experience with cottages. They want to be accommodated on farms, to have the half-boarding there, they are interested in the participation in rural festivals. However, rural population is not willing to offer them accommodation in their houses. The new forms of rural tourism are developed in spontaneous way. The specific issue is building new trails (e.g. wine-routes) for tourists in rural areas.

*The multifunctional agriculture is also related to the cultural and educational activities implemented in open air museums.* Their activities include the shows of traditional farming techniques and processes, crafts, folk performances. The growing number of visitors has the chance to active participate in these activities. Another example of the new use of rural space are various activities in the fields of medical rehabilitation and elimination social exclusion in the case of mentally handicapped or drug addictive through the help of agricultural activities.

*It looks social and cultural demands as for the agriculture and rural areas are the less developed and articulated in the university curricula, although the demands are big among the public. It is an emerging niche in the interest of the future students and universities should offer more programmes in rural traditions, rural social live, rural tourism, rural housing or in social policy as a part of the integrated rural development programmes.*

**Conclusions**

It is obvious the perceptions and demands of the Czech public want agriculture to be shaped in multifunctional way. It opens the possibility for the universities to broader their portfolio of courses behind the traditional programmes. Because the demands are so extensive there should not be any fear of no interest of the students and about their inability to find the jobs. It might be the problem in the case the programmes will not reflect these demands.

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# Public participation in the landscape development decision processes in the Czech Republic

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*Abstract*

More than five years´ experience of the Czech Agricultural University in Prague with the teaching and learning activities on the Århus Convention, the EU EIA and SEA Directives and the European Landscape Convention of the Council of Europe implementation integrating with the economic and social EU support programs and funds is fruitfully explored in the recent subjects of applied landscape ecology for Bc., Mgr., PhD., M.Sc. and lifelong learning. The legal background and practical approaches of the implementation of the tools of the public participation in the CR (petition, local referendum, civic association foundation and forms of activity) and in further countries have been compared in the seminars. Among several hundreds seminar works several tens were focused on the public participation on the landscape management cases.

*Key words*

public participation, Århus Convention, European Landscape Convention, EU EIA and SEA Directives, teaching activities

The active and effective public participation in the landscape development decision-making and decision-taking processes is well based in the Czech environmental and common legislation and is fully compatible with the Czech international obligations in this sphere.

The role of direct democracy in the civic society was integrated among main streams in the sphere of public participation in the subject Landscape Ecological Application as one of items of Faculty of Forestry and Environmental Sciences of CUA in 2000.

More than five years´ experience of the Czech Agricultural University in Prague with the teaching and learning activities on the Århus Convention, the EU EIA and SEA Directives and the European Landscape Convention of the Council of Europe implementation integrating with the economic and social EU supporting programs and funds is fruitfully explored in the recent subjects of applied landscape ecology for Bc., Mgr., PhD., M.Sc. and lifelong learning.

On the basis of the former subject Landscape Ecological Applications several special subjects have been lectured by tutors of the recent Landscape Ecological Laboratory in the course of the last years (Environmental Impact Assessment, European Landscape Management tools, Environmental Systems of Management in the CR, European Landscape Convention, European Landscape Policies etc.).

CUA enriches the academic education landscape to reflect the European web of landscape ecological regulations that have been introduced to provide for sustainable European landscape management. We offer modular system of related courses (Environmental Impact Assessment, European Landscape Management tools, Environmental Systems of Management in the CR, European Landscape Convention, European Landscape Policies, etc.).

Students have been taught on the basis of the concrete Czech projects, concepts and policies in comparison with the experience in the EU countries and in member countries of the International Association for Impact Assessment. Special attention concerns the comparison of the specific countries´ experience of the Erasmus and Socrates students.
The legal background and practical approaches of the implementation of the selected tools of the public participation in the CR (petition, local referendum, civic association foundation and forms of activity) and in further countries have been compared in the seminars.
Among several hundreds seminar works several tens were focused on the public participation on the landscape management cases. Students´ seminar works concerning the petition (new crematory in the city of Bor u Tachova), local referendum (Brno railway station removal) and civic association focused to the historical landscape - Virgin Mary Valley in the vicinity of the city of Jičín – reconstruction) are presented as examples in this paper.
Case study "Petition" (Andrle, 2006) concerned with the construction of the new crematory in the residential area of the town Bor u Tachova. Enlargement of the recent graveyard due to problems with ground water was declared as the official reason of the project. Inadequate capacity of crematory became the main reason of local inhabitants´ protest expressed by the petition. "Transboundary" commercial use was as one part of latent misgivings presented. Excitation of broad public discussion resulted to the new town master plan preparation.
Case study "Local referendum" (Patrik et al., 2006) summed up the inhabitants´ reaction to the project of city of Brno main railway station removal. Better technical parameters for extremely high speed railway corridor were declared as official reason of this project. Origin of artificial hiatus between historical city centre and new railway station vs. extremely high prices of the newly created urban lands were created as the root of the conflict between two special interest groups. In contrary of the result of this movement – 25 000 signatures for local referendum, 67 440 (85,6 %) inhabitants for town railway station modernization in the present location - town council decided on the benefit of the removal of main railway station in the city of Brno.
Case study "Civic association" (Krupka, 2006) utilized the experience of the reconstruction of the very fine composed baroque landscape in the vicinity of city of Jičín. Care of historical landscape heritage Virgin Mary Valley became the main goal of this civic movement. Union of villages in the Virgin Mary Valley was registered as the civic association. The civic association has wide scope of activities. Effective involvement of broad local public to the regional development and active participation on the landscape planning and decision making and decision taking are the recent results of these efforts.
The main effects of the seminar activities for students are:

- understanding of direct democracy principles and tools
- comparison of experience
- imaging to be in the position of the key players in the game
- active participation in the own local problems solution
- inspiration for future real life situation.

However, public participation can also create difficulties:

- it does not automatically lead to consensus,
- people and public authorities can be cynical about the value of participation,
- people may only participate if they think their interests are threatened,
- it can raise unrealistic expectations of what can be achieved,
- it may slow down the decision,
- it costs money, and we don't have any.

Our experience indicates that effective, or authentic, public participation implies more than simply finding the right tools and techniques for increasing public involvement in public

decisions. Authentic public participation, that is, participation that works for all parties and stimulates interest and investment in both administrators and citizens, requires rethinking the underlying roles of, and relationships between, administrators and citizens. Many of the graduates of this specialization found a job in their professional carrier in this sphere.

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# Education striving for societal change: Master's Program in Sustainable Business

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*Abstract*

Ever-more-real global climate change, increasing energy consumption, loss in biodiversity – the need for environmentally benign societal change has been growing in Western countries. Can Education for Sustainable Development (ESD) have expected impacts on future development? In this paper it is suggested, that education designed sensitive to and with profound integrative conceptualisation of dimensions of sustainability - ecological, economical and socio-cultural - may offer new dynamics and direction into sustainable development. The Master's Program in Sustainable Business is a collaborative educational initiative by two university institutes, Small Business Centre of the Helsinki School of Economics and Ruralia Institute of the University of Helsinki, on a regional campus of Mikkeli University Consortium. The two-year program is designed for students with BSc in business economics or environmental sciences or agricultural and related sciences. The program focuses on integrative strategies for teaching and learning business economics with environmental and social sciences. The integration proceeds on three levels: the level of teachers, doing research in sustainable development, the level of content of education and the level of students in multidisciplinary groups. The program has multidisciplinary and trade off as well as inter- and transdisciplinary and 'emergent' approaches for conceptualisation of sustainable business. The impacts of the program will be evaluated on the basis of conceptual and practical learning outcomes. The evaluation results enable the judgement of the success of this particular ESD approach and its further development.

*Keywords*

Sustainable business, master's program, integrative disciplinary strategies, impact evaluation

## 1. Introduction

"Now in our own lifetime we are witnessing a startling alteration of climate... It is now established beyond question that a definite change in the arctic climate set in about 1900, that it became astonishingly market about 1930, and it is now spreading into sub-arctic and temperate regions. The frigid top of the world is very clearly warming up." An Amazon 'pro-reader' comments that "The quotes ...were from Rachel Carson's 1950 book, The Sea Around us...passages that sound like they could have been clipped out of today's headlines were written ... nearly 60 years ago, fully 8 years before the International Geophysical Year (IGY) activities transformed climate science and fully a decade before Silent Spring...". (Itzkan 2006). By today, there is a huge body of scientific and educational literature about environmental impacts like global climate change, ozone depletion, acidification, eutrophication, loss of biodiversity and chemicalisation, both on local and global level. The widespread political acceptance of "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission On Environment and Development 1987) has also its critics. They claim that the program for

sustainable development has not tackled the economic-political causes of the present crisis, but leaves the avenue open for governments and industries to continue the harming of natural and social environment (Niiniluoto 2006). The core activities within societies, the cycles of production and consumption within (market) economies, seem to be a more complicated field for socio-economic and environmental adaptation than perhaps initially expected. Education for Sustainable Development (ESD) has been suggested as part of the solution, exemplified by Agenda 21, ongoing Decade of Education for Sustainable Development (DESD) 2005-2014, strategy for Education for Sustainable Development by UN Economic Commission for Europe (UNECE) and Baltic 21E. This educational Agenda 21 aims to introduce sustainability as a ”natural and stable part” for educational systems in the countries of the Baltic Sea Region. As a whole, the task for the universities is a difficult one but of great value. (Jäppinen 2006).

If cycles of production and consumption in market economies are one of the central stages for sustainable development, then education sensitive to and with profound conceptualisation of business economics with environmental and social sciences is needed. The Master’s Program in Sustainable Business is an educational initiative for sustainable development, integrating business economics with environmental and social sciences. The program was developed in collaboration by two university institutes, Ruralia Institute of the University of Helsinki and Small Business Centre of the Helsinki School of Economics, on a regional campus of Mikkeli University Consortium. Sustainable business has been defined as economic activities, which are sustainable economically, socially and environmentally.

## 2. Integration of business economics and environmental sciences in Sustainable Business

In Johannesburg conference 2002, sustainable development was defined as consisting of ecological, economic and socio-cultural dimensions. Sustainable development may be seen presently as a political and mundane concept, not as a well-defined scientific concept or theory. However, in societies involved in knowledge economy (Neef 1998), disciplinary education and degree programs function as drivers of societal development. If the scientific and educational approaches for sustainable development are not building bridges between disciplines, the professional communication and practices can hardly be progressive. In other words, ESD needs education based on analytical and integrative, theoretical and practical interpretations of disciplinary dimensions of sustainable development.

The Master’s Program in Sustainable Business has an in-built approach for transformative learning, the conscious change of world view based on scientific understanding of economic and environmental processes (Rohweder 2006). The teaching input relies on economic, environmental and social critical evidence about the need for more sustainability, instead of attitudinal education (Lankoski 2006). The learning outcomes of the program are expected to be productive and lead into more advanced conceptualisations and practices for sustainable development. Because the program is new, it was possible to follow the principles of constructive alignment (Biggs 2003) in the design and planning from the start. The conscious aim was to build coherence between societal need, educational aims, contents, teaching and learning methods, assessment and learning outcomes.

The Master’s Program in Sustainable Business follows the traditional disciplinary logic during the first cycle, and the students entering the program have their BSc either in business economics or in environmental sciences or agricultural and related sciences. The key design principle in advanced studies is the presentation of and search for connections between business economics, environmental and social sciences. The program also includes basic studies of business economics for environmentalists or agriculturalists and basic

environmental studies for students of business economics. After this initial phase there are courses in research methodology, followed by orientation studies in sustainable business. Finally, there are advanced studies in sustainable business and the Master's thesis. The two year program (120 ects) is structured in the following way:
The orientation studies to sustainable business, three courses, 18 ects
Methodological studies, two courses, 12 ects
Advanced studies in sustainable business, six courses, 37 ects
Master's thesis 40 ects (12 included in the methodology)
Basic studies in business administration or environmental sciences, four courses, 25 ects
The core content of the second cycle consists of teaching and learning strategies integrating the disciplines. The teaching input is given by business economists and environmental scientists, who have integrated 'the other field' into their research, as well as by representatives from working life. The students deal with real life cases in groups by multidisciplinary approaches or individually by working pluridisciplinarily. Also interdisciplinary strategies are used to examine e.g. how certain environmental and social issues impact on business economics or vice versa. Transdisciplinary, emergent approaches are in principle possible as well. The teaching and learning is strongly constructive, students training the identification and integration strategies on cases by discussions with each other, teachers and firm representatives.

## 3. Educational market for the program

It has become increasingly clear that educational market is based on demand. Gero Lenhardt at Max Planck Institute (Wegner et al. 2004) contends that "If the students like to study Byzantine, that's what there is. This is how the market functions. Everything else is socialist planned economy." The statement stresses the flexibility of educational offerings according to demand. Today, educational programs can be seen as legitimate, if they have demand and if they comply with societal-political aims, educational supply and working life needs.
The Master's Program in Sustainable Business complies with these preconditions. However, there was an interesting skewness in student demand. The program was perceived more interesting by students of environmental and agricultural and related sciences than by students of business economics. The tentative analysis suggests that the students of business economics are less often interested in natural or environmental sciences. Additionally, the students did not perceive the ideological flavour in the name of the program very attractive. On the contrary, the students of environmental or agricultural and related sciences felt positively about involving themselves with studies in business economics, which some of them had already done. Also the ideological tinge was favourably identified among them. These results offer a piece of microsociological evidence to the perceived difficulty of economic life to relate with environmental and social aspects. The result supports the original design of the program as well, whereas it also calls for developmental efforts.

## 4. Evaluation of the program

As a new program design (Owen with Rogers 1999) for theoretical and practical approach in sustainable development, the program needs evaluation as basis for decisions concerning further funding and development. The tentative evaluation plan uses different evaluation approaches in conjunction.
Initially, a proactive evaluation was made for the program. It was positive in terms of policy analysis, estimated demand by regional and national firms, student demand and collaborative

educational supply by the universities. Additionally, comparable educational approaches were not identified in Finland and the traditional business economics education was not oriented towards integration of environmental or social studies.
Clarificative evaluation will discuss how the educational aims were translated into course contents and teaching and learning methods. The integrative strategies used and developed are of particular interest, as well as their success, deemed by the students, teachers and firms. The balance between the basic disciplines, studies in sustainable business as well as the methodology studies will also be commented.
The interactive evaluation deals with the perceptions of students and teachers about the highly constructive, argumentative and communicative character of the program. Also the competition and partnership aspects between students will be dealt with.
Impact evaluation will be the most important part due to the interest in expected academic and transformative, conceptual and practical learning outcomes. First, the academic quality of teaching will be assessed following the Program for teaching and studies 2007-2009 in the University of Helsinki. Additionally, there are specific matrices for thesis grading (1-7) in different faculties. The transformative character of the program will be evaluated in terms of the two axes of 'theory and practice'. Master's theses are analysed for their integrative strategies as well as their clarity, sophistication and practical applicability. The practical level of transformative learning, relevant for working life, is evaluated by experiences of the students in their own firms or the firms they are working in. The tentative evaluation of the program offers promising results about the practical applicability and well developed theoretical strategies in integrating business dimension with the environmental and social dimension of sustainable development.

## 5. Conclusions

The Master's program in Sustainable Business responds to the perceived need to introduce environmental and social science based understanding into business economics studies. The program is a profound, conceptual and practical, approach to Education for Sustainable Development (ESD). The central feature is that different disciplinary dimensions of sustainability are not only taught and learned within the same program, as separate parts of it, but constructive efforts are made by the teachers and students in groups to integrate these dimensions into functional solutions on the firm level. The student demand was skewed in the way that students of applied biological fields were more interested in the program than students of business economics. The evaluation of the program gives valuable information about the success of this ESD approach both on theoretical and practical level.

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# New ways of diversifying university's activity: Environmental industry Centre of Excellence based on natural resources in Szent István University

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*Abstract*

The Regional University Centre of Excellence (RUCE) is founded in 2006. It is based on the complex utilisation of innovative, natural and economic resources and opportunities provided by the environmental industry at Szent István University, a higher education-research base of Hungary with long traditions. The RUCE aims to lay down the scientific foundation and develop within the region a new sector of the national economy, the environmental industry. By creating the RUCE, the university strongly aims to comply with the regional development objectives and priorities of the Government and European Union primarily in the area of environmental management, quality of life, retention of population, competitiveness and income generation, and, by creating competitiveness within the country and internationally, to establish new educational, research, consultation and adult training functions that can offer solutions for the requirements and challenges of the knowledge-intensive higher education institutions of the 21st century at international standards.

It is our important mission to be in the lead in the area of application and development of these dynamically growing new scientific disciplines and launch gradual, post-gradual and adult training programmes based on them that will assist the development of the knowledge base of the region and environmentally conscious attitude, as well as attraction of knowledge intensive industries and economic activities with a large added value (technology-intensive companies, service centres, development centres, outsourcing bases, etc.); it is a strategic interest of not only the region, but also the entire country. RUCE will develop on the basis of the complexity of its managing institution, based on which a process can be managed from the idea to the finished product within the framework of one institution (procedure, patent, prototype) with the support of modern economic and corporate management surveys and calculations.

In this context it is predictable that in addition to the large number of enterprises joining the RUCE, a lot of other enterprises will join in future. It is also certain that the accumulated results will help turning knowledge into tangible assets in the form of patents and enterprises (start-up, spin-off and incubator houses). Consequently, we shall have a research enterprise symbiosis with benefits for all partners, generating new development and requirements all the time. In addition, we have also identified an important task for the Centre of Excellence to integrate the knowledge potential accumulated in the research, non-profit and corporate sector, as well as results and methods of R&D activities into education at various levels, thus becoming an educational, consultation and further training centre of agricultural biotechnology.

## 1. Mission and future vision of the Centre of Excellence

The purpose of this proposal is to introduce the Regional University Centre of Excellent based on the complex utilisation of innovative, natural and economic resources and opportunities provided by the environmental industry at Szent István University, a higher education-research base of Central Hungary Region with long traditions. Our envisaged Centre of Excellence aims to lay down the scientific foundation and develop within the region a new sector of the national economy, the environmental industry. It is our important objective to integrate the research and education potential in specific scientific disciplines within our region, creating a cluster-based technology, scientific and innovation centre, which will contribute a great deal to a balanced economic and social development of the region as well as the entire country aiming at sustainability. Our intention is to transfer and multiply the accumulated knowledge, promoting competitiveness of small and medium-sized enterprises operating in the region. The objectives of the 'Environmental industry Centre of Excellence based on natural resources' implemented on the organisational base of Szent István University are in harmony with the concept of the National Development Plan and the Operational Programme of Central Hungary Region.

By creating the Regional University Centre of Excellence, the university strongly aims to comply with the regional development objectives and priorities of the Government and European Union primarily in the area of environmental management, quality of life, retention of population, competitiveness and income generation, and, by creating competitiveness within the country and internationally, to establish new educational, research, consultation and adult training functions that can offer solutions for the requirements and challenges of the knowledge-intensive higher education institutions of the 21$^{st}$ century at international standards.

The mission of the Centre of Excellence is to reflect the three strategic pillars selected for application and development should be reflected in results and corporate outputs together. During the implementation of these objectives, faculties of Szent István University seated in Gödöllő and Budapest, the sectoral research institute seated in Gödöllő (Technical Institute of the Ministry of Agriculture and Rural Development) as well as enterprises of the region having close co-operation with the university and research institutes will extend their co-operation based on the guiding principle of the environmental industry and natural resources, as well as closely related scientific disciplines. This dual pillar will be supplemented with the integration of new information and knowledge created in the centre of excellent in education, representing the third pillar of the future centre. It is our important mission to be in the lead in the area of application and development of these dynamically growing new scientific disciplines and launch gradual, post-gradual and adult training programmes based on them that will assist the development of the knowledge base of the region and environmentally conscious attitude, as well as attraction of knowledge intensive industries and economic activities with a large added value (technology-intensive companies, service centres, development centres, outsourcing bases, etc.); it is a strategic interest of not only the region, but also the entire country.

Natural resources, as renewable resources, offer great opportunities for the society to develop an environmentally conscious and energy-efficient lifestyle managing existing resources. The environmental industry, constituting the most important pillar of the Centre of Excellence, provides an ideal professional, scientific and experimental basis for this objective.

In our view, the environmental industry is a new, complex, multidisciplinary sector, which has reached strategic importance recently. Activities of the environmental industry and related to it, as well as scientific disciplines researching and relying on them are extremely diverse

and complex on their own. Consequently, it is not a mature or exact scientific discipline yet; it is much rather a user-oriented co-operative and multidisciplinary group of activities with a primary task of identifying phenomena and laws relating to natural resources and external factors of economic activities of the secondary and tertiary sectors, as well as define proposals. There is a very close interrelationship between the environmental industry and quality of life of people.

An environmentally friendly, high-quality, service-oriented economic structure is a key element of competitiveness and sustainable economic development. Increase of efficiency of consumption of natural resources, dissemination of eco innovation and environmentally conscious domestic practices reduce the environmental load, but also improve competitiveness and quality of life at the same time.

Consequently, the mission of the Centre of Excellence is to establish and operate a knowledge-building, generating and inter-mediating centre that promotes appearance, development and use of intellectual values. It intends to achieve this objective by creating a centre containing technologies, products and services relating to basic and applied research in a concentrated fashion. It is also among the strategic objectives that acquired new knowledge could be used in real life in the form of innovative projects as soon as possible, i.e., the objective of the Centre of Excellence is not only to accumulate and intermediate knowledge, but also promote the utilisation of ideas, research results and other intellectual products in the economy.

In terms of the future vision of the Centre of Excellence, the Regional University Centre of Excellence (RUCE) intends to promote Hungarian social and economic modernisation more strongly in future. Based on its geographical situation, size and diversity of educational and research activities, its accumulated experiences and results to date, as well as a new approach to its programmes even in international comparison, its suitability for those programmes, as well as the established intellectual and material resource concentration, it may become a scientific and education centre with considerable impact not only in the regions containing the individual organisational units of the institution, but also in the entire country, the Carpathian basin, Europe as well as the globalising world.. Thus we can develop a knowledge base concentrating a lot of knowledge which is based on theoretical knowledge, transferring and developing results for practice, perceiving and understanding empirical needs and impulses, and it also passes on this complex knowledge to the next generations.

In terms of the future, an important objective of the Centre of Excellence is to integrate the knowledge potential of all faculties of the university, as well as the opportunities of its partner institutions in Gödöllő and other sectoral institutions closely related to the university and, by developing the Centre of Excellence, to use these capacities intermediating them to actors of the business sector.

Based on its geographical situation, results of its education and research activities and diversity of its professional activities, the Regional University Centre of Excellence will function as a scientific and education centre in the country, as well as in Central Hungary Region. This regional role will increase in future in the Central Hungary Region, where the Regional University Centre of Excellence is situation, primarily in Pest County surrounding the capital city and neighbouring rural small areas in the environmental industry and scientific disciplines of economic and social sciences as well as rural development, closely related to it in terms of nationally and internationally.

Based on our relations we can conclude that international research representing the basis of the environmental industry is extremely preferred in the market sector. Although it is not the case yet, in the near future this area can become an R&D scientific discipline. The environmental industry knowledge centre of Szent István University base don natural

resources could even become a Hungarian as well as European centre with competitive research programmes.

## 2. The comprehensive objective and activity field of the Centre, international comparisons

The most important objective of the Centre of Excellence is to harmonise with the tender, researches on different fields in the university and institutes of the region which gives a frame to the transmission and utilisation of basic and applied research results in the entrepreneurial sector. An important aim is to benefit from the knowledge capacity in education with developing the current graduate and postgraduate courses towards adult education and training emphasising on lifelong learning. Further goal is to train a highly qualified expert team that is essential to conducting research and development projects in enterprises and our objective is also the creation of pre- and postdoctoral positions therefore creating new work opportunities.

It is a definite objective of RUCE, to be created on SZIU basis to comply with the regional development challenges of the European Union and to establish new education, research, consultation and adult training functions based on national and international competitiveness, as well as create an internal atmosphere within the institution that can offer solutions for the requirements and challenges of the higher education institutions of the 21$^{st}$ century at international standards.

During the first three years, the activities of the Centre of Excellence will focus on environmental industry research, greatly relying on the existing technical profile of industrial research units, as well as existing relations with companies. Development of existing educational system, the specialisation and doctorial schools operated within the structure of the university and education of new generations of experts represent an important area of activity and development objective. In addition, an important and planned activity segment is development and enhancement of adult expert training facilities based on the requirements of the business sector, as well as establishment and testing of diversified knowledge material, which can be used in practice.

International comparison is rather difficult due to the complexity of the scientific disciplines and interdisciplinarity, indicated above. However, in this respect, it can also be concluded that the environmental industry is a very technology-intensive sector. In our view, environmental industry is much more than just industrial activities aimed at environmental protection. It also contains the economic process focusing on environmental elements and natural resources and as such, it also has an impact on the quality of life of households.

It also leads to a conclusion that the environmental industry is a very technology intensive sector. In Western Europe, development activities related to the environmental industry are generally organised by companies with a strong capital position or networks crated by them. In Germany, the state actively participates in the implementation of technology and knowledge transfer, as it is illustrated well by the Rheinland-Pfalz example (Kompetenznetzwerk Umwelttechnik). This first option is not feasible in Hungary as the national SME sector has a shortage of capital, and there are very few companies with a strong capital position. State support, preference of the environmental industry, and an adequate higher education scientific centre are also required in Hungary for giving the initial industrial impulse.

In European comparison, the University of Wageningen is closest to SZIU, because it has a similar concentration of the areas of the environmental science, users, as well as research

institutes operated on market basis. Naturally, in terms of its financial resources and proportion of foreign students, the University of Wageningen has a much larger potential.

On the basis of the above, it can be concluded that participants of the Centre of Excellence of Szent István University developing the environmental industry, and organised within the sector by local governments and enterprises supplement each other well and form a synthesis based on functional mutual effects.

## 3. Motivations, professional and economic reasons of establishing a Centre of Excellence

Environmental management and improvement of environmental safety, parallel with the improvement of the quality of life and social welfare will constitute major factors of development policy in the near future. Environmentally conscious economic activities require presentation of natural values, as well as elimination of environmental damages accumulated in the past.

The environment industry Centre of Excellence should be created with a centre in Gödöllő, because Budapest and its agglomeration generate numerous environmental problems based on the high number of population, its transport network developed alongside a not very well considered concept and concentrated industrial activities, the solution or prevention of which represents important challenges for experts, local governments and enterprises involved in this subject.

25% of the population of the country live in Budapest, more than 30% of the national industry is concentrated in Budapest. The side products imposing a load on the environment are deposited in this region, and in most cases no solution has been offered for them yet. A considerable part of the higher education and research institutions of the country are concentrated in Central Hungary Region, and the highest number of innovative small and medium-sized enterprises are also seated in this region These days, the region already operates as a symbolic Centre of Excellence. In order to enable the region to fulfil this function in an international context too, its knowledge base has to be strengthened, relying on its already established or developing role as a Centre of Excellence, and making use of all existing opportunities.

The basic motivation and driving force of the establishment of the new Centre of Excellence is that the university and related research institutes, as well as university faculties have a ‘critical mass’ of knowledge and expert capacities in environmental industry.

In terms of professional and economic reasons, it should be highlighted that in the strong market competition enterprises have new and novelty results, i.e., ‘customers’, through whom they can obtain market advantages against their competitors.

The social need to act, aiming at the elimination and prevention of environmental problems, indicated above, is a further reason for the centre. In addition, we must not forget abut another either, namely that as the non-renewable energy resources are exhausted, the issue of utilisation of renewable energy resources will become an economic constraint, in relation to which the RUCE can break a lot of new results.

It is an important professional argument that these days production enterprises are unable to devote sufficient resources for experimental research and development (on average they spend 1.8% of their revenues on such purposes).

It is an important argument for the business sector that within the framework of the Centre of Excellence, they can participate in shows, professional and scientific presentations, trainings, incubation programmes, even based on shared organisation, supported by the results and infrastructure of the Centre of Excellence.

## 4. Research and development program

The research and development program of the Center of Excellence is based on three previously mentioned directives. The three main programs are:

- Combined composting of sludge and lignocellulose-based waste and utilization of the end products as a precision plant nutrient
- Development of management methods for natural resources, establishment and operation of a Danubian monitoring system, model development for pollution prediction systems
- Ecological effects and environmental safety of environmental industry

## 5. Economic utilisation of the results of research and development

A primary method for economic utilisation of research and development results generated within the framework of the Centre of Excellence is the passing of results to participating economic organisations and on the basis of this the establishment of reference factories. These factories can compose a basis for the spreading of technologies and methods on a regional and national level. Utilisation of designed products will be possible following industrial legal remedy and market survey together with the formation of marketing strategy and will be executed both by the manufacturer and by the marketing activity of other consortium members. As independent spin-off enterprise established by the members of the consortium seems to be the most suitable for economic utilisation/exploitation. The main duty of this enterprise will be the forwarding of products and technologies to the market by organising and managing the work of producing and marketing enterprises.

## 6. Vision

In future, the Centre of Excellence will develop on the basis of the complexity of its managing institution, based on which a process can be managed from the idea to the finished product within the framework of one institution (procedure, patent, prototype) with the support of modern economic and corporate management surveys and calculations. In this context it is predictable that in addition to the large number of enterprises joining the Centre of Excellence in the first round, a lot of other enterprises will join in future. It is also certain that the accumulated results will help turning knowledge into tangible assets in the form of patents and enterprises (start-up, spin-off and incubator houses). Consequently, we shall have a research enterprise symbiosis with benefits for all partners, generating new development and requirements all the time. In addition, we have also identified an important task for the Centre of Excellence to integrate the knowledge potential accumulated in the research, non-profit and corporate sector, as well as results and methods of R&D activities into education at various levels (university, doctoral schools and adult education), thus becoming an educational, consultation and further training centre of agricultural biotechnology.

# Social competence in relation to subjective feeling of well-being

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*Abstract*

A survey into social competence of adolescents and its relation to the up-bringing in a family, to self-evaluation and to wellbeing was carried out between September 2005 and January 2006.

Students of two different types of secondary schools were chosen to take part in the survey: a school of technical specialisation – a Higher professional school and a Secondary technical school in Litomyšl and a school of pedagogical specialisation – a Higher pedagogical school and a Secondary pedagogical school in Litomyšl.

The questionnaire was answered by 296 students between the ages of 15 to 20. We have summoned basic information of the following aspects: sex, family, type of school, number of brothers and sisters and academic performance (the latest marks in Czech language and mathematics).

We have chosen the following methods: "Social Skills Inventory" (1989) by R. Riggio to judge social competence, "Questionnaire to elicit the type of up-bringing in a family" (1995) by J. Čáp and P. Boschek to judge the influence of a family, "Questionnaire on self-evaluation" by Rohner, " Bern questionnaire on wellbeing" (1995) by A. Grob which measures six basic elements of wellbeing – positive attitude towards life, experienced problems, somatic problems, self-respect, feelings of depression, feelings of joy.

The subject of the analysis has been the relationship between particular scales of social competence and the relationship between the total score of social competence and the type of up-bringing in a family and wellbeing and self-evaluation. When examining the relationship between social competence and wellbeing, the survey has discovered that there is a dependence between the total score of social competence and feelings of joy ($r = 0{,}188$) together with the increase of problems ($r = 0{,}262$) and somatic problems ($r = 0{,}273$) by highly socially competent adolescents.

It seems that social competence of adolescents increases the subjective feeling of wellbeing and feelings of joy; however it also brings other problems, mainly connected with emotional and social sensitivity. When judging self-evaluation it has been interesting to discover that highly socially attentive adolescents judge themselves as more aggressive and hostile. Probably, high emotional and social sensitiveness leads to strong self-critical opinion of oneself.

*Key words*

social competence, wellbeing, positive attitude towards life, experienced problems, somatic problems, self-respect, feelings of depression, feelings of joy

## Social competence in relation to well-being

A survey into social competence of adolescents and its relation to wellbeing was carried out between September 2005 and January 2006. Social competence is extremely important for

successful and responsible life; however, in our country a little attention is paid to it as compared to vocational competence. It is formed and developed outside the formal education.
Individual sciences define competence variously. However, all disciplines interpret competence as a specialised system of abilities, knowledge and skills which are necessary to reach the aims. This definition might be applied to individual dispositions, as well dispositions in a social group or an institution, e.g. a company.
Scientists have agreed that competence is applied in all the si tuations which require processes of thought, acting and learning. Competence is a theoretical construct and a hypothetical psychological process which includes cognitive, emotional, motivation, social and behavioural components. Competence has always a structure and also comprehends a complex of action systems which includes not only knowledge and skills but also strategies and rules, needed to the application of knowledge and skills, and adequate emotions, attitudes and an effective regulation.

**Social competence**

Psychologists inquiring into social and personal topics regard the conception of a socially competent personality extremely useful because it joins individual features of a person and features of a social system.
In most books and papers concerning social competence, the authors talk about social intelligence which they comprehend as a synonym to social competence. The conception of social intelligence was introduced into psychology by E. L. Thorndike. He comprehends social intelligence as an ability of an individual of understanding and treating others. (Smékal, 2002)
Also Košč (1986) debates the relationship between the conception of intelligence and competence. He declares that according to Garmezy a replacement of the conception of intelligence by competence is discussed since 1927. According to Košč this tendency is a result of frustration of scientists which appears after a constant failure of defining the conception of intelligence and an unsatisfactory situation in measuring the intellectual output by the tests of intelligence. He regards the conception of “intelligence” as an alternative to the conception of “competence” and understands it as an effort to revise the actual views on intelligence.
H. Gardner (1999) understands the conception of intelligence quite similarly. His conception of multiple intelligence is contextual; the context includes both individuals and society. He states seven relatively autonomic spheres of the cognitive operation of an individual, by whose cooperation a competent behaviour of an individual arises. He conceptualised these spheres as potentials and called them competence. They are the following: linguistic, musical, logical – mathematical, spacial, kinetic, interpersonal and intrapersonal (social). The concept of social competence depicting the important prerequisites for successful task-solving by both individuals and groups is based on the structure of competence. The structure is completed by atmosphere and quality of interpersonal relationships, which in mutual interaction create important conditions for the development of competence.
Social competence is defined by Smékal (1995) as “aptitude and effectiveness of one ’s dealing with others in social interaction based on the respect towards human dignity and the developed culture of one’s personality”. He comprehends it as aptitude and mastery of an individual to deal with others in an adequate and effective way and to solve one´ s integration and position in a social group, conformable with the aims of a group and respect to moral principles.

Mr. Smékal emphasises that everyone who is engaged in a social activity and lives with others must have social competence.
From the aspect of the relation between age and social competence, adolescence is a period when social competence is created following the childhood.
Accession of adolescence is an extremely dramatic change. During the time, the young go through the period of puberty, their cognitive skills expand, and the sense of "I" and identity are developed. Their relationship with parents and peers undergoes a significant change.
Hair, E. et al. (2001) mention two important aspects of social competence, i.e. the quality of social relationships and good social skills. The quality of social relationships is dependent on good social skills and good social skills increase the quality of relationships. These two aspects correlate; they increase the quality of each other. Good relationships increase good social skills and practising of social skills increases the quality of relationship.
In our research we have used the concept of social competence by R. Riggio.
R. Riggio (1998) understands social competence as a constellation of various communication skills. He divides basic skills of social communication into the following three groups: 1. skills of receiving information – communication sensitivity, 2. skills of emitting information – communication expressivity, 3. skills of monitoring, controlling, regulation of communication. These three basic skills are enforced in two spheres: a verbal, qualified as social and a nonverbal, qualified as emotional. By combining them, Mr. Riggio has conceptualised six social skills: Emotional Expressivity, Emotional Sensitivity, Emotional Control, Social Expressivity, Social Sensitivity and Social Control.
R. Riggio conception is realised in a 90 self-evaluation-item method SSI – Social Skills Inventory (Riggio, 1989) and we have used it in our research.

## Well-being

The interest into wellbeing has arisen as an opposition to traditional psychology which mainly inquests into negative phenomena of human psychics, social relationships and is based on the negative paradigm. However, in recent years a "positive psychology" has become the centre of attention, e.g. health psychology, positive features of an individual, personality features which are responsible for stress management, personality features which are responsible for excellent achievements, feelings of happiness, hope and optimism. Satisfaction and wellbeing come under these positive aspects.
A. Grob (1995) distinguishes between habitual and actual wellbeing. The habitual wellbeing arises from satisfaction of natural and acquired needs; the actual wellbeing is dependent on active factors and arises from positive experience or by elimination of negative experience. Satisfaction with life is connected with emotional stability and positive attitude towards social environment. Is there any correlation between wellbeing and social competence? We assume that people with higher level of social competence are more satisfied in social situations and they receive more rewards from the society and these premiums lead them to frequent contact with society and many positive experience and feelings.

## Method

In our research we have used "Bern questionnaire on wellbeing" (BSW-A) (1995) by Grob which has been created from the questionnaire on wellbeing for young people (BSW-Y, Grob, Luethi, Kaiser, 1991). The structure of the questionnaire is composed by two main components of wellbeing, i.e. cognitive and emotional dimension. Bern questionnaire on wellbeing examines six basic elements which constitute the wellbeing:

*Positive attitude towards life* (PATL)
Six statements on the scale of six points, ranging from “I strongly disagree” to “I strongly agree”. 1-6 points

*Experienced problems* (EXP)
Seven statements on the scale of six points, ranging from “I strongly disagree” to “I strongly agree”. 1-6 points

*Somatic problems (SOP)*
Eight statements on the scale of four points, ranging from “absolutely no” to “very often”. 1-4 points

*Self-respect (SR)*
Three statements on the scale of six points, ranging from “I strongly disagree” to “I strongly agree”. 1-6 points

*Feelings of depression (FED)*
Four statements on the scale of six points, ranging from “I strongly disagree” to “I strongly agree”. 1-6 points

*Feelings of joy (FEJ)*
Five statements on the scale of four points, ranging from “absolutely no” to “very often”. 1-4 points

Point maxims, minims and medians

| | | |
|---|---|---|
| PATL | | |
| Minimum 6 | Maximum 36 | Median 18,5 |
| EXP | | |
| Minimum 7 | Maximum 42 | Median 21,5 |
| SOP | | |
| Minimum 8 | Maximum 32 | Median 16,5 |
| SR | | |
| Minimum 3 | Maximum 18 | Medián 9,5 |
| FED | | |
| Minimum 4 | Maximum 24 | Medián 12,5 |
| FEJ | | |
| Minimum 5 | Maximum 20 | Medián 10,5 |

To judge social competence, we have chosen the method of R. Riggio “Social Skills Inventory”. R. Riggio understands the social competence as a multidimensional construct that includes skills of receiving, decoding and understanding of social information together with other social skills such as verbal and emotional expression, regulation of social behaviour and acting social roles.

**Sample**

Students of two different types of secondary schools have been chosen to t ake part in the survey: a school of technical specialisation – a Higher professional school and a Secondary

technical school in Litomyšl and a school of pedagogical specialisation – a Higher pedagogical school and a Secondary pedagogical school in Litomyšl.
The questionnaire has been answered by 296 students between the ages of 15 to 20. We have summoned basic information of the following aspects: sex, family, type of school, number of brothers and sisters and academic performance (the latest marks in Czech language and mathematics).
Altogether, there have been 177 female (59, 8%) and 119 male (40, 2%) participants who have taken part in the research, 190 (60, 8%) of them have been students of technical schools and 116 (39, 2%) of pedagogical schools.
There have been 257 (86, 8%) students who live in a complete family and 39 (13, 2%) whose parents are divorced.
There have been 13 (4, 4%) students who are the only child, 170 (57, 4%) students with a brother or a sister, 77 (26%) students with two brothers or sisters, 25 (8, 4%) with three brothers or sisters, 9 (3%) students with four brothers or sisters and 2 students (0, 7%) have had five brothers or sisters.

**Results**
The subject of the analysis has been to compare the individual scales of wellbeing and/with the scales and overall score of social competence.

Table No. 1 Results of the whole set in the scales of wellbeing

| N=296 | Age | PATL | EXP | SOP | SR | FED | FEJ |
|---|---|---|---|---|---|---|---|
| M | 17,20 | 24,92 | 18,74 | 14,94 | 12,96 | 8,08 | 14,05 |
| SD | 1,28 | 4,62 | 5,64 | 4,31 | 3,41 | 3,23 | 2,91 |
| Median | 17,00 | 25,00 | 18,00 | 14,00 | 13,00 | 8,00 | 14,00 |

Judging the results of our survey with “ideal medians” of individual scales, we can observe that in our group of adolescents the figures of Positive attitude towards life, Self-respect and Feelings of joy are above the median, while Experienced problems, Somatic problems and Feeling of depression are below the median.

Table No. 2 Difference between boys and girls in the scales of wellbeing

| Boys N=119 | PATL | EXP | SOP | SR | FED | FEJ |
|---|---|---|---|---|---|---|
| M | 25,18 | 17,17 | 13,17 | 13,30 | 8,24 | 13,69 |
| SD | 4,47 | 5,39, | 4,24 | 3,42 | 3,39 | 2,80 |
| Median | 26,00 | 17,00 | 13,00 | 14,00 | 8,00 | 14,00 |
| Girls N=177 | | | | | | |
| M | 24,75 | 19,79 | 16,13 | 12,72 | 7,98 | 14,30 |
| SD | 4,72 | 5,57 | 3,94 | 3,40 | 3,3 | 2,97 |
| Median | 25,00 | 20,00 | 16,00 | 13,00 | 8,00 | 15,00 |
| t - test B:G | | 4,05** B<G | 6,15** B<G | | | |

*p<0,05; **p< 0,01

Judging the results in the scales of wellbeing according to the sex, we can see that girls live through the problems significantly more and they have also far more somatic problems than boys.

Table No. 3 Correlation of the scales of wellbeing and social competence

| | PATL | EXP | SOP | SR | FED | FEJ |
|---|---|---|---|---|---|---|
| EE | | | | | | |
| ES | 0,182** | 0,209** | 0,322** | | | 0,276** |
| EC | | 0,179** | 0,225** | | | 0,183** |
| SE | 0,203** | 0,144* | 0,183** | | | 0,190** |
| SS | | 0,393** | 0,356** | -0,120* | | |
| SC | | 0,151** | | | 0,152** | |
| SSI | | 0,262** | 0,273** | | | 0,188** |

*p<0,05; **p< 0,01

The results illustrate that Emotional Sensitivity and Social Expressivity influence a positive attitude towards life. Nearly all scales of social competence significantly correlate to/with experienced problems and somatic problems, i.e. the higher social sensitivity is, the more intensively we feel our troubles and somatic problems. Socially sensitive people are not only sensitive towards others but also to themselves and they live through more troubles and somatic problems than less sensitive people. These correlations also apply to sex. Girls have more troubles and somatic problems and they are also more socially competent than boys. The scales of Emotional Sensitivity, Emotional Control and Social Expressivity influence not only negative feelings but also feelings of joy.

**Conclusion**

The results of our survey have shown that the level of social competence has a correlation with wellbeing of adolescents in both positive and negative effect. It ignites feelings of joy; however, it also brings more troubles and somatic problems. Social Sensitivity and empathy has not only positive influence on one's life in society but it als o causes intensive feelings of happiness and dissatisfaction.

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# Developing Students' Professional Competences for decision making by active learning methodology

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*Abstract*

Curricular reform has recently defined competences of students to be achieved at the Faculty of Agriculture, Belgrade University. Learning outcomes are defined and for most modules and study programs these include generic skills such as: efficient learning, team work, presentation and evaluation skills, critical thinking, creativity, responsibility, negotiation, problem solving, and decision making. To create future professionals for rural development some of these generic skills should be developed from the first study year. We present a case study using active teaching methods to encourage first-year students to use specific subject knowledge to develop some generic competences. Students doing Animal Sciences were placed in a professional decision-making situation playing the roles of representatives of different stakeholder groups, using active teaching/learning methodologies in the Zoology (Animal Biology) course. In the final course session a debate on genetically modified organisms (GMOs) was organized. During the class, skills for professional decision-making, team work, problem solving and other social skills were exercised, so that students could use not only specific subject knowledge, but also a range of soft competences needed for their future professions. Results illustrated the importance of such interactive classes to increase professional decision-making capacities of students. This model of teaching/learning is an example of good practice in HE, addressing stakeholder needs for rural environments.

*Key words*

active learning, decision-making, higher education, skills, student competencies

## I Background: Development of professional decision-making capacity: waste of time or crucial elements for professional education?

It is often thought that Faculties do not prepare students for professional practical work with them getting only theoretical knowledge that they cannot apply in their profession. The fact is that at our Faculties only facts and data are in focus, and not skills and other competences [9]. A key competence of future professionals in the agricultural sciences is the capacity for professional decision-making, which includes both knowledge and understanding of the phenomenon in question, as well as decision-making skills. To educate students to become competent, independent and responsible professionals, it is essential to develop and practice their decision-making capacities [5], which cannot be developed rapidly, in a single class. It requires systematic development throughout the student's time in higher education, and throughout different courses, because learning is domain-dependent [1, 2, 6, 8, 10]. It is particularly important to develop the capacity for decision-making within the framework of HE as this is a "virtual" environment where real-life problems can be considered, but where consequences of these decisions are not real, having no impact in the outside world.

Real professional life and education for it differ markedly. During HE, students receive mostly ready-made knowledge; they rarely face dilemmas or problems about existing

doctrine, and for each question there is usually a single right answer. In real life, however, such situations are relatively unusual: most problems are not limited to a single subject, there is no unique answer, different knowledge and skills are needed to make the decision and apply it in phenomena affecting not just the narrow area of the profession, but also the larger community. Ever since Komensky, division according to subjects has been the most rational way to educate younger generations. But problems occur because of this segmented knowledge, i.e. students leave school without developing a system for further learning and the ability to apply their acquired knowledge over the long term. The best way for students to connect information is by professional decision-making and solving problems that need to be approached from different aspects [3]. Furthermore, recent research [4] shows that students who are encouraged to express their own views in class and who are experienced in decision making are likely to have better educational outcomes.

**II What we did to develop the capacity for professional decision-making of students?**

Our objective was to develop the students' capacity for professional decision-making. To encourage students to use specific knowledge acquired for developing their decision-making competences, an active teaching/learning methodology was used in the Zoology (Animal Biology) course taught in year one at the Department of Animal Sciences, Faculty of Agriculture, Belgrade University.

The choice of problem for consideration was extremely important, needing to develop the skills of professional decision-making, team work, problem solving, other social skills, and to give students the possibility to use not only specific knowledge of the subject, but to employ a range of soft competences that would be needed for their future professions. Thus, it should

- represent a real life, rather than a scholar situation, in which students could easily find themselves when they start working, so that students had to role-play a specific profession
- require the use of literature sources, the internet, textbooks, and other people to get to know and understand the problem they would be dealing with
- require students to cooperate with each other
- require the presentation and defence of a particular professional standpoint and opinion face to face with a wider public
- not be from a narrow professional area, but should have several aspects and different stakeholders, and be of importance for the wider community.

The most appropriate topic to satisfy these criteria was genetically modified organisms (GMOs) and their pros and cons. Thus, in the final session of the first year Zoology course a debate about GMOs was organized. Instructions for the debate were given two months earlier by encouraging students to find points for and against them from the literature, internet, and other sources. Students would be placed in a situation to make a professional decision by role-playing representatives of different stakeholder groups (general public, multinational company, University, producers, consumers, NGOs). The aim of class preparation was to develop students' capacities to independently discover relevant information, to assess the reliability of different information sources, to develop critical thinking, analysis, understanding, and predicting skills, as well as to consider ethical issues and professional responsibilities. Students were told to collect as many arguments as possible for and against GMOs, as they would be placed in the situation of defending or condemning their use. The class was prepared according to the model of an "expert group" confrontation. Students had to act as a Government expert group to decide whether to accept the offer of a multinational company to build a Research Institute for GM crops and to grow them in exchange for export preferences and other benefits for Serbian products. Views of other producers, consumers and NGOs would also be sought. The class consisted of two rounds of group discussions. First the

24 students were randomly distributed into six stakeholder groups, and in the second round they became members of four Government advisory teams of stakeholder representatives. Each group had to decide upon advice it would give to the government on adopting GMOs.

Two years after this initial group exercise, an opportunity arose to challenge a group of third year students with a similar exercise. During their Fishery course students were asked to participate in another class concerning the dilemma of the future professional employed at a fish farm considering the use of fish feed containing GM ingredients. Students would have to decide whether to stop the import of GMO feed because of the risks (though it gave excellent production results and improved farmers' incomes) or to continue to import it and explain to the public that GM food doesn't represent any risk. Participants of this class were 9 students who had already participated in the GMO debate during the Zoology course ("experienced"), and 14 students who hadn't participated in that debate ("inexperienced"). After decision-making, students were asked to fill in questionnaires: one for "experienced", and the other for "inexperienced" students. Students were also monitored during both interactive classes by the professor, assistant and two other professors who had attended the classes.

## III Results and Discussion

First, responses of the nine "experienced" students questioned after the year three GMO class will be considered.

*Outcomes of the year one GMO class*: Students could circle as many as they wished of 18 alternative responses in the questionnaire. On average they selected six responses and each of the 18 responses was selected at least once, showing that such a class had an impact on many skills. The most frequently mentioned outcomes of the class (54% of answers) were that students: a) learned about GMOs and gained knowledge on their uses; b) learned how to cooperate with others in the group; c) learned how to use arguments in conflicts of different ideas; d) learned how to anticipate the consequences of certain decisions; e) learned which methods to use to convince others in the correctness of their own opinions; and f) were made to think about their professional responsibilities.

These six responses are crucial components of the decision-making process. The final one is especially important as professional responsibility is rarely discussed during the course, but is left for individuals to work out for themselves. As jobs in which these future experts will work are so important to the community (food especially), it is essential to develop an awareness of professional standards and responsibilities from year one within each subject.

*Transfer of acquired knowledge and skills:* Nearly all students (8/9) said that knowledge and experience obtained during the active class on GMOs in year one helped them to manage the new situation of problem solving and decision making. The most frequent comment was that they gained knowledge of higher quality (5/9). Others said their abilities to approach problems from different angles and to cooperate with others improved. Almost all participants agreed that training in decision making helped in other similar situations. Half the students thought that the knowledge and skills from the active classes didn't help much in other subjects, but primarily because other teachers don't apply active learning methods. The other students thought the acquired knowledge was useful to them in other subjects, primarily nutrition. Note that it is not simple to make direct transfer from one field/domain to another. Meta-cognitive studies [10] have shown it is difficult to transfer efficiently strategies of problem solving developed in one field to others, which means that they are domain-dependent, so each subject at the Faculty needs its own problem-solving and decision-making exercises.

*Decision-making process:* Offered 10 possible responses, participants concluded that the most difficult aspects of the decision-making process were: 1) to anticipate all the negative

consequences of the chosen solution; 2) doing the preparatory work on literature and getting to understand the problem; 3) consciousness about their responsibility towards the public for the decisions made; and 4) to make good/convincing presentations for others (75% answers were in these categories). It is completely logical that it was hard to them to predict the effect of certain decisions, and to take responsibility for some of them. Learning how to make decisions cannot be developed rapidly, in a single class, but must be a process which gradually develops with practice.

The remaining 25% of answers included: 5) cooperation with and understanding others in the team; 6) persuading others that a certain answer is the best; 7) choosing one from several alternative solutions, none of which was ideal; 8) considering several parameters during decision-making. Those answers show that for efficient team work it is not enough to put individuals to work with others, but that team work requires both preparation and practice. It also identifies the problem of being given in classes only "scholar-knowledge" i.e. that students are most frequently offered one correct answer - ready-made knowledge which they should accept. The consequences of this type of learning are that students cannot adapt easily in practice, that they have problems when it is necessary to consider several parameters or to make a choice between options which have both positive and negative outcomes.

The 14 "non-experienced" students, faced with this exercise for the first time during their studies, found the most difficult aspects of the decision-making process to be responses 1), 2), 3) and 7) from the list above, and a response not rated highly by "experienced" students: composing professional arguments to form their own opinion.

Assessing what they need to learn and practice more to be competent for professional decision making, of 50 total responses the following stood out: acquiring knowledge about communicating food risk, how professionals in their field think, how to plan in long periods certain actions, how to cooperate with others in groups, how to anticipate the consequences of certain decisions, developing a conscience about professional responsibility toward the public, how to gather relevant data for certain subject, how to use these data for solving problems.

Of 17 offered responses, all occurred at least once in students' answers, which shows that students until then had not been prepared in any way for solving problems by themselves, or to make decisions. Unfortunately, the dominant way for students to work at the faculty is learning from notes or textbooks, and that they very rarely work independently on studying a particular phenomena to exchange their findings with others to solve problems. During studies the accent is more on acquiring facts then on developing skills and professional ethics.

Both "experienced" and "non-experienced" students made similar choices and found that formulating arguments, defending them and taking responsibility for them were serious difficulties in making decisions. All students also said unanimously that for three years, except for these classes on GMOs, they hadn't had any similar class in which decisions had to be made or problems solved. Unanimously they expressed their desire to have more of these classes during studies, where they could practise future professional roles, develop and train important professional skills of solving problems and decision making. Characteristic answers were: *A big omission in this faculty's work is that we don't have more similar debates like yours; There are not many classes like this; We think this type of class should be enlarged.*

A surprising finding was that all students found preparatory work to identify and understand literature and preparing presentations to be amongst the most difficult aspects of decision making. As these were third year students, this showed they had obviously done little individual work on literature and to develop other important intellectual skills during their studies, which should be without doubt important components of their studies.

When we look at what the "experienced" group learned most from the active GMO class in year one, those skills are exactly those weak points of the "non-experienced" group.

Obviously more classes of this kind would contribute to developing useful competences of students, and developing skills necessary for competent and responsible professional conduct.

Based on our monitoring of students' work we can conclude that “experienced” students remembered the previous class (2004) very well, the content of which they discussed and used in the 2006 class. This class scenario included the personal involvement of each student, not only cognitive skills but the whole personality, that contributes noticeably to memorizing the content of the class. We also conclude that motivation for participation in class work of the “experienced” students was high (one index of this is the large number of comments they wrote in questionnaires, and their additional professional curiosity for GMO problems, and that “experienced” students could manage more easily in team work - they started faster, they communicated more efficient with each other and they made decisions quicker.

**IV Conclusion: toward better quality and more useful professional knowledge and skills**

Professional decision-making capacity is one of the most important competences that students should acquire during their HE. A number of questions they will face in their professional life are not of the “scholar” origin, where they don’t have a single correct answer, but instead need to combine many parameters, and even more difficult is assessing different parameters and prioritising them, with none of them being completely ideal. These situations call for a competent, independent and responsible professional. To create such a professional, it is necessary that during the University education he/she has to be placed in situations to exercise and learn the procedures of decision-making and group work.

Interactive classes in which students develop their capacity for group work, decision making, and presentation and defence of the chosen solution have many benefits: acquired knowledge is longer-lasting and more applicable; student motivation for work and learning increases; they learn to connect and use different professional and social skills; collaborate more easily with others in common projects, and transfer knowledge and skills into new situations. Such classes in HE should be more frequent and extended to other subject areas.

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# Forestry and society - conceptual and competence problems and consequences in the Czech Republic

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*Abstracts*

Presentation summarizes the topical relation of forestry disciplines and the landscape management for general benefit, as well as the new understanding of forestry in the society. It documents the causes of the forestry crisis at present, analyses the reasons and offers limited way how to fight this undesirable situation. Forestry is under strong social survey, control and criticism, despite having many economic, ecologic and social benefits for the society. This trend is obvious especially in the Middle Europe, with conservative forestry paradigms and traditionalist general understanding. On the contrary, the sustainability approach is the mostly developed there. The main forestry contribution is to bringing together all aspects, presenting itself as the sustainable natural resource guarantee.

*Key words*

forestry, economy, environment, social aspects, sustainable management

## Introduction

Forestry determines, together with the agriculture and urbanism, the character of the landscape in the decisive way. It is also the mean of effective utilization of renewable natural resources: biodiversity, soil, wood, other forest products, non-production effects – in general creating the landscape welfare. It had been developed as a specific branch, using in a sustainable way these sources and utilizing the spontaneous natural processes at the maximum level. Differentiated human impact was and it still remains part of this concept. The forestry was undergone long development since early Middle-Ages and the dynamics of this social movement accelerates and complicates at present even more. The political impacts and demands of the society are changing at more rapid scale then the forest management can fulfill the former ones and reformulate its paradigms. This is inherent character of the growth and development processes in the forest ecosystems. Despite these limitations, the society demands were and still are satisfied on the basis of self-financing in the Czech Republic – not usual thing in the Europe. Also not negligible finance sources are moving to other social uses – forestry so sponsors many other social needs including nature and wildlife protection.

The aim at minimizing the human impact and maximizing the forest land extent for so called “spontaneous development” is connected with contemporaneous economic situation, contemporary surplus of non-renewable sources and with globalization of their use. Decentralized and renewable resources are in these contexts undesirable from the point of view of global economy.

Another tendency is remarkable in the Czech as well as foreign media: increasing criticism for forestry in spite of its “environmental” impacts. It the medias, this is presented as conflict between “foresters, forestry” on one side and “science, ecology, scientists” on the other. In fact, this conflict and division is non-natural.

**Forestry and nature protection**

Majority of protected areas in the Middle Europe, including the Czech Republic, are located on forest lands. It is determined by the natural dominance and variability of this biome in our countries. The plant communities with dominant tree species compartment covered *cca* 90 % of our territory. Also in the Czech countries, the first natural reserves were established with conscious forest owners and managers (Žofín virgin forest 1838, Boubín virgin forest 1858). Other protected areas are represented by natural non-forest ecosystems (peats, swamps, rocks, steppes), or by important cultural heritage objects (ponds, mountain and flower meadows *etc.*), demanding active human impact (traditional management activities or simulating treatments). Otherwise – natural succession would lead to reforestation.

Different situation is in the protected forest areas. There is prevailing tendency of spontaneous development preference despite the topical character of forest stands/ecosystems. The conservation of these areas was enabled both by declaration of these areas, both by lowered management intensity on sites, excluding economically active results in conflict situations with nature protection. At present, these problems multiple their intensity, they are supported by the European tendencies, evaluating the forestry activities negatively from the society point of view. Accordingly to environmentalists, ecological activists including some NGOs, the forestry is judged without knowledge of environmental impacts and consequences. The forestry is not considered as similar to other activities, as agriculture or urbanism, but as clearly environment degrading factor. The regulation and planning is not feasible for its importance, but for the negative impact – in contrast to other land uses.

These pressures are in paradox the most intensive in the countries and regions with the forestry and forest management of the highest level, with strongest regulations and sustainability traditions. Not in real cases, where the forest ecosystems are strongly endangered. Even for the most appreciated environmentalist organizations, *e.g.* WWF and COE, the replacing of wood by “more ecological” materials, such as steel, glass and concrete is acceptable. The psychological reasons are playing probably the role too. In the Europe of today, the majority of urban population lost the real contact with the nature, the knowledge of land utilization, conservation and protection were replaced by emotional, irrational movements. It can be called “steak effect” – everybody appreciates the view on the “idyllic” landscape with cattle, majority enjoys the steak, but the butcher´s work not. From this perspective the tree felling is barbaric. These tendencies strengthen with increasing European exchanges of new “cultural” trends (in the sense of human behavior) also in the Czech Republic.

**Why the Mid-European forestry is so vulnerable?**

There are many reasons of negative acceptance of forestry in the Mid-European context, the most obvious and the most important are summarized in the following text:

1) Forestry is declared as a minor part of the Czech economy – 0.9% of GDP, 0.7% of labor, even less in other industrial Eu-countries. The social and political priorities are located other ways (magic 4% for human rights fighters). It is easy to replace the wood by other materials, these pressures occur, the non-renewable materials are supported by economically strong groups.

2) The costs are increasing in the forest production at the prices stagnation, the economical power is decreasing. The countries are favorized, where the strong environmentalist restrictions are eliminated (tropical, developing countries), where the forestry technologies form important part of the national economy (Scandinavia) or where the forestry and logging are separated (Anglo-Saxonian countries). The decrease of effectiveness and the necessity of

funding the non-production forest functions lead to the dependence on financing policies – the political and other non-professional aspect prevail in these cases.
3) The forestry is under strong social survey, the forestry treatments are good visible in the landscape. Other problems, even more important and dangerous, as waste management are outside the environmentalist activities. They demand more professionalism, offer less political "points", there are more interests of economically strong companies and communities. Forest and forestry is like a football – everybody understands it.
4) Specific problem of the Czech countries is represented by deformed economical relations, for the firms doing their job in forestry, the main target is not minimizing of expenses and maximizing of income, but the maximizing of material and finance fluxes.
5) Another problem is represented by not clear competencies and politisation of the relation inside the state administration – Ministry of Agriculture vs. Ministry of Environment.

**Extreme conflict – Šumava (Bohemian Forest – BF) National Park**

The BF National Park can serve as extreme, but typical example. Roughly 70,000 ha of prevailingly forest lands were declared as National Park beginning of 1990ies without exact analysis of the status of large ecosystems. In the case of forest stands, the alochthonous spruce even-aged monocultures prevailed totally. They had lowered stability, which demonstrated itself by large wind as well as bark-beetle calamities since mid 1980ies. Unfavorable climatic, administrative and political conditions accelerated this catastrophic situation even more. Individual forest complexes extended their optimal age (120 – 140 years) and collapsed. They were not in the close-to-nature state, enabling spontaneous non-catastrophic dynamics, inherent to Mid-European natural forest ecosystems. Despite this fact, it was decided to leave these stands for conservative passive management on large areas, in conflict with all the knowledge and practical experience.

Consequences, impacts and results of this approach were several times summarized on many meetings and are out of topic of this presentation. This approach is contra-productive at solution of professional and scientific problems, summarization and evaluation of exact data, but it needs also much attention and care. *E.g.* the bark-beetle calamity is relatively restricted and located in one part of the NP territory, but due to politisation and medialisation it became limiting for the management of the National Park and its administration (3 changes of the management in the 15 years). Both sides of the conflict, "foresters" as well as "activists" declare the danger of NP revision and restriction.

**Role and potential of the forestry approach in solving of ecologic and environmental problems**

Despite the negative view of the society, the forestry offers considerable contribution to the management of the landscape including protected areas. Let us mention the traditional view on forestry as an economical land use type. The sustainability principle of the forestry resulted in long-term strategies aiming at sustain, balanced and safe wood production, resulting in the formulation of sustainable development on economical, later ecological basis too. Forestry is leading branch in this spite. The specific aspect of it is represented also by the fact: forestry has not only the ecologic, but also economic and social role in the society. The "total ecologisation" of the forestry is neglecting the fact, that majority of forest lands are parts of the estates used economically, that 6 % of the GDP depends on the utilization of the productive forest functions (forestry itself and the consequent industries). Many protected areas are part of these estates, their economical use was part of the financing policies for these forest parts in fact.

Discussing on active management of protected forest areas it is argued often, that it is not possible to “create the natural forest with the chainsaw”. It is sure, this is not possible, but it is feasible to create such forest structures by the forest management, enabling non-catastrophic spontaneous forest dynamics in the future. Using the passive management in the even-aged monocultures of non-native tree species composition, this period could be several times longer. The impacts in the cultural landscape are not easy to predict. The aspects of time and economical expenses are some of forestry potential benefits of this approach.

Forestry as an economical discipline is only one point of view, less important from the aspect of nature protection and management. The second one is represented by particular forestry disciplines, formulated as scientific areas (*e.g.* forest ecology, dendrology, tree physiology, forest management, forestry economy). Specific knowledge on forest ecosystems and their sustainable use is summarized there. No doubt, two aspects are important. The research and science can not be split in the “basic” and “applied” ones, on “scientific” and “forestry” approach respectively. The border can not be delimited clearly because of the complexity. Hierarchical division of the science, favored by media and academic workers, is contra-productive and failing. Saying objectively, previewing the dynamics of forest ecosystems in the BF National Park, the “natural scientists, academicians” in contrast to “foresters” failed totally and regularly.

The next point of view and discussion topic consists in the complexity of problem consideration. Again, the narrow forestry specialized view is contrasted to the complex ecologic holistic approach. Analyzing the real situation, the contrast is obvious. The “forestry aspect” includes the holistic ecologic, economic and social view contradictory to specialists in biological disciplines, restricted by their deep but restricted insight. The discussion is across the disciplines in fact, but this was emphasized several times. The political and personal topics play in limited space conditions also their role.

The future of competition of these artificial, non natural groups is uncertain. Will it prevail the collaboration in the next period, or the confrontation, even ignorance will be the rule? This is not easy to estimate, it depends on many factors: will the state administration and management prefer the political or professional solutions, are specialists of particular scientific disciplines able to collaborate on professionally established research? Will the mechanisms arise preventing the problem politisation and replacing the discussion by personal conflicts? Also the pressure on the renewable resources use and motivation of the economical sphere could act positively. Our nature including the forests and forestry would appreciate this the most.

Note: the presentation originated as a part of the research project **NAZV 1G58031 Význam přírodě blízkých způsobů pěstování lesů pro jejich stabilitu, produkční a mimoprodukční funkce**

# Curricular Reform at Serbian Agricultural Faculties: achievements of the TEMPUS JEP towards meeting the needs for rural development

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*Abstract*

The paper presents progress on curricular reform through the Tempus CD JEP Project: "Reform of Agricultural Higher Education in SCG" at 2 major agricultural faculties in Serbia. The other participating institutions are: University in Hohenheim (Germany) and Aristotle University in Thessaloniki (Greece).

This Tempus project is to support the reform of education in the field of agricultural sciences at faculties of agriculture in Belgrade and Novi Sad, bearing in mind the needs of rural development and labour market demands as well as the expected increase in demand for knowledge and expertise in the agricultural sciences. In particular, the project will contribute to the development of the new modules of undergraduate curriculum, retraining of scientific staff and improvement of academic and educational skills, upgrading and modernisation of teaching and communication equipment, development of teaching methodology and introduction of inter-active learning principles.

The leading principle in curricular reforms is to profile the programme for general agricultural education in such a way that it can later lead to a more thorough specialist knowledge development in a wide range of directions all based on the principles of sustainability. This widening of the study programme is necessary to provide the students with the knowledge to cope well with the new working environment and to give them skills directed towards profitable agricultural production, farm management, information systems and technologies and, thus to contribute to sustainable rural development.

One of the major outcomes of the HE curricular reform process in agriculture is defining learning outcomes at all levels: from modules to the study programs. This will also help the government to create a national framework of qualifications for agriculture.

*Key words*

curricular reform, agriculture, HE, learning outcomes, Tempus JEP

## Background of the project:

The Faculties of Agriculture (FoA) of Novi Sad and Belgrade are recognised as centres of competence for providing valuable training in agriculture and among the leading faculties for the whole country as well as for the Balkan region. The existing curricula at faculties of agriculture are structured as traditional "diploma" courses lasting four years and leading to the Diploma-degree of an agricultural engineer in one of several possible fields of study. The organisational scheme of the study is traditional; students have to choose the desired specialisation at the beginning of their studies, without the possibility of changing it once enrolled. The duration of studies is too long (the average time to graduation is over 7 years and the dropout rate of students is very high (70%). Curricula are inflexible due to the lack of any elective modules. Moreover, facilities and equipment are generally out-dated, inappropriate, broken or just non-existent. In addition, the relatively small amount of field work doesn't provide students with the necessary practical skills and tools (Poleksic et al,

2002). As a consequence there is a decreased motivation for entering into agricultural studies. Finally, the system of evaluation recently introduced by the Tempus project UM-JEP-16079-2001 (Novi Sad) needs to be applied on a wider base.
The paper presents current progress on curricular reforms through the Tempus CD JEP Project: "Reform of Agricultural Higher Education in SCG" (TEMPUS CD_JEP-18069-2003) at 2 major agricultural faculties in Serbia. The other participating institutions are: University in Hohenheim (Germany), as the grant holding institution, and Aristotle University in Thessaloniki (Greece).
Specific objectives of this project are: to enhance agricultural HE at Agricultural Faculties, to develop new modules of basic studies of undergraduate curriculum, to upgrade teaching and communication equipment, and to develop teaching methodology, including the introduction of inter-active learning principles.

**Goals of the project:**
The goals in reconstruction of curricula structure and module content according to EU Higher Education principles are defined as:

- Introduction of modular one-semester courses
- Introduction of the ECTS
- Introduction of QA (student evaluation, peer review of lectures, accreditation of new programs)
- Introduction of modern teaching and communication equipment
- Introduction of new teaching methodologies, including inter-active learning principles

To realize the project goals, the following activities were planned and performed. At the beginning a Steering Committee (SC) and a Local Co-ordination Committee (LCC), responsible for the management of the project were established. One of the key activities would be East-West mobility of lecturers (one month, to study the curricula) and undergraduate and postgraduate students (3 months, to follow courses of their interest) from both agricultural faculties to the Universities of Hohenheim and Thessaloniki. The lecturers would be chosen by the LCC, which is responsible for the language proficiency of candidates. West-East mobility of lecturers was also planned from partner EU universities for intensive courses and to present the achievements of study reforms at their home universities to the wider teaching staff and student audiences in Belgrade and Novi Sad. Under the supervision of the LCC the draft structure for new study programs with respect to BSc/MSc requirements would be outlined, together with modularization of teaching contents and development of an information package based on the ECTS.
At the end of the second project year a draft version of the new study program with the information package should be submitted to each faculty and university councils, the Serbian Accreditation Commission, and the Ministry of Education and Sport.
Improvement of academic and educational skills of the teaching staff would be carried out through the implementation of methodology for active teaching/learning. A group of teachers from the FoA in Belgrade (Poleksic et al, 2004; Pekic et al, 2005) has already been trained for the introduction of new teaching methodology to create their lectures using the active teaching/learning methodology, to motivate students to take a more active and participatory role in the teaching process, to develop specific relevant activities through which students can efficiently acquire professional skills and knowledge as well as to understand better the aim of the subject learnt, to evaluate the quality and effectiveness of their own and their colleague's lectures (expert peer reviewing).
At the end of the third project year a draft curriculum for the interdisciplinary and inter-regional Master's program would be prepared and submitted to regional partners for final

revising and recognition. Its successful implementation would open possibilities of new inter-regional cooperation.
Serbian Faculties would organize the Final Conference for lecturers of national faculties of agriculture and members of the former Joint Rectors' Conference in order to continue the scientific co-operation with partner institutions. The Final Conference would discuss the role of agricultural HE in creating professionals capable of coping with the needs and public expectations for rural development and safe food production

**Achievements of the project after two years:**

Curricular reform
In Novi Sad B.Sc. curricula were reformed by establishment of common/basic studies (three semesters) for courses/specialisations in Plant production and Plant and environmental protection. The duration of modules has been fixed to one semester, and there are five modules per semester. New courses/specialisations and modules have been introduced, including 20-30% as elective modules. The descriptions of modules (information package) and distribution of credits per module have been completed. In addition, continuous assessment of students' knowledge during the module and transfer of intramodular credits to the final exam have been planned.
In Belgrade, first the basic framework of the reformed study structure was approved by the Faculty's Teaching and Research Board, together with the Glossary of reform. A new study structure (4 + 1 + 3) is ready and study programs have been prepared by the Committee and approved by the Teaching and Research Board. For the four-years Bachelor studies 12 new curricula are prepared: four in plant production, four in food technology, one in animal production, one in agroeconomy, one in land management and one in machinery. A one-year Masters course is in preparation, as well as three-years Doctoral studies. In addition, learning outcomes are now defined for each course and curriculum together with detailed study structures, evaluation methods, and student workload.

Intensive course
An International course in Organic Agriculture was held in Belgrade in November 2005 with eight lecturers (two from each partner University) covering all aspects of organic agriculture. Printed material was prepared for each student. About 100 students from Belgrade and Novi Sad attended, passed the test, received their Certificate, and evaluated the course with an overall grade superior to 4 out of 5.

Equipment
Last, but not least is equipment purchase that represents 30 percent of the project budget. For Novi Sad this amounted to: 1 Faculty server, 10 Institute servers, 2 IBM kiosks (main hall), 27 computers and video projectors with lockers for lecture rooms, and finally improvement of the Faculty's computer network .
For Belgrade the following teaching laboratories were equipped: 2 Central Teaching microscopy labs – one for Plant sciences (Botany) with 28 microscopes and one for Animal production (Zoology) with 24 microscopes, with demonstration microscopes and video cameras, video projectors and a PC computer with Internet connection in each lab; and 2 microscopy labs – one in the Plant protection Department and one in Microbiology with 10 microscopes, a demonstration microscope, and a video projector in each lab, with video camera in one and a digital camera in the other lab.

## Conclusions

The leading principle in our curricular reforms has been to profile the programme for general agricultural education in such a way that it can later lead to the development of a more thorough specialist knowledge in a wide range of specialisations. This widening of the study programme is necessary to provide the students with knowledge to cope well with the new working environment and to give them skills directed towards profitable agricultural production, farm management, information systems and technologies and, thus, to contribute to sustainable rural development.

One of the major outcomes of the HE curricular reform process in agriculture at the faculties in Belgrade and Novi Sad has been defining learning outcomes at all levels: from modules to the study programs. This will also help government to create a national framework of qualifications for agriculture.

In conclusion our future plans are: preparation of a Tempus SCM Project for enhancing teachers' competences at faculties of agriculture in Serbia, preparation of a JEP regional Project for enhancing teachers' and students' mobilities and cooperation in the region through the Joint Master and/or Doctoral Programme. This Joint Master program will be focused on public expectations and requirements for rural development of common interest for participating countries

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# Possibilities of Multimedia Academic Literature in Education of Crop Production

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*Abstract*

University education must follow developments in these areas. The role of this type of education, especially in subject field of natural sciences, is at present a priority in solving some issues in agricultural practice, and it also shows a better prospective and competitiveness for the Czech agriculture in the future. The high professional qualification not only of managers but also of all involved workers is essential for sustainable development of Czech agriculture. The education of students at universities of agriculture should obviously respond this basic fact. Regular innovation of pedagogical activities as a part of qualified education methodology and responding study materials are essential.

The annual innovative methodology in education has been realized at the Department of Crop Production of the Faculty of Agrobiology, Food and Natural Resources, Czech University of Agriculture in Prague, since 2001. We have prioritized modern methodology in such relatively challenging subjects as crop production. The challenge is partly caused by a need to respond contemporary trends both in crop production and its quality. This especially applies to issues of some crops that are indispensible as resource of food industry and as traditional Czech crop growing.

At present there is available a multimedia publication – „Special Phytotechnic, Root Crops, Hops, and Medicinal, Aromatic and Spicy Plants“ - for the subject education that is focused on crop production. The latest information on researches including practical expertise can be found in the professional text of the publication.

Multimedia professional literature effectively enhances a greater students´interest in these subjects. The methodology of this publication is reflected in students´knowledge at exams in responding subject fields. Visual explanation improves not only standard but also alternate forms of university study. Also the multimedia textbook on the web page of the Czech University of Agriculture is advantageous. This makes the textbook accessible to a wide range of students as well as to a wider public. This textbook presentation is very flexible, and it can be said, that it is a well fitted form of a study material for students, as well as a prospective professional form how to accommodate the public interest in issues of agriculture also in the future.

*Keywords*

multimedia publication, Hops, Medicinal, Aromatic and Spicy Plants Aromatic Root Crops

## 1. Introduction

University education must follow developments in these areas. The role of this type of education, especially in subject field of natural sciences, is at present a priority in solving some issues in agricultural practice, and it also shows a better prospective and competitiveness for the Czech agriculture in the future. High professional qualification not only of managers but also of all involved workers is essential for sustainable development of Czech agriculture. The education of students at universities of agriculture should obviously

respond this basic fact. Regular innovation of pedagogical activities as a part of qualified education methodology as well as responding study materials are essential.

The increasing application of information technology, networks and internet create new possibilities how to extend methodology and to develop basic and complementary study materials (Jarolimek, Vanek, Kubata, 2002). The multimedia textbook that is currently presented on the CZU network, is surely advantegous (Rysova, Jablonska, 2002). It is avialable to a wide audience. It comprises a latest professional text, graphs and diagrams, tables and colored pictures. The main advantage is a variable publication, its adjustability and flexibility to change the content.

At all colleges and universities (Rohlíkova, 2003), as well as at ours these issues are treated with a great attention. A development of new forms of study materials is also supported by grant agencies.

The annual innovative methodology in education has been realized at the Department of Crop Production of the Faculty of Agrobiology, Food and Natural Resources, Czech University of Agriculture in Prague, since 2001. We have prioritized modern methodology in such relatively challenging subjects as crop production. The challenge is partly caused by a need to respond contemporary trends both in crop production and its quality. This especially applies to issues of some crops that are indispensible as resource of food industry and as traditional Czech crop growing.

Gradually four multimedia professional texts, funded by grant agencies, have been developed at our department and others are being worked out.

## 2. Multimedia Publication

The target of a project was to improve and to make the process of knowledge transfer for students more effective, it should also motivate them to study with a help of new education methodology. Developed multimedia materials can be used by students of bachalorial, magisterial programs, combined garden and agronomy study programs, and these presentations can be also offered as diversified study programs to community interest groups. On the Czech University webpages these presentations are thus referred as study programs of a various purpose.

Multimedia publications are focused on growing technologies and present trends of growing selected plants that are grown extensively in our conditions. The quality and possibilities of trade access are observed.

Printed specialized publications as monographs on crop growing are available only in a limited number and their financial costs are very high. And currently in the Czech Republic they are not published very much.

Financially the most advantagous is the form of multimedia texts which can be found on webpages of the Czech University of Agriculture and they are either freely accessible or a via password which can be obtained at tutorials. The main advantage is a study material variability, adjustability and flexible response to content changes, and a directed access via a password. At present there are available multimedia materials „Special Phytotechnic, Root Crops, Hops, and Medicinal, Aromatic and Spicy Plants“ for study subject of crop production. The professional content of this material comprises the latest pieces of information which are

based on research and field expertise. On-line material or its transformation into a CD ares useful study additional materials

Root crops are first in question, but generally the issue concerns all principal agricultural crops, where the most dynmaic shift in production quality and knowledge of possible influence of qualitative parameters of growing technologies have been recently notified in work and competitiveness as essential.

Czech hops rank among other crops has always been important economic crop, and has had a long world-wide tradition. Quality indicators of Czech cultivars and also clones are highly estimated in Europe and in the world. Even though hop arable land has decreased recently, it still belongs to most important comodity in the Czech export.

Also medicinal, aromatic and spicy plants sustain an important role both in domestic and world certified medicine, as well as in popular homeopathy**.** To acquire information on growing medicinal, aromatic and spicy plants is quite complicated, and their growing land is often classified as the growing land of „the other plants“. At present when supply is higher than demand, the quality of the herb is stressed, and it is evaluated by the quantity of active substances. The knowledge of these substances and a possibility of their modification by growing technologies are almost indispensible for growers.

Transformed multimedia application are tabular, easily mangeable, and enable flexible searching of information in text or in files. They provide individual setting of working environment. Not only using but also developing multimedia publications is very unsophisticated and easily manageable. Their usefulness is also exploited if the cost of printed materials is too high. Developed publications are available at the address: http://etext.czu.cz/sekce.php?id=publikace

Developed multimedia publications motivate students to study these subjects. Its usage and availibity can be seen in field subject command of students at exams.

### 2.1. System of Multimedia Electronic Publication

Developed presentation of System Multimedia Electronic Publication provides readers on internet formerly printed materials (books, journals, annual surveys, study texts, etc.) via modern information technology klient-server to an unlimited number of users whenever requested and without any necessary installation. The system is installed by a server operator which markedly decreases costs of presenting pieces of information.

A user can find freely on-line publications which permanently provide more information for the interested, allow easy and synoptic networking and copying. Publication offers fulltext searching in available materials.

Publication offers fulltext searching in available materials. Majority of them has supplementary registers of basic concepts, frequently with explanatory notes. Their forms can sometimes respond questions which are tested. A CD form substitutes searching.

This multimedia on-line material has been worked out by a team headed by Ing. Petr Kos (smep@petrkos.cz; www.petrkos.cz). Processing was based on platform and technology of Linux You, Apache, PHP, MySQL. To operate the system it is necessay to use minimally configuration PHP $4^{+}$, MySQL $3.23^{+.}$

## 2.2. Current State at the Department of The Czech University of Agriculture, Prague

At the Department of The Czech University of Agriculture, Prague, a database was processed that presents on-line library. On webpages it´s available:

- On-line reading books, journals and study texts
- Quick and effective seaarching text information
- Publishing varied documents, scientific and professional literature

At present only the Czech University of Agriculture educators can publish their work. Only an author of the on-line material provides the access by login or password. Developed databeses contain materials of various fields of study, thawt can be found on etext.czu.cz.

The members of the Department of Crop Production prepared four materials. Two are focused on plant growing – „Special Phytotechnic“ (Pulkrabek and col., 2004) and „Root Crops“ (Juzl and col., 2000). Further materials are on crops which are currently the subject of scientific research at the department. The first one in question is on „Hops“ (Snobl and col., 2005), one of most important crops in the Czech Republic, and thus sustainably tested at the department. The material on hops growing is worked as DVD. Last year the study text on medicinal, spicy and aromatic plants was accomplished. This commodity belongs to favourable subject fields of students and also a larger community. It also ranks among important research issues of the department, and the research is mainly targeted on progressive development and quality research. The content of effective substances in drugs which can be influenced by growing methods is the essential aim. Also a quality evaluation of drugs is under reserch as it is a significant criterion in purchasing and processing medicinal, spicy and aromatic plants.

Other materials are being prepared especially as multimedia professional study programs for seminars, and also workshops and seminars on root plants are being developed at present.

## 3. Conclusion

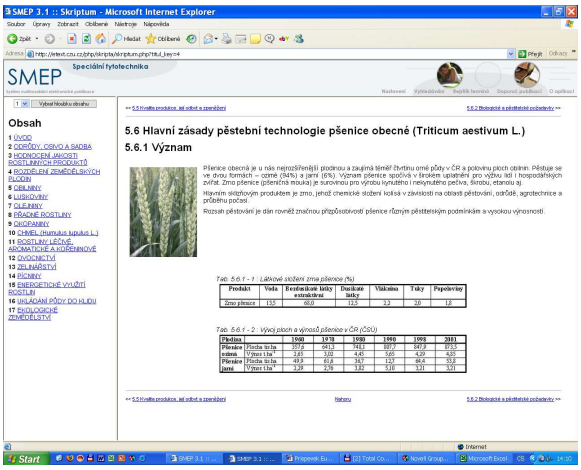
Professional on-line study materials in the System of Multimedia Study Publications are definetly a prospective form of studies for students of crop growing subjects. Multimedia professional literature effectively contributes to a greater students´interest in these subjects. The methodology of this publication is reflected in students´knowledge at exams in responding subject fields. Visual explanation improves not only standard but also alternate forms of university study. Also the multimedia textbook on the web page of the Czech University of Agriculture is advantageous. This makes the textbook accessible to a wide range of students as well as to a wider public. This textbook presentation is very flexible, and it can be said, that it is a well fitted form of a study material for students, as well as a prospective professional form how to accommodate the public interest in issues of agriculture also in the future. However printed professional materials remain still as basic study study materials. On-line materials or CDs that are based on them are good supplementary materials.

Picture 1: Introductory Content of the Databasis of Study Literature


Picture 2: Brief Characteristics of the Detail of Publication


Picture 3: Examples of Using Photographs in Study Text


Picture 4: Examples of Using Tables in Study Texts

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# Bringing the entrepreneurial experience into the lecture room at Reading: some observations and their implications

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*Abstract*

Undergraduate students increasingly favour agricultural management and business degrees over those that focus purely on "agricultural science". Within these degrees, job-savvy undergraduates choose modules that offer the opportunities for acquiring transferable skills and experiences that would enhance their chances of finding jobs after graduating. At the same time the UK Government has been trying to strengthen the relationship between Universities and Business. To this end the Higher Education Funding Council for England has provided an innovation and enterprise culture strand of funding to Universities to encourage the embedding of innovation and entrepreneurship teaching within a range of existing HE curricula. Against this backcloth, the designers of curricula have the challenging task of designing modules that blend such learning opportunities with the academic rigour expected of a degree course. Within the School of Agriculture, Policy and Development at Reading, an elective module on *Entrepreneurship* was designed and offered about 3 years ago and it has attracted a significant proportion of undergraduates in the School, raising issues related to the pedagogical design of such modules and their delivery. This experience also provides some insights into what type of students choose these modules and why. The availability of this module has coincided with the encouraging societal attitudes towards entrepreneurial training and education, possibly fostered by some remarkably popular, and critically acclaimed, television programmes such as *Dragons' Den* and *The Apprentice*. The elements of the module include: *elevator pitch* on an innovative idea; participation in seminars led by 'youngish' and notably successful entrepreneurs; the challenge of researching the market from scratch for the business idea and then developing a workable plan that investors (astute bankers) would find worth supporting; forming teams and working with them; and, presenting and 'selling' the proposition to investors. There are several educational and curriculum design issues here that this paper addresses: the balance between experiential learning and academic rigour; the extent to which 'exemplary' entrepreneurs can inspire students and how can designers keep them interested to spare time for students; the learning abilities that are stimulated (cognition versus formalised instruction); can the usual entrepreneurial attributes such as the ability to perceive and create opportunities, risk-taking, motivation and an innate need for achievement really be 'transferred' to students, leading to the *born* versus *made* debate and thus the limit to which *entrepreneurship* can realistically be brought to the lecture room. Not everybody can/should be an entrepreneur but we may all be able to benefit from the ability to apply some of the skills associated with entrepreneurship in our working lives. For instance, an important entrepreneurial ability is to think laterally and consider how to use your knowledge and skills in different areas or to tackle evolving issues. In fact a world populated by solely by entrepreneurs may be an unpleasant place to live and entrepreneurs often rely on the social and economic structures created by a diverse society in which to be entrepreneurial. As educators our role is to encourage graduates to develop a range of entrepreneurial skills which they can bring to bear either within large business organisations or in the running of their own businesses.

*Keywords*
Entrepreneurship; university education; curriculum design.

## Introduction

Undergraduate students increasingly favour agricultural management and business degrees over those that focus purely on "agricultural science". Within these degrees, job-savvy undergraduates choose modules that offer the opportunities for acquiring transferable skills and experiences that would enhance their chances of finding jobs after graduating (Rehman and Park, 2006). At the same time the UK Government has been trying to strengthen the relationship between Universities and the Business and the business community at large. To this end the Higher Education Funding Council for England has provided an innovation and enterprise culture strand of funding to universities to encourage the embedding of innovation and entrepreneurship teaching within a range of existing higher education curricula. Such a background presents a challenge for the planners of university degrees' curricula of designing modules that blend practical learning opportunities with the academic rigour expected of a degree course. Over the past few years there has also been a drive towards 'diversification' in that many universities where agricultural sciences are taught are offering courses that would have a broader appeal and thus, hopefully, compensate for the declining numbers wishing to pursue higher education in agriculture.

Within the School of Agriculture, Policy and Development at Reading, an elective module on *Entrepreneurship* was designed and offered 3 years ago, primarily, in response to the feedback received from the first cohort of students graduating from its new degree course in *Agricultural Business Management*[1]. These students came predominantly from an agricultural background and as possible entrants to the industry were looking for educational experience in fields like 'Diversification', 'Starting a new small business' and 'Getting out of farming entirely'. At that time a new academic appointment was made in the School, which provided an opportunity for a fresh look at the course and thus the idea of a module on *Entrepreneurship* took shape. Once available, the module attracted a significant proportion of final year undergraduates, raising issues related to the desirability of offering such modules including their academic rigour, pedagogical design and delivery.

It was rather propitious circumstances that the commencement of this module coincided with the encouraging societal attitudes towards entrepreneurial training and education, possibly fostered by some remarkably popular, and critically acclaimed, television programmes such as *Dragons' Den* and *The Apprentice*[2]. These television programmes seem to have inspired our students. In fact, one key feature of the module at Reading, *elevator pitch*, is akin to the pitches in the *Dragons' Den* television show. Even though this module has been in existence for 3 years, the experience of designing and offering it to the undergraduates touches on several issues and some of our reflections seem worth sharing with fellow educators.

The paper begins by describing the aims and contents of the module and how it is delivered. It is then followed by some observations arsing out of the experience. The issues that are worth considering include: the balance between experiential learning and academic rigour; the extent to which 'exemplary' entrepreneurs could inspire students and how they could be encouraged to spare time for students; the learning abilities that are stimulated (cognition versus formalised instruction); the question of whether the usual entrepreneurial attributes

such as the ability to perceive and create opportunities, risk-taking, motivation and an innate need for achievement can really be 'transferred' to students formally, that is the *born* versus *made* debate and, thus the extent to which *entrepreneurship* can realistically be brought to the lecture room; and, the benefit that students could derive from applying some of the skills associated with entrepreneurship in their working lives. Opinion is offered on these matters and the paper concludes by evaluating the considerations that are likely to determine the future of the *Entrepreneurship* module, or some similar ones, in institutions of higher education primarily for agriculturally related subjects. It is hoped that the paper will lead to worthwhile discussion amongst participants in the 8th European Conference on Higher Agricultural Education.

## The *Entrepreneurship* Module

This is an optional 10 weeks module available to finalists from at least 4 degree programmes in the School of Agriculture, Policy and Development. It is based almost entirely on project work, undertaken in teams, usually consisting of at least three members each named deliberately after well-known and high achieving British entrepreneurs such as Dyson, Branson and Sugar. Students are assigned randomly to these teams. There is virtually no obvious expectation of any academic reading and there is no final written examination. The team work, with other members with whom an individual has been 'thrown in', implies having to learn to cooperate as well as contend with the element of 'competition' in inter- and intra-team situations. In all of this, the focus on self-directed learning for the learner is retained.

*Aims of the module*

There are two broad aims of the module:

- Develop an understanding of the skills that an entrepreneur would need and the issues that have to be faced in setting up a new 'enterprise' or own business from scratch. The emphasis therefore is on starting new businesses rather than developing existing ones. Many of the skills and principles learned however are applicable in either case.
- Develop transferable skills that participants will require in management situations.

The educational objective is that at the conclusion of the module an individual participant should be in a position to answer the following questions clearly and 'honestly'.

Do I know what is entrepreneurship and is it for me?
How do I convert my entrepreneurial 'abilities' and skills into a real enterprise?
What do I need to do to start my own business?

*Assessed elements*

The module is assessed in three constituent elements and academic staff, outsiders (cooperating bankers) and student themselves as peers are involved in the process of assessment. The components of assessment are shown in Table 1.

Table 1: Components of assessment for the Entrepreneurship module

| Element of assessment | Proportion of credit earned (%) | Assessed by |
|---|---|---|
| Pitches | 25 | Module convener, independent assessors and students (peers) |
| Presentation of the business plan and question and answer | 25 | Module convener, independent assessors and students (peers) |
| Written submission (business plan document) | 50 | Module convener and independent assessors |

The primary challenge for the teams is to develop a business idea into a fully developed business plan, which is assessed independently by the module convener, a bank manager and a land agent who is member of the Royal Institute of Chartered Surveyors and the final mark is agreed amongst these assessors. This written plan has half of the total credit for the module and it is a substantive document expected to present a business proposition providing details such as the background, the opportunity, the market for the product, the situation in relation to the competitors, the sales strategy, the management structure of the business, the financial forecasts (capital requirements, sources of finance, projected Profit and Loss Account, Cashflows and Balance Sheet), an assessment of the risks and the possible exit strategies. This form of assessment is both summative and formative.

The preparation of this plan begins as a 'pitch', that is the presentation of the business idea within two minutes by a team, for judgement, to all the participants on the module joined by the convener, a bank manager and the independent assessor. This presentation takes place in the 3rd week of the module and is assessed for novelty of the idea and its feasibility as a business proposition. The assessors provide a candid view and quite often, as a result, the teams have modified their ideas or chosen new propositions.

The written plans are submitted for assessment by the 9th week and then they are presented orally in the final week by each team within 15 minutes to the same audience and assessors for assessment, the same as for the pitches. On this occasion, the assessors act as possible 'venture capital providers' whilst all audience assess the presentation for its feasibility and for the quality of detailed preparation to put the business proposition into effect, judged by a 'Question and Answer' session. After the assessors have agreed a mark, a detailed feedback is provided to each team on their return to the School after 3 weeks' break between the terms. The final mark awarded to an individual is 'adjusted' using the peer assessment provided by fellow members to reduce the chances of 'passengers' obtaining unearned credit.

*Delivery of the module and its contents*

The assessment of the various elements of the module and the mode of delivery are linked closely. The experience of 'rooting and hunting' for a business proposition provide the chance to perceive and discover an entrepreneurial opportunity. The experience of team work facilitates the emergence of a *leader* and other typical actors in project teams, allowing expression of individual talent as suited to the task. The pitches and the presentation of business plan for scrutiny by *venture capitalists* bring out students' skills of communication and 'to thinking on one's feet' and stand up to severe criticism. Presentations from outside presenters are effectively 'case studies' in entrepreneurship and entrepreneurial processes narrated 'live'.

There are some aspects of the module that remain constant from one year to the next, but for outside speakers it cannot be so as the convener has to accept who is available and willing to contribute to the module. Table 2 outlines the academic content of the entrepreneurship module for 2005/2006.

Table 2: Outline of the Entrepreneurship Module

| | Topic | Presenter(s) |
|---|---|---|
| Week 1 | Introduction to the module and the work-plan<br>Am I an entrepreneur?<br>Developing ideas for a business<br>Decide whether to start a business<br>How to develop ideas<br>Forming a business | Tahir Rehman<br>Jason Beedell<br>(SmithsGore) |
| Week 2 | Independent group work to prepare for pitches | |
| Week 3 | 1. Writing a business plan<br>Making your business plan stand out<br>2. Pitches | Jason Beedell<br><br>Jason Beedell<br>Tahir Rehman |
| Week 4 | Providing finance for entrepreneurs<br>Sources of finance for entrepreneurs<br>Grants etc<br>Budgeting and cashflow forecasting<br>Negotiation<br>Customer care | Michael Summers<br>(HSBC Bank**)** |
| Week 5 | Review of progress on projects | Tahir Rehman<br>Jason Beedell |
| Week 6 | Marketing and selling<br>Marketing your business<br>Pricing your product or service<br>Effective PR<br>Advertising<br>Effective selling | Denis Baddeley<br>Entrepreneur |
| Week 7 | Building your business team<br>The main roles in a business<br>Choosing and using an accountant<br>Recruitment and interviewing<br>Business law and using a solicitor<br>Employment law | Matthew Lawlor<br>**(**The Royal Mail**)** |
| Week 8 | Building your skills to lead your business<br>Developing yourself to achieve your personal goals<br>Effective Leadership<br>Team Building and high impact Communication Skills<br>Motivating and empowering your staff<br>Networking<br>Finding a mentor | Ed John<br>Entrepreneur |
| Week 9 | Independent work on projects/Review/Consultation<br><br>Submit business plan for assessment | Jaosn Beedell<br>Tahir Rehman |
| Week 10 | Five-minute presentations and Q&A session | Jason Beedell<br>Michael Sumner<br>Tahir Rehman |

## Observations on the experience of running the *Entrepreneurship* module

Before touching on the educational and curriculum design issues, there are a number of observations that emerge from the experience of running this module.

*The 'proposition …a workable business plan' spectrum*
By having to generate/discover/create an innovative proposition and to develop into a workable business plan that will convince the *venture capitalists* to invest funds in the idea, students go through a surrogate entrepreneurial experience. This element of the module is in accord with the view that in the entrepreneurial process the fundamental task is how to perceive opportunities effectively and efficiently (Bygone and Hofer 1991, p.16). Evidently, communicating with investors/bankers is exercising skills of communication and persuasion. Additionally, students gain an appreciation of the concerns[3] that a budding entrepreneur has. But the current structure of our *Entrepreneurship* module could well be part of a larger Business Management module.

*Have a business plan, will travel*
For those who experience the module successfully, their confidence is fostered and many comment that it provides them something to highlight as an achievement in their forthcoming job interviews. It is a bit of a T-shirt syndrome – "been there, done that".

*Source (s) of "inspiration"*
As mentioned earlier the two television programmes, *Dragons' Den* and *The Apprentice* inspire students and make them appreciate the importance of innovative ideas and innovations in defining and determining success in real life. Likewise, the importance of team building and organisation are driven home. Contributions by real entrepreneurs to the module constitute stories carrying the sublime messages of 'what we have learnt' and such narrations invoke cognition and play an important role in entrepreneurial learning as some recent research demonstrates (see: Rae 2000).

*What a difference access to Internet makes*!
After initial discussion amongst team members, almost all teams utilise the Internet to discover possibilities and/or ideas and propositions to inspire them. Whilst such enthusiasm is commendable, the use of the World Wide Web can compromise the originality of the propositions put forward. However, the assistance provided by the Internet sources in completing various steps involved in producing business plans is of undoubted value.

*Students' interest – "harvest" any coursework credit going and maximise return to time spent on curriculum activities!*

The experiential learning based entirely on project work provides a 'soft' option for students to harvest credit and they will go for it! In terms of a student's calculus of effort expended and credit gained, modules like *Entrepreneurship* are attractive and provide an opportunity to make learning an enjoyable experience.

## Issues and their implications

There are a number of pedagogical issues that are of relevance to our experience of running this module. Some discussion on these should be constructive.

*Should such a module be on curriculum for a BSc (Honours) degree?*
This question stems directly from the last observation as one could pose the question that in module such as *Entrepreneurship* there is little to challenge intellectual development and therefore why should it be included in the curriculum for a degree course? In answer to this we would argue that at least part of a well-designed curriculum ought to expect students to develop transferable skills in a self-directed mode of learning. And, of course, intellect is required in identifying entrepreneurial opportunities and there are strong reasons, such as self-reliance, financial success, innovation, roles, recognition and independence that explain why certain individuals are nascent entrepreneurs[4]. It would be difficult to find an institution of higher learning where some form of entrepreneurial education is not offered, particularly after the 1980s explosion in provision for undergraduate courses on entrepreneurship in the United States (see: Robinson and Haynes 1991).

*What is entrepreneurship and who are entrepreneurs?*
A vast amount of literature is available on both of these concepts and there is a strong tradition of contributions by sociologists, economists, psychologists, management scientists and businessmen on both topics. But the elusiveness of the precise description of entrepreneurship is illustrated by the following three quotations:

> According to Mitton (1989) "entrepreneurship and pornography have a lot in common: they are both hard to define. To get consensus on what they mean is impossible." Mitton goes on to quote Justice Stewart of the Supreme Court of the United States, who in an obscenity trial case in 1964 could not define pornography but went to say that he knows it when he sees it. Likewise, Mitton doesn't define entrepreneurship, at least not to everyone's satisfaction, but recognises it if he sees it!
>
> Gartner (1989, p.47) quotes Cole (1989, p.17) who asserts that " … for ten years we ran a research center (sic) in entrepreneurial history, [and] for ten years we tried to define the entrepreneur. We never succeeded. Each of us had some notion of it – what he thought was, for his purposes, a useful definition. And I don't think you're going to get further than that."
>
> Hull et al. (1980) agree with Kilby (1971) who draws an analogy between an entrepreneur and the Heffalump, a character in Milne's *Winnie-the-Pooh* stories, who " … is a rather large and very important animal. He has been hunted by many individuals using various ingenious trapping devices, but no one so far has succeeded in capturing him. All who claim to have caught sight of him report that he is enormous, but they disagree on his particularities."

The preceding quotation is particularly apt as it does reflect the situation with regard to entrepreneurs as described by various researchers and scholars in the literature on entrepreneurship. Gartner (1989) has reviewed some 32 studies that have taken the 'trait approach' to establish who the entrepreneurs are and what is entrepreneurship? Gartner himself takes the view that entrepreneurship is what entrepreneurs do and thus his perspective is that of human behaviour, with which we concur. From these various characterisations some common and distinguishing features of the 'Heffalump' do emerge. To have some understanding of these traits, we have updated the list of characteristics compiled by Carland et al. (1984) in Table 3 below.

Table 3: Contributions to defining distinguishing characteristics of entrepreneurs

| Date | Author (originator of the idea) | Characteristic s) |
|---|---|---|
| 1848 | Mill | Risk bearing |
| 1917 | Weber | Source of formal authority |
| 1934 | Schumpeter | Innovation; initiative |
| 1954 | Sutton | Desire for responsibility |
| 1959 | Hartman | Source of formal authority |
| 1961 | McClelland | Risk taking; need for achievement |
| 1963 | Davids | Ambition, desire for independence; responsibility; self-confidence |
| 1964 | Pickle | Drive/mental; human relations; communication ability; technical |
| 1971 | Palmer | knowledge |
| 1971 | Hornaday & | Risk management |
| | Aboud | Need for achievement; autonomy; aggression; power; recognition; |
| 1973 | | innovative/independent |
| 1974 | Winter | Need for power |
| 1974 | Borland | Internal locus of control |
| 1977 | Liles | Need for achievement |
| 1978 | Gase | Personal value orientation |
| | Timmons | Drive/self-confidence; goal oriented moderated risk taker; internal |
| 1980 | | locus of control; creativity/innovation |
| 1981 | Sexton | Energetic/ambitious; positive reaction to setbacks |
| | Welsh & White | Need to control; responsibility seeker; self-confidence/drive; challenge |
| 1982 | | taker; moderate risk taker |
| 1985 | Dunkelberg & | Growth oriented; independence oriented; craftsman oriented |
| | Cooper | Deliberate need for discovery and as not innovative as the |
| 2003 | Krizner | Schumpeterian *entrepreneur* |
| 2003 | | |
| | Carter et al. | Self-realisation; recognition; independence; roles |
| | Shane | *Nexus* between the individual and the opportunity |

Developed from the original compilation by Cartland et al. (1984, p.356)

The psychological profile research on characterising entrepreneurs suggests (see: Hornaday and Bunker 1970; Hornaday and Aboud 1971; Lachman 1980; Palmer 1971) the following list of entrepreneurial traits.

Psychological factors identified by Hornaday et al.* to be related to successful entrepreneurs

Energetic participation in endeavour
Confidence
(Desire for) being your own boass
Need to accomplish
Likes work
Good balance (common sense)
Tenacity
Sensitive to needs of others
Compulsion to contribute something worthwhile
Greater financial return pursuit
Luck
Adaptability
Desire for recognition
Knowledge of field
Desire to move themselves
Initiative
Risk-taking
Ability to project enthusiasm

*Taken from Hornaday and Bunker (1970, p.51); see also Hornaday and Aboud (1971)

In a similar vein, Mitton (1989) defines 'compleat entrepreneurs' in terms of what they do as follows:

| |
|---|
| "They See a Big Picture Perspective" |
| "They Spot Unique Opportunities" |
| "They Make a Total Commitment to Their Cause" |
| "They See a Need for Total Control" |
| "They Have a Utilitarian View of What's Right" |
| "They Welcome Uncertainty" |
| "They Use Contacts and Connections" |
| "They Embrace Competence" |
| "They Possess A Special Know-How" |

Source: Mitton (1989, pp. 11-17)

Where does all this lead to? An examination of these traits would suggest that there are some strong features of 'Heffalump' that make him 'Heffalump' and the most dominant are: creativity - discovering, perceiving and creating opportunities including both flexibility and risk taking; motivation and persistence (or 'frustration tolerance', according to Hull et al. (2001); the need to achieve and the need to lead (or the 'resistance to standard procedures', again according to Hull et al. (2001). To put it crudely then to be 'Heffalump' one needs his genes, the so-called "entrepreneurial DNA" (Knudson et al. 2004) that is, a predisposition towards, or a propensity for entrepreneurship. It leads us straight into the *borne* versus *made* debate and thus can entrepreneurship be taught? Admittedly without the 'appropriate' personality, it would be difficult, if not impossible, to become a successful entrepreneur; but, there are degrees of nascency and there should be opportunities available at institutions of higher learning for those to be encouraged and developed. Thus it may not be possible to educate somebody to be an entrepreneur but we believe it is possible to for teachers and/or students to learn some of the skills usually associated with entrepreneurship.

*Bringing entrepreneurship to the classroom*

There is now considerable research to suggest that there is merit in the '*they are borne*' argument. However, for bringing entrepreneurship to classroom, we ought to draw the distinction between *entrepreneur* (the individual with or without his/her DNA) and the processes of *entrepreneurship*. To consider what can be brought to the classroom, two analytical models of the entrepreneurship process, one by Shane (2003) and the other by Ardichvili et al. (2003) are particularly interesting (see Figures 1 and 2 below)

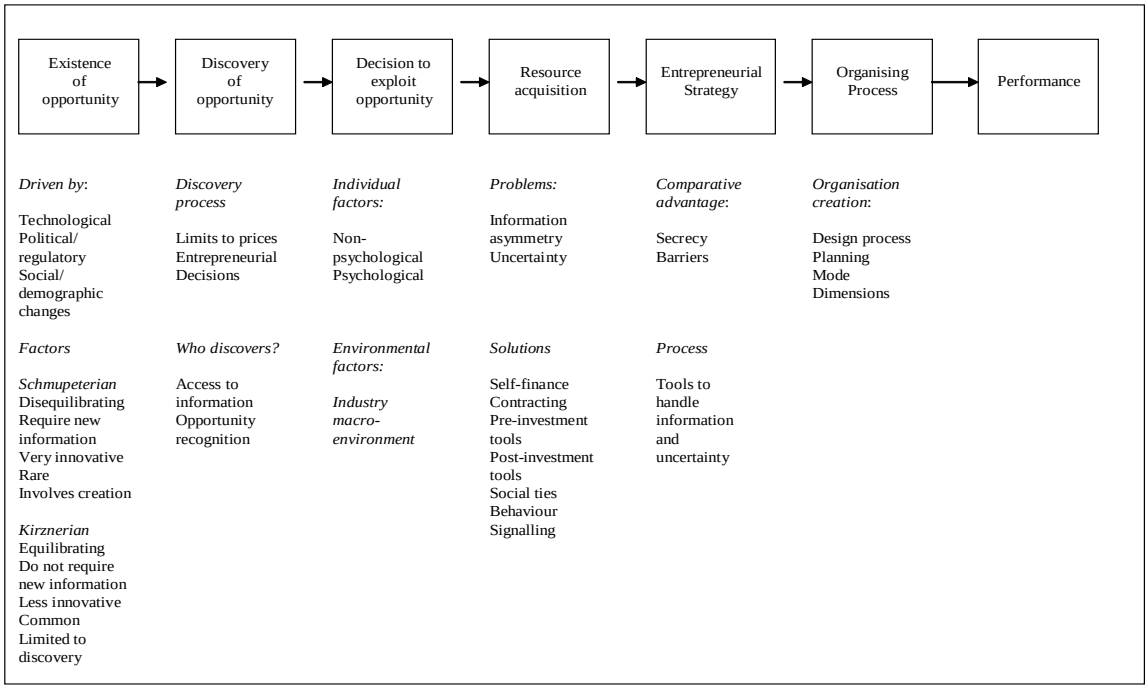


Figure 1: Shane's synthesis of the entrepreneurial process along the 'opportunity – individual' nexus (taken from: (Shane 2003, p.251))

From figure 1, it should be clear that *personality* plays a significant role in the 'discovery' and 'exploitation' processes whereas 'resource acquisition' (particularly the solutions part of it), 'strategy' and 'organising' components of the entrepreneurial process are 'learnable'.

Figure 2 illustrates the model presented by Ardichvili et al. (2003) is possibly even clearer from the point of view of transferable skills that can be acquired on *Entrepreneurship* modules. The 'core process' as identified in this model can be brought to the class room and notwithstanding the importance of "entrepreneurial DNA", the learning of the processes therein should lead to the acquisition of transferable skills by the students participating in such learning experiences.

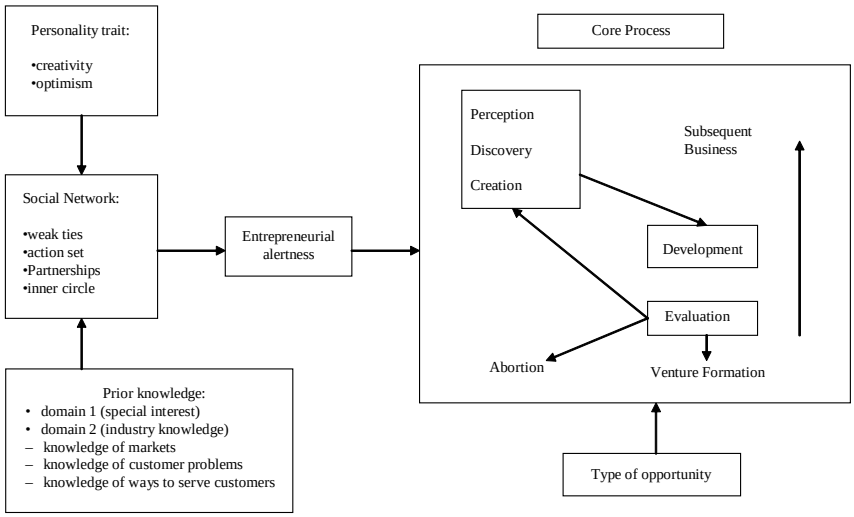


Figure 2:. Opportunity discovery and creation as the core process of entrepreneurship (taken from: (Ardichvili 2003, p.118))

We agree with Gartner (1989) that on entrepreneurship modules much can be learned through simulation of entrepreneurial behaviours. To mention a few, such 'behaviours' include: skills involved in the start up processes of a business venture; identification and evaluation of business problems; the process of team formation; learning about the support that any new venture requires in legal, financial, marketing and technological aspects of establishing a business; and, the experience of producing a business plan should identify the features of a successful business plan.

## Concluding remarks

In this paper we have presented our experience of developing an entrepreneurship module and then dealt with some of the learning, pedagogical and academic issues that it led us to consider. A sceptic academic may question the desirability of such modules being present on the curricula for university degrees, but our experience would make us disagree with this point of view. We should be thinking of developing these modules further, which is a subject for a different kind of paper. *Entrepreneurship* can realistically be brought to the lecture room. Admittedly, not everybody can, or, should be an entrepreneur but we may all be able to benefit from the ability to apply some of the skills associated with entrepreneurship in our working lives. For instance, an important entrepreneurial ability is to think laterally and consider how to use your knowledge and skills in different areas or to tackle evolving issues. In fact a world populated by solely by entrepreneurs may be an unpleasant place to live and entrepreneurs often rely on the social and economic structures created by a diverse society in which to be entrepreneurial. As educators our role is to encourage graduates to develop a range of entrepreneurial skills which they can bring to bear either within large business organisations or in the running of their own businesses.

## Notes

1. This is one of 6 undergraduate programmes that the School of Agriculture, Policy and Development offers; the other 5 include: BSc Agriculture; BSc, BSc Animal Science; BSc Consumer Behaviour and Marketing; BSc Food Marketing and Business Economics; BSc Rural Environmental Sciences; and, BSc Rural Resource Management.

   The *Agricultural Business Management* programme has been a very successful example of 'diversification' of the undergraduate degrees and has over the past fives become a bit of a 'flagship' course for the School. It was designed specifically to achieve the following objectives:

   - Develop the student's understanding of the economic, technological and organisational principles that underlie the practice of business management, particularly in the agricultural and rural sectors;
   - Enable the students to learn how to apply such principles to the management of agricultural and other businesses;
   - Develop the critical appreciation of the techniques and concepts available to assist effective execution of the business management function; and
   - Develop the range of personal and transferable skills that are expected from 'Reading Graduates' in order to become successful managers, leaders, advisers and communicators.

   Part 1 of the programme provides the student with a foundation of core skills and knowledge. Part 2 covers the more demanding aspects of business management and agricultural science. Part 3 completes the formal education, with the dissertation as a major component. The course contents are follows:

   **Part 1 (three terms 120 credits) 2006/7**

   **Compulsory Modules (100 credits)**

   Introduction to Agricultural & Food Systems
   Introduction to Livestock Systems
   British Agriculture In Practice (Agric & ABM)
   Countryside and the Environment
   Introduction to Crop Production
   Economics 1
   Economics 2
   Introduction to Marketing

Quantitative Methods 1
Introduction to Management
Career Management Skills

**Optional Modules to be selected (guided choice, 20 credits)**

International Development: Global & Local Issues
The UK Food Chain
Soil Use and Management
Soil, Land and Environment
Institution Wide Language Programme

**Part 2 (three terms 120 credits) 2007/8**

**Compulsory Modules (90 credits)**

Field Study Tour (Including Career Management Skills)
Farm Business Administration
Animal Production
Environment and the Farm Business
Practical Farm Analysis and Cereal Agronomy
Research Methods and Data Analysis
Quantitative Methods 2
Business Management
Financial Management

**Optional Modules to be selected (guided choice, 30 credits)**

Grassland Management
Forestry and Woodlands
Agricultural Mechanisation
Animal Health and Disease
Practical Nature Conservation
Organic Farming
Agronomy of Combinable Break Crops
Management of the Non-Profit Organisations
Economics 3
Economics 4
Marketing Management
Food Retailing
Policy Analysis
Institution Wide Language Programme

**Part 3 (3 terms 120 credits) 2008/9**

**Compulsory Modules (80 credits)**

Business Management Case Studies
Business Planning and Control
Dissertation
Final Year Project

Students can choose to undertake either AP3A81 Dissertation or AP3A86 Final Year Project. If the latter is chosen then an additional 20 credits of optional modules must be selected.

**Optional Modules to be selected (guided choice, 40 credits)**

Geographic Information Systems & Simulation Modelling
Approaches to Sustainable Development
Agricultural Systems in the Tropics
Cereal Management and Marketing
Human Resource Management
Animal Welfare
Wildlife in the Farming Environment
Business Entrepreneurship
Equine Management
Agronomy of Root and Tuber Crops
Dogs and Cats
Horses
Business Strategy
Supply Chain Management
Economic Aspects of the Food Supply Chain
Marketing Strategy
Rural Policy and Countryside Planning
Consumer Policy
Advanced Qualitative Research Methods
Institution Wide Language Programme
Agricultural Law and Valuation
Forestry

At present the following number of students (in three parts) make up the programme:

| | |
|---|---|
| Part I | 19 (new entry) |
| Part II | 22 |
| Part III | 16 |

2. These two television programmes are very popular offerings from the BBC. In the *Dragons' Den* contestants with innovations and innovative products have to make a pitch for investment on offer from *entrepreneurial* investors and face gruelling inquisition to win backing. In *The Apprentice*, which is a stylised version of its namesake from America and sponsored by the well-know American magnate, Donald Trump. The British version, sponsored and run by Sir Alan Sugar, an entrepreneur of outstanding ability is in fact an eleven week long job interview where the selected candidates live and work together to complete tasks and business challenges set by Sir Alan. Those who fail at various hurdles are eliminated leaving only two towards the end to be pitted against each other to win a 6 figure salaried job in one of Sir Alan's companies. The details and complete videos are available for viewing at the BBC's Website, www.bbc.co.uk.

3. Blanchflower and Oswald (1998, p.46) have identifying the following concerns, in the their relative order of importance, for budding entrepreneurs in a study involving 139 subjects who are "seriously intending to be self-employed within the next few months).

> "Where to get finance
> Cash flow
> How to start?
> Where to get advice?
> Finding premises
> Finding clients
> Competition
> No guaranteed income
> Losing savings
> Understanding tax
> Understanding bookkeeping
> Pension
> Employing people
> Effect on family"

4. In a recent study involving 1400 independent business owners/founders as subjects in 11 countries, Carter et al. (2003) have used 38 statements (reasons) to elicit responses on what motivates individuals to become entrepreneurs. Using multi-variate statistical techniques they have identified the following factors of reasons from a sample of 558 useable responses.

Carter et al. (2003, p.27) factor loadings for reason items.

| Factor: | 1. Self-Realisation | 2. Financial Success | 3. Roles | 4. Innovation | 5. Recognition | 6. Independence |
|---|---|---|---|---|---|---|
| Sum of squared rotated loadings | 2.60 | 2.41 | 1.98 | 1.98 | 1.75 | 1.50 |
| Percentage variance accounted for | 14.43 | 13.40 | 11.01 | 10.98 | 9.72 | 8.32 |
| Cronbach's α | 0.78 | 0.76 | 0.73 | 0.63 | 0.60 | 0.58 |
| To challenge myself | **0.77** | | | | | |
| To fulfil a personal vision | **0.68** | | | | | |
| Grow and learn as a person | **0.66** | | | | | 0.37 |
| To lead and motivate others | **0.65** | | | 0.33 | | |
| Power to influence an organisation | **0.41** | | | 0.48 | | |
| Earn a larger personal income | | **0.81** | | | | |
| Financial security | | **0.80** | | | | |
| Build great wealth, high income | | **0.66** | | 0.35 | 0.38 | |
| Build business children can inherit | | **0.61** | | 0.31 | | |
| To continue a family tradition | | | **0.78** | | | |
| Follow example of a person I admire | 0.38 | | **0.72** | | | |
| To be respected by my friends | | | **0.64** | | 0.60 | |
| Innovative, forefront of technology | | | | **0.78** | | |
| To develop an idea for a product | | | | **0.72** | | |
| Achieve something, get recognition | | | | | **0.78** | |
| Gain a higher position for myself | | 0.31 | 0.32 | | **0.54** | |
| Get greater flexibility for personal life | | | | | | **0.79** |
| Free to adapt my approach to work | | | | | | **0.68** |

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# A Study on Consumers' Perception towards Quality Milk and Their Willingness to Pay Incentive Price for Good Quality Milk: An Analysis from India

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*Abstract*

The present study reveals the perception of the rural consumers regarding the quality of milk and their willingness to pay extra price for good quality milk. Quality milk, coupled with sanitation and phytosanitation aspects of milk production in general in WTO regime of trade liberalization and Indian Dairy Industry in particular are important issues, not only for urban class but for rural communities as well. The study was conducted in Uttar Dinajpur and Birbhum districts of West Bengal of India in the year 2001-02. Random sampling was applied to select total four villages. Twenty consumers were randomly selected from each village. Thus, total 80 respondents were contacted to know their perception of quality milk. A schedule was developed to study the perception of the consumers regarding clean milk and their willingness to pay incentive prices for good quality milk. The perception of consumers towards quality milk was studied on 7 different attributes viz., nutritive value, wholesomeness, colour, appearance, human safety, freshness, composition characteristics

The study revealed that 67.50 percent of the respondents had average perception regarding milk quality, whereas 17.5 per cent of them had good opinion regarding the different attributes of good quality milk. On the other hand 55 per cent of the consumers of the study area were willing to pay one rupee more per litre and 20 per cent of the consumers agreed to pay 0.5 paise more per litre for better quality milk. The quality consciousness and willingness of people to pay for good quality products would definitely encourage the producers to adopt clean milk production practices. Milk produced as per the well management processes offer hope for the quality conscious consumers.

*Keywords*

Clean milk, quality milk, consumer perception, dairy farmers

## Introduction:

In the present scenario of globalization dairy marketing is a challenge as well as opportunity too. It opens up the market for competitive improvement of quality, which can go a long way in assuring the elimination of health hazards originated from dairy and dairy products. The milk must confirm to International Specifications of Quality in chemical and microbiological terms. The importance of quality need not be further emphasized. Quality is not something to be discussed, it should be there. Quality milk is not only a matter of final product rather it is a combination of well management processes. Most of the consumers understand the term clean milk on the basis of original taste, fresh in outlook, and wholesomeness.

Dairying in developing countries like India is still not mechanized. Milking of animals is done in front of consumer by dairy farmer and sold, is thought to be pure for a rural consumer layman as they did not see any water or other substances adulterated with the milk. But they failed to recognize the presence of antibiotics, oxytocin, and pesticide residue in the milk. According to Sharma and Sharma (2001) the term quality milk is used for designating raw milk from healthy milk animal produced and handled in clean, healthy and good hygienic practices, containing only small number of non-pathogenic bacteria and which is capable of remaining sweet till the time it reaches the customer or processing unit. Theoretically, the quality milk stored at a constant temperature of 15°C will keep 3 to 4 days from the time.

According to Ogale (1999) "milk quality is not option: but obligation. Milk quality is most important factor in dairying today."The socio-economic condition in India is different from many developed countries due to constraints like low crop and livestock productivity, enormous population, illiteracy, hunger, poverty etc. At the same time, we cannot afford to remain aloof from the global market, as India has emerged as the largest milk-producing nation in the World. We will have to increase the productivity as well as enhance milk quality to sustain in global market. In today's competitive market, consumer both internal and external is the most important component when business of a commodity is concerned. So, in this context, the sensory perception and preference of consumers about milk quality is utmost importance. Number of consumers in India is growing everyday as we can see that a huge number of consumer walking every morning to nearby Khatals(rural market) in rural and semi urban areas as well as standing in queue in front of milk parlours to collect packaged milk in almost every big town and cities. They obviously want to ensure that the milk their families consuming is hygienic and unadulterated, and for that they perhaps ready to pay incentive prices or extra prices. This would motivate the farmers to adopt clean milk production practices. For this it is imperative to understand the perception of consumer regarding quality of milk and their willingness to pay extra prices for quality milk. Keeping these things in mind, the present study has been undertaken with the following objectives:

1. To find out the perception of consumers regarding quality of milk.

2. To study consumers' willingness towards incentive payment for good quality milk

**Methodology**

The study was conducted in Uttar Dinajpur and Birbhum Districts of West Bengal of India in the year 2001-02.Random sampling was applied to select one block from each district and two villages from each block. Therefore, total four villages were selected for the present study. Twenty consumers were randomly selected from each village. Thus, total 80 respondents were contacted to know their perception of quality milk. A schedule was developed to study the perception of the consumers regarding clean milk and their willingness to pay incentive prices for good quality milk.

**Findings & discussion:**

**Perception of Consumer Regarding Different Attributes of Milk**

Table 1. Shows that majority of respondents (67.50%) had average perception regarding milk quality, while 25 per cent of them were in poor perception category, whereas

only 17.50 per cent respondents had good opinion regarding the different attributes of good quality milk.

**Table 1. Perception of the consumers regarding quality of milk**

| Sl. No. | Category | Frequency | Percentage |
|---|---|---|---|
| 1. | Poor (< 56.33) | 20 | 25.00 |
| 2. | Average (56.33–70.12) | 46 | 67.50 |
| 3. | Goods (> 70.12) | 14 | 17.50 |

Mean = 63.225

S.D. = 6.89

The perception of consumers towards quality milk was studied on 7 different attributes viz., nutritive value, wholesomeness, colour, appearance, human safety, freshness, and composition characteristics. Figure1. the confirms that the attribute of nutritive value received the highest overall score (94.58%), followed by wholesomeness (88.33%), appearance (82.77%), colour (79.17%), freshness (74%), human safety (73%) and composition characteristics (72.5%) of milk quality as perceived by the consumers.

**Nutritive value:** A close perusal of figure 1 revealed that nutritive value is one of the utmost important factors (94.58%) for the quality of milk. Almost all consumers perceived that milk should act as health tonic particularly during recovery after illness. According to most of the consumers specially educated consumers adjustment of protein and fortification of vitamin was the important characteristics of milk quality.

**Wholesomeness**: Wholesomeness is the second most important attribute of quality milk (88.33%) as informed by the respondents. Generally, the consumers judge the wholesomeness on the basis of cream layer they get after boiling the milk. It is the physical view which consumer judges the milk quality on this basis.

**Appearance:** Consumer generally synonym the purity with milk, as a liquid without any contamination. Most of the consumer perceived that milk of good quality must be free from any foreign matter and have the characteristics such as good looking, natural and attractive.

**Colour of milk:** Colour is important for milk quality as perceived by the respondents. The yellowish white colour of milk in case of cow is the yardstick. According to the consumers, dullness or any other unnatural colour makes the milk very poor quality.

**Freshness**: Consumers dislike the milk having off smell and slate flavour. They strongly believe that the good quality milk always contain the typical sweet taste. A fewconsumers reported that some time they found milk with the off smell of feed ingredients and rancid smell. According to them, this type of milk was very poor in quality.

**Human safety**: There were nine statements in the schedule related to human safety attribute of milk quality. Consumers reported that milk having high bacterial count with extraneous water and adulterated milk as poor in quality. The maximum respondents of the

study area did not know about the possibility of contamination of milk by pesticides and fertilizers, heavy metals, aflatoxins etc.

**Composition characteristics**: Most of the consumers perceived that good quality milk must have high fat content. It was also observed that the consumers who were highly educated and health conscious perceived that good quality milk should contain more protein than fat because high fat contain may be responsible for high blood pressure, diabetes and heart problems. These findings support the study of Katre and Prasad (2000).

### 2. CONSUMER WILLINGNESS TOWARDS INCENTIVE PAYMENT FOR GOOD QUALITY OF MILK

Incentive payment for good quality milk is utmost importance for the dairy farmers to adopt the scientific practices for clean milk production According to the Table.2. majority of the respondents (55%) of the study area were willing to pay one rupee more per litre followed by 20 per cent of the respondents who had agreed to pay Re.0.50 paise more for better quality milk. But more interestingly, it has seen that 5 per cent of the respondents were willing to pay Rs.2 extra per litre for good quality milk.

**Table 2. Distribution of respondents towards incentive payment for good quality milk**

| Amount (extra Rs. Per litre) | Frequency | Percentage (%) |
|---|---|---|
| Rs.2 | 4 | 5 |
| Re.1 | 44 | 55 |
| 50 paise | 16 | 20 |
| No | 16 | 20 |

One important observation of the present study is that the consumers who agreed to pay more for good quality milk wanted quality assurance and standard to be decided by formal institution. In order to meet the microbiological standards, adoption of hygienic concept by the farmers by giving them incentives to produce clean and safe milk is of utmost necessity. Sinha and Sinha (1997) also suggested the similar opinion.

## Conclusion

The quality consciousness and willingness of people to pay for good quality products would definitely encourage the producers to adopt clean milk production practices. Milk produced as per the well management processes offer hope for the quality conscious consumers be it urban or rural.. These management processes are stringent and many producers and extension personnel are ignorant about them, hence, efforts should be made to educate and train the concerned people so that clean milk especially milk produced in scientific healthy ways could get a boost. This will help clean milk production mainly to meet the rising demand in developed countries besides, improving supply of clean milk to domestic consumers, willing to pay incentive price for such production. We hope the quality consciousness and willingness of the people to pay for good quality milk would definitely go up in coming years.

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# The Role of Consumer in Developing and Activating the Rural Landscape

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*Abstract*

Our landscape is depending on the human activity. Its impacts are often unpredictable and deeply interdependent. Resistance for change among the inhabitants and other parties involved is reduced by participation and information throughout the planning. In the financial, technological, environmental and social points of view the changes in cultural landscape are to fix together. The 2000 Land Use and Building Act in Finland has given more opportunities to the consumer (citizen) to plan his or her living surrounding. The purpose of the study is to observe the participation in the land use process and the potential of civil activity in influencing the impacts of planning the landscape in the countryside. Six years later 2006 it is easy to evaluate the activity of people's participation in planning their own home area for everyday life.

The program is a part of Social Impact Assessment (SIA) that is one of the programs in communal land use planning. The Act on Environmental Impact Assessment Procedure was passed in 1994 according to the EU directive 85/377/EEC from the year 1988. Finland has signed the ECE general agreement of the environmental impact influenced over the national borders. Apart from the environmental impact the research of the social impact has become more accurate. The civil involvement in the land use development is new issue after the new legislation. In reality the law has caused much more work for the city planning authorities.

The regulations and rules have transformed into the learning of organisations, women organisations and extension in rural areas focusing on co-management, multi-stakeholder approaches and long term pro-active change. The co-operation between inhabitants, enterpreneurs and other professionals in semi rural areas in order to increase social wellbeing beside environmental welfare is notable.

The population is quickly increasing in Southern part of Finland. At the same time the Northern areas of Finland are wondering how to plan sustainable long term welfare to keep the population in rural countryside. The Environmental and Social Impact Assessments are used direct evaluate the welfare of the inhabitants in the rural and semi rural areas. The extension and advisory quarters are significant in disseminating the multilevel knowledge. The IT technology and media is supposed to extend the research to the consumers who are active to follow the plans and brave enough to present the opinions of the inhabitants further on to the decision makers.

The first part of the study is from holiday leisure exhibition area in Central Finland. The basic data sample has been collected before and after the exhibition from the community of 2800 inhabitants. The other sample is from the similar housing exhibition from the city of 200 000 inhabitants. The local papers are used as information and advisory method for inhabitants. The indicators of the knowledge flow from the information source to the local participant are in focus. With these indicators the change in behaviour among inhabitants who need the disseminated knowledge is tool for decision makers.

*Key words*

consumer, landscape, enterpreneurship, planning

## 1. Introduction

The role of consumers has become more important in planning the landscape in rural and semi rural areas in Finland. The Land Use and Building Act 2000 about the common participation to area planning has been well adapted in public bahaviour. The communities have organized the meetings for the usual people. In the same way the education for the inhabitants to participate planning of their local surrounding has become more common in Finland.

The local activity in rural development is evaluated in the second biggest city of Finland in summer 2006. The evaluation was in the same time of national "Housing exhibition"
The local inhabitants organised a "Citizen Housing Exhibition" outside the exhibition.
The European Union was partly financing the happening. The village society was officially the partner for EU. The society nominated a project person to take care of all paper work caused of the happening in summer 2006. The time was limited from 1st of June to 30th of September.
The real happening was during the official Housing Exhibition time from 13th .July to 15th. August 2006. The Citizen Housing Exhibition is supposed to evaluate a study of consumer's activity in Finland. The study is about the ordinary people's possibility and activity to participate the planning of their own living surrounding. The law of the year 2000 for the inhabitants' activity is known but not always in use when the communities and local authorities plan the areas for constructing, natural saving or e.g. for the road building or water supplier reservoir.

## 2. Method

During the Citizen Housing Exhibition the four bus circle trips was organized outside the exhibition area in the village where the people came to see the new built individual houses and semidetached houses for hire. The Housing Exhibition area was strictly boarded and only for exhibition visitors.

**The bus trips** were to introduce the old builded area and its historical development during centuries of the village. That kind of introduction was asked in the meeting of city authorities when they first time came to see the future Exhibition area three years ago. On the third weekend, on Saturday was organized a seminar ín the local school auditorium.

**The seminar** participants was told how the exhibition area had been developed according to the village activity during the years. That had begun twenty years before the official government based Land Use and Building Act. In the seminar there was an exhibition to clear the idea of this village's nature. There were the back ground books on the seminar hall. The newly edited history was available for the new potential inhabitants of the area. Two architects were telling the history of the development and hard work of the local people with the community authority. Local people created the side line plan of the area to introduce it as an other possibility instead of official plan. Decision makers saw how to solve the use of housing area and the nice looking needs of landscape in those days 20 years ago. The previous life in the village was made more attractive for the seminar participants. The worker in the local railway station told the stories and anecdotes about the very interesting time of the village during the Russian occupation. The film of the previous time was seen in video.

The advertising of the bus trip and seminar had begun in time in June by press release and personal invitations to persons who were known to be related to the seminar. The four

bus enterprises were in concurrence The cheapest bus enterpreneur did not reply in July when it was needed. The second was in every case best in price according the quality of bus and service.

The marketing needed more effort during the summer. The first information was distributed locally in the newsletter of village society in June. More advertising founded important. The special leaflet printed and distributed at the end of July just before the seminar on the 5th August. The result was to turn bustrip visible more popular compared to pilot trip..
Very remarkable was personally information to the people on a stand in front of the railway station. The stand was a point of the community's semi official organizations. The village society had a possibility to keep their newsletter in sight and tell its activity for the Housing Exhibition visitors.

The village was a special place for the Housing Exhibition. Its situation was the most important task to have a stand.to introduce the village itself to the exhibition visitors. Its enterprises, new church, active possibilities outside planning areas and history . The local newspapers were active in advertising, storytelling, positive information and facts of the village itself.

The study data is from mutual surveys and quantitative numbers during Citizen Housing Exhibition happenings.

## 3. Results

The bus trips became more and more popular during the summer. The first circle was a pilot driving specially for the guide. The last fourth was so popular that the bus was over booked and some ten could not come in. The seminar time was maybe wrong in hot Saturday afternoon in summer. The small number of seminar participants were happy and eager to know more.
The bus partipants were in pilot trip 3 over 30 years and 2 under 30 years old, one man and four ladies. altogether five persons plus guide and busdriver.
28 July 2006 bus trip had 29 participants. On the 5.August were 21 participants On the 12.August were 32 older than 30 years old and 6 under 30 years old participants of whom 12 men and 26 women together 38 people. As summary the bustrip participants were mostly ladies with the children or with the senior inhabitants of the village.

Interactive Planning -seminar during the exhibition in auditorium of the school there were invited previous active village planners. But most of them could not come, maybe because of very hot summer weather. Those who were partipating were 14 persons from whom eight ladies and six men. In the same time there were people who must work in the other project in the railway station. info point.

The report of the happening until the end of June was given to EU authorities at the end of September. Before the official Housing Exhibition was the preparative marketing and advertising to the national media and local papers by the project organiser.
The people in the village had well read the local papers. They were prepared to pay the trip because that information was written in paper. They were very happy to hear the trip was paid as an European Union program. It means the newspaper had been good advertising way.

The bus trips to the rural and not yet planned areas of the city were curiously new even to the local participants. The reason to organize the trips was fulfilled in order to activate the people to see the economical and environmental possibilities of their own area to develop.
For the organiser's point of view it was great to open the eyes to see the opportunities of the area and maybe wake up more proud. The area is in hazzle to planning by the community in

nearest future and in fear of distroy the Sleeping Beauty's dream. The local activity is a key point in saving the historical and environmental curiosities of the area and avoid serious mistakes.

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# Small-scale wood products industry as a rural wealth generator

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*Abstract*

The writer's background as a long serving employee of a major Nordic forestry company offers a natural platform to discuss wood products industry, i.e. production of sawn timber and further processed goods, and manufacturing of wood-based panel products such as plywood, particle board and fibre board. As the conference is focused on rural industries, it is suggested to concentrate on small-scale wood products industry in a local context. Therefore, less attention is paid to the mainstream forest industry, generally marked with sizeable capital investment, high-level efficiency, and global distribution for the diversified and sophisticated product range.

Although the forest industry, as most other industrial sectors, seems to be ever consolidating into larger and more powerful entities, it is the writer's firm conviction that there is room for successful and economically viable small-scale undergrowth in this sector. In the following, an attempt is made to discuss a business concept where rural development needs, availability of necessary inputs, and sustainable economies will meet in a way beneficial to all parties in a rural community. For discussion purpose this concept is called LWG, which stands for Local Wealth Generator.

The rationale of an LWG and its boundaries and limitations are discussed. The typical cost structure of an LWG is presented in order to prove that the cash flow generated by this type of an operation very quickly and efficiently turns within the local community. Finally, the key success factors of the concept are summarised.

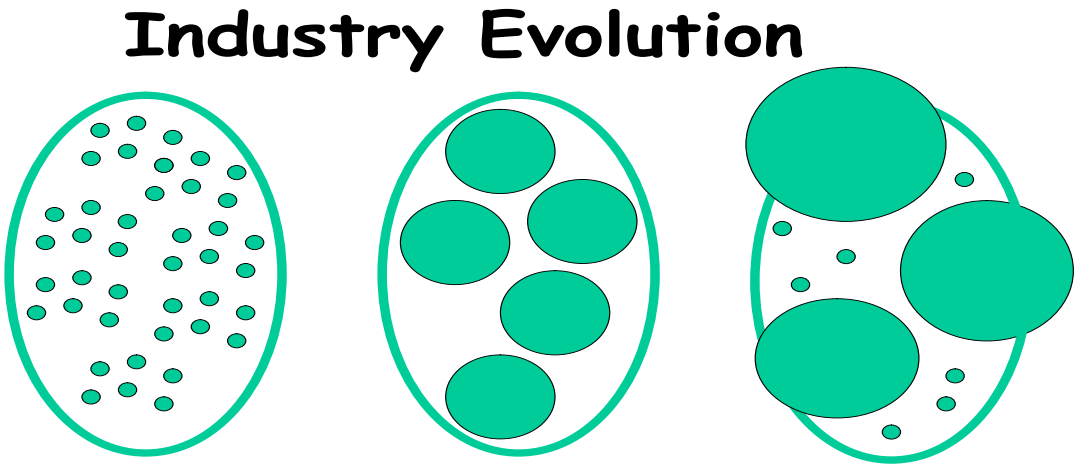
## 1 Industry Evolution

The forest industry evolution is illustrated in three phases (see Exhibit 1), the first showing emerging industries some 100 years ago. Raw material, energy and the work force were procured at short range around the mills, and due to the technological limitations productivity remained low. At the next phase, which still prevails in many countries, the companies and production units grow larger, providing higher efficiency but at the same time demand important capital inputs as well as international sales arrangements. The third phase, already in place in the Nordic countries, illustrates the emerging of large multinational players. High efficiency and specialisation marks these units, which for instance may concentrate on product range for one market only, e.g. Japan.

It is rational that the large units pay less attention to the local scene for several good reasons, i.e. i) raw material procurement is regionally coordinated with other mills within the operation, ii) high efficiency and specialisation demand operational expertise, which may not be available locally, iii) the market specialisation bypasses any local needs.

Arguably, there is a need and a place for local operations which are harnessing the local resource and feeding the community around them with the outputs of the mill, and most importantly, generating cash flow which quickly turns in the community, creating various opportunities.

Exhibit 1




| | | |
|---|---|---|
| local procurement | regional procurement | cross-border procurement |
| local sales | international sales | segmented & local sales |
| low productivity | increased productivity | focus & specialization |
| low investment | large investment | optimized investment |

## 2 Micro-mill Concept

In many areas of Central Europe, forests are the main natural resource, providing an optimal raw material base for a small wood products operation, e.g. sawmill. Since at the same time there is demand for building materials, notably wood for new construction and renovation, it would seem natural to invest in wood products industry in rural areas.

The analysts of the forest industry, however, would be quick to point out the weaknesses of wood products industry, being a declining sector with modest profit potential, operating in an oversupply situation, squeezed between increasing raw material costs and eroding sales prices, and burdened by ever growing investments to achieve sufficient productivity. Notwithstanding the above, it is conceivable that there are ways to achieve the objectives of a unit in the wood products industry, providing that the entity is able to position itself favourably in a local micro-level competitive situation.

As a model LWG, a local timber sawmill operation is chosen and the value chain from forest to the customer will be outlined. The main functions of an LWG are the following: i) raw material procurement and inward logistics, ii) processing plant and equipment, iii) skilled work force, iv) products and by-products, v) local marketing and sales, vi) management, administration and financing.

One of the key differences between a large-scale operation and a “micro-mill” is the nature of the cash flow. A large operation due to its wide area of procurement and sales, as well as large investment, will direct its cash flow much further away from the local community: forest owners are largely not local, service providers are usually bigger nationwide sub-contractors, expertise to run the mill has to be acquired further away, etc.

Exhibit 2

# Cost Structure

| Item | % | Beneficiary | Local efficiency |
|---|---|---|---|
| Sawlogs | 40 % | forest owners | high |
| Harvesting | 15 % | entrepreneurs | high |
| Transport in | 5 % | entrepreneurs | high |
| Work force | 20 % | employees | high |
| Consumables | 5 % | suppliers | medium |
| Plant & equipment | 7 % | suppliers, banks | low |
| Other services | 5 % | entrepreneurs | medium |
| Taxes & charges | 3 % | government | medium |
| Transport out | 5 % | entrepreneurs | high |

## 3 Key Success Factors

It is suggested that an LWG should meet the following criteria: i) to harness in a sustainable way the local raw material base, ii) to offer community members employment compatible with their education and skills level, iii) to offer community members entrepreneurial opportunities, iv) to generate output directly useful in the community, v) to be financially affordable in terms of capital expenditure required, vi) to have a long term viability in the competitive environment, vii) to meet high environmental and social responsibility standards; in summary, to efficiently convert local inputs into cash and wealth for the local community.

# Key Success Factors

- **Raw material procurement**
  - **selective & focused, price not critical**
- **Production**
  - **keep it simple, do not over-invest**
- **Customers**
  - **local clientele in construction, packaging etc.**
- **Work force**
  - **local, motivated, committed**
- **Relationship with community**
  - **responsible, good citizenship**

## 4 Summary

Although the idea of an LWG may be acceptable and viable, the concept requires development. It is also true that many micro-mills or LWG's already are operating successfully. However, in order to create a working model where it does not exist as of yet, efforts are needed by many parties. In the context of this conference, the writer would suggest that the universities would have an important role to play in education and training of potential entrepreneurs, the future operators of the micro-mills.

# Summary

- **What does it take**
  - **Education & training**
  - **Start - funding**
  - **Networking**
  - **Entrepreneurship**
  - **Local approach**
- **Potential benefits**
  - **well-distributed wealth**
  - **sustainable rural community**

# Which paradigms in education for sustainability?

**Jean Simonneaux**

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*Abstract*

This paper develops the framework of an ongoing research project about education for sustainability (EFS). The sustainability concept has been integrated in the French curricula of agricultural education for more than 5 years. This subject comes under the heading of "socio-scientific issues" used in North America (Sadler, 2004).

In France, a connected field of research is entitled "questions socialement vives" (Legardez & Alpe, 2001). This field analyses the teaching of issues, which are "controversial" in today´s society, both in the field of research and in the classroom. There is a debate about sustainability in the science field and at the same time in the social fields of (economic growth, biodiversity, energy and pollution). Sustainability is at the same time a scientific question, a social question and an ethical question. The word "education" is used to indicate a citizenship and ethical perspective - even an ideological one - for some people. The result expected from the teaching situation is not only an acquisition of knowledge. The educational challenge is to enable students to develop informed opinions, to be capable of making choices with respect to preventive measures and to be able to debate such issues (Simonneaux, L, 2002). The school has a mission to transfer values, but the school system and the teachers promote a position of neutrality (Simonneaux, L & Simonneaux J, 2006). The importance of praxeological and ethical dimensions in EFS is identified in the French literature (Sauvé, Boyer & Pommier). In French agricultural schools, links with outside partners are encouraged in educational activities about sustainability (Vincq J-L & Marshall E., 2006).

To analyse the teaching strategy adapted to sustainability, we borrow various paradigms from a framework defined by MT in his work on the teaching of philosophy and we adapt his analysis to EFS. In a European comparison of teaching models, Michel Tozzi (2001) has identified 4 paradigms used by the teachers. In EFS, the *historic* paradigm is founded on the principle of a teaching based on the chronology of the concept of sustainability. The *doctrinal* paradigm considers sustainability as **the** way of thinking. The aim of the *problem-driven* paradigm is to connect specific problems and criticize the different solutions rather than to find a solution. The *praxeological* paradigm suggests that what is most important is to engage pupils in a sustainable action.

We suppose that the first and second paradigms are more often used in a scientific tradition, and that the other ones are more often used in professional education. Possibly a use of these four paradigms will be found in current teaching practices. The purpose of the next step of this study is to analyse succession and variety in the teachers' activities.

*Key-words*

education for sustainability, socio-scientific issues, teaching strategy

This communication develops the framework of an ongoing research project about education for sustainability (EFS). The sustainability concept has been integrated in the French curricula for agricultural education for more than 5 years. This subject comes under the heading of « socio-scientific issues » used in North America (Sadler, 2004). In France, a connected field of research is entitled "questions socialement vives" (Legardez & Alpe, 2001). This field

analyses the teaching of issues, which are "controversial" in today's society, both in the research fields and in the classroom.

**Socio-scientific issues and "questions socialement vives"**

In science education the notion of 'socio-scientific issues' has been introduced as a way of describing social dilemmas impinging on scientific fields (Kolsto, 2001; Sadler *et al*., 2004 a, b; Zeidler *et al*. 2002). These are issues on which people have different opinions and which have implications in one or more of the following fields: biology, sociology, ethics, politics, economics and/or the environment. Socio-scientific issues, in particular, are controversial since they involve a lot of uncertainty.

The educational challenge is to enable students to develop informed opinions on these issues, to be capable of making choices with respect to preventive measures and the intelligent use of new techniques and especially to be able to debate such issues. This means, among other requirements, that students have to understand the scientific content involved, including its epistemology and be able to identify controversial topics and analyse their social implications (in economic, political and ethical terms, etc.) - "In order to solve most problems arising in modern society, scientific solutions alone are not enough, in other words, they must also take into account the social implications of decisions relating to scientific investigation" (Sadler *et al*., 2004 a & b).
The so-called "Questions Socialement vives" (Socially Alive Issues) by Legardez and Alpe (2001) raised three levels of socially alive issues. The first one takes place within the science sphere itself because of competing points of view which lead to debates on the production of reference knowledge for the teaching. The second one takes place in the social and media environment and participants in the teaching situation (both students and teachers) cannot avoid them. And the last one takes place in the classroom because teachers often feel that they are not capable of dealing with them.

**Sustainability and socio-scientific issues**

Within education we consider sustainability to be a socio-scientific issue. There is a debate about sustainability in the scientific field as well as in the social field (economic growth, biodiversity, energy, pollution..) - sustainability is at the same time a scientific question, a social question and an ethical question. Beat Bürgenmeier (2005) shows that, within sustainable development, economic rationality must be limited by the introduction of ethical considerations

Sustainable development can certainly be considered an ideological project, for example, Agenda 21 of UN contains explicit values about poverty in the chapter concerning social and economic dimensions : "*The eradication of poverty and hunger, greater equity in income distribution and human resource development remain major challenges everywhere"*. Everyone agrees about poverty eradication, and other choices, even in Agenda 21, are in debate in the socio-politic field: *"Halt and reverse protectionism in order to bring about further liberalization and expansion of world trade, to the benefit of all countries, in particular the developing countries"*. The position is less obvious in the report of the summit of Johannesburg in 2002, but the debate continues. Not everyone, even in economic research, believes that the liberalization of trade in developing countries is beneficial.

The question of zero growth is another example of socio-politic debate. There are many others socio-politic subjects which are treated in agenda 21: democracy, shelter and homeless, demography, gender,…

Of course, we can also find environmental, physical or biological debates and not only socio-politic subjects. We can discover similar subjects in the local agendas, but the questions and debates are nearer citizens' preoccupations and less theoretical but they can be controversial too.

Indeed sustainable development is an ideological project with political objectives based on different scientific frameworks but mainly based on ethical points of views (environmental preservation, solidarity between generations, equality..) - how do we take these characteristics into account in education for sustainability? The aim is to prepare future citizens and we must question which kind of knowledge the school transmits and what are the links between different types of scientific knowledge (economics, biology…) and ethical positions (equality, environmental quality…). Education for sustainability examines scientific knowledge together with the ethical and social consequences.

**Education, teaching, training… and propaganda**

The word « education » is used in France to indicate a citizenship and ethical perspective – and even an ideological one, for some people. There is an expectation that teaching is more than just the acquisition of knowledge.

The expression "education FOR sustainability" shows that there is a commitment in this project, the students are supposed to subscribe to sustainability.

The educational challenge is to enable students to develop informed opinions, to be capable of making choices with respect to preventive measures, to be able to debate such issues (Simonneaux, L, 2002). Thus, students should be able to identify the different positions before making their choices. But the question, in the case of sustainability, is not so simple. Some values or principles are incorporated into the culture, equality or democracy for example. The aim of education is that students subscribe to these values. At the same time, others principles are debated and must be taught: zero growth, energy, trade and environment,… The way is narrow for education; school can be accused of propaganda (concerning economic choices for example) and of not preparing students for citizen choices.

The school has a mission to transfer values and, at the same time, to discuss principles.

The difficulties are:

- The distinction between the values that the school transmits and the values to discuss,
- The links between a general value or a principle and the application in local choices and actions,
- The school system and the teachers promote a position of neutrality (Simonneaux, L & Simonneaux J, 2006), the tradition of secularity in France requires a religious neutrality but favours a political and ethical neutrality,

The importance of praxeological and ethical dimensions in EFS is identified in the French literature (Sauvé, Boyer & Pommier…). In French agricultural schools, links with outside partners are encouraged in educational activities about sustainability (Vincq J-L & Marshall

E., 2006). Our objective is to build up a structure of analysis, which integrates ethical dimensions into education for sustainability.

**The educational strategies**

To analyse the teaching strategies adapted to sustainability, we borrow various paradigms from a framework defined by Michel Tozzi within his work on the teaching of philosophy and we adapt his analysis to EFS. In a European comparison of teaching models, Michel Tozzi (2001) has identified 4 paradigms used by teachers. In EFS, the *historic* paradigm is founded on the principle of teaching the chronology of the concept of sustainability; the *doctrinal* paradigm considers sustainability as THE way of thinking; the aim of the *problem-driven* paradigm is to connect specific problems and criticize the different solutions more than to find a solution; the *praxeological* paradigm suggests that what is most important is to engage pupils in a sustainable action.

| | **Goals of apprenticeship** | **Content** | **Teaching scenarios** |
|---|---|---|---|
| Historic paradigm | To know when the concept of sustainability appeared and how it developed | Events and dates | Presentation of content analysis of documents |
| Doctrinal Paradigm | To subscribe to the principles of sustainable development. | Definition of SD,<br>Presentation of tools and a method which has to be used | Use of the method presented |
| Problem-driven paradigm | To identify various positions,<br>To argue a point of view | Presentation of various interpretation of SD, Presentation of social and scientific controversies | Presentation of content analysis of documents Debate, case study, examples |
| Praxeological paradigm | To engage students into a « sustainable » behaviour | Presentation of tools and diagnosis methods | Action, participation, and analysis of concrete cases |

We make several assumptions about teaching practices in EFS:

- The first and second paradigms are more traditional in scientific education and the other ones are more often used in vocational education.
- These 4 paradigms can be found in current teaching practices or in the curriculum at different moments.
- Different disciplinary cultures favour different paradigms: teaching about economics traditionally encourages the use of the problem-driven paradigm, biology teaching traditionally encourages the doctrinal paradigm…

The historic and doctrinal paradigms may be the first step of the EFS project, but problem-driven and praxeological paradigms are necessary to enable students to develop informed opinions on these issues, to be capable of making choices and to be able to debate such issues. We believe that Education For Sustainability cannot be taught only through specified parts of the curricula, in the context of one particular subject (biology, economy, environment…).

It is necessary to train students to integrate the complexity involved in sustainable developement and to take into account interactions between various domains to empower them to analyse problematic situations or debates in a sustainable perspective.

We are now analysing succession and variety in the teachers' activities.

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# The public and agriculture: an educationist view of changing relationships

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*Abstract*

The paper analyses current relationships, misunderstandings, and anxieties between society and agriculture, treating them as educational discomforts, and argues that European farmers (with appropriate support) are themselves increasingly able to play a part in treating the disorders. Rapid changes in agricultural science, economics, and technology have created a separation between the perspectives of those who work in farming, and agriculture, and the larger urban population of Europe. The resulting behaviours include misunderstandings and conflicts that can be harmful to the future of agriculture. The Theory of Reasoned Action is used to indicate how intentions, attitudes, norms, beliefs and values contribute to behaviours, and thus to demonstrate the complexity and multiplicity in what is involved in addressing differences in assumptions and expectations. What is now fundamental is clarification and consensus about the production and service functions of the agricultural industry, the lack of recognition of which is an underlying cause of many of the problems. Industries commonly react to this by developing agreed statements of mission and this is what is required, avoiding slogans, generalisations and the narrow interests of pressure groups. The movement of farmers into diversified enterprises is well established, and includes multiple and serial diversification, on which date are given. Since this is based on visitor attractions, these are good opportunities for farmers to conduct public relations. Their qualification and experience are already a good basis for this and, increasingly, the output of wells educated agriculturists from Higher Education will add to this. Finally, some tasks for education for better public understanding of the agriculture industry are outlined.

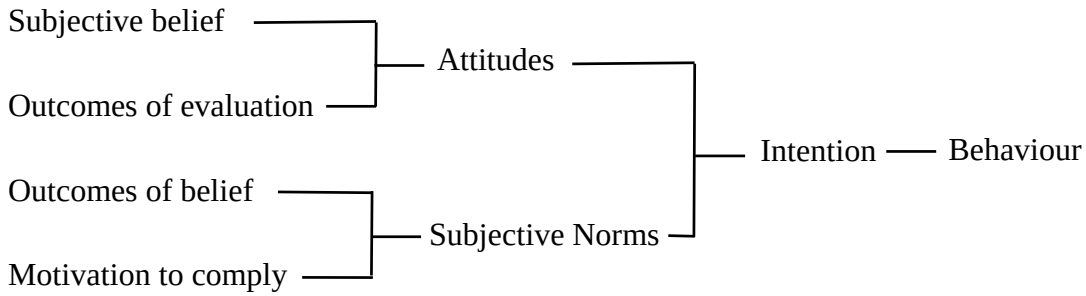
## Introduction

The main thrust of the 8th ECHAE Conference is focused on Higher Education. However, historically and currently, concern with agriculture is of importance to the whole of society. For several millenia, perceptions of farming were essentially those of producers. Of course, these were also consumer perceptions but these two views of farming were largely those of the same people. For the past century, however, perceptions have experienced increasing separation in Europe, leading to increasing disagreement and conflict and substantial changes in the way that farmers and farming are viewed by the public. At the same time, agriculture has experienced what appears to be an unprecedented rate of change, led or supported by its science, economics and technology bases. There has also developed another separation (somewhat analogous to what has happened to perceptions) between production agriculture and 'nature'. With relatively slow change, perceptions have time for adjustment and modification; with rapid change, these become more uncomfortable. The aim of this paper is to analyse current relationships and anxieties between society and agriculture, treating them as educational discomforts, and to argue that European farmers (with appropriate support) are themselves increasingly able to play a part in treating the disorders.

## Change in Agriculture

Many sources of pressure on, and response in, human attributes are evident in changes in agriculture, and the analysis of what is involved is a matter of interest to educators working at all levels. They hold some things to be self-evident truisms, including the belief that much human behaviour is learned and is based on changes in knowledge, skills and attitudes; these are therefore of major interest to teachers. The precise relationships between these elements and behavioural outcomes are, however, complex and difficult to arrange in a general theory that can inform practice. The Theory of Reasoned Action (Ajzer 1988) is an attempt to do this and, before interest returns to the main topic, it is useful to pressure the idea of behavioural change a little further, based on this theory.

Seen as purposeful action, behaviour derives essentially from an intention which acts as the precursor. Intention is formulated from two sources, namely attitudes and subjective norms. The former can be seen as outcomes of the beliefs (essentially, but not synonymously, knowledge) of an individual and the individual's evaluation or assessment of the value of the things connected to the intention. The latter (the subjective norms) are a consequence of the influences of other people, especially in terms of their approval or disapproval of judgements and subjective beliefs. To these can be added the strength of the motivation to comply with, or reject, commonly expressed beliefs. Thus:




If this, albeit brief and simplified, account of Reasoned Action can be accepted, the decisions taken in modern agriculture must be expected to conflict with the perceptions of (largely urban) European society. Differences are likely to occur in beliefs (including knowledge), evaluative judgements, motivation to follow or reject general pronouncements (often of a single interest and persuasive pressure group), personal attitudes. social norms and individual intentions. At of these will determine the assumptions and expectations that after public behaviour towards farming and farmers, and agriculture.

What this educationist view of behaviours has contributed is a demonstration of the complexity and multiplicity of what is involved in addressing differences in assumptions and expectations in a situation of rapid change. Reconciling the conflicting perceptions is likely to be difficult. Another self-evident truism in education, namely that good practice requires clarity of objectives has more positive implications for agriculture in relation to its understanding by the non-farming public. Dealing with lack of understanding (or misunderstanding) is hence the responsibility of those who **do** know (i.e. who set the objectives that are pursued on farms), rather than those who **need** to know. So, to state a mission (a generalised compendium of objectives) became a prominent element of management of productive enterprises in the 1980 s.

## Mission in Agriculture

Armed with a mission statement, a company might approach its customers with confidence, able to state and justify whey it existed, what it did, with what benefits to whom, and with a uniform voice. The mission gave vision and clarity to propose, and cohesion to endeavour. It stated consensus on behalf of all those involved. It could be emotive and uplifting, and hence energising.

Arguably, this is what European agriculture now needs: it has become an industry. It has advanced far beyond the craft-based human activity of its early years, and the highly productive application of research in the 19th and 20th centuries and its pressure for enlargement and intensification. The current stage is typically one of managed, pre-planned, standardised and market-driven production; and these are the characteristics of any industry. So, too, are the common public perceptions of negative externalities that may affect human health, other interests, and the global environment.

What is needed, and what appears now to be developing among those professionally involved, is consensus over the mission of the European agricultural industry. It will be helpful if this could be stated without the use of slogans such as 'sustainable', 'organic' and 'environmental friendliness'. The elements of the mission can be seen as efficient, competitive, and profitable food, fibre and bio fuel production, within managed ecosystems that deliver biodiversity and desirable landscapes, and linked to the existence of viable rural communities. It is a matter for debate whether this mission maker agriculture a production or a service industry, or both:
for the purpose of this paper it is necessary only to accept an industrial status.

Higher Agricultural Education can claim to have played an important role in guiding the industrialisation of agriculture and in responding to it through modern courses and curricula. Now, farmers have a major public relations role.

## Farmers and the public

Food production requires strict attention to bio security, and some practices that cannot easily be made transparent to the public. However, farming throughout Europe has become multi-functional and diversified, albeit to varying scope and scale. Farms (acknowledged as difficult entities to define) can now be realistically conceived only as land-based activities managed to optimise the returns on all their usable resources. This is seen in the remarkable growth of diversified activity on-farm, in addition to the equally remarkable increase in fields since the 1950 s. Food security internationally has increased, even under adverse conditions of weather and disease, though areas of political conflict and an anticipated future global population of 9 billions, are reminders of the dangers of complacency.

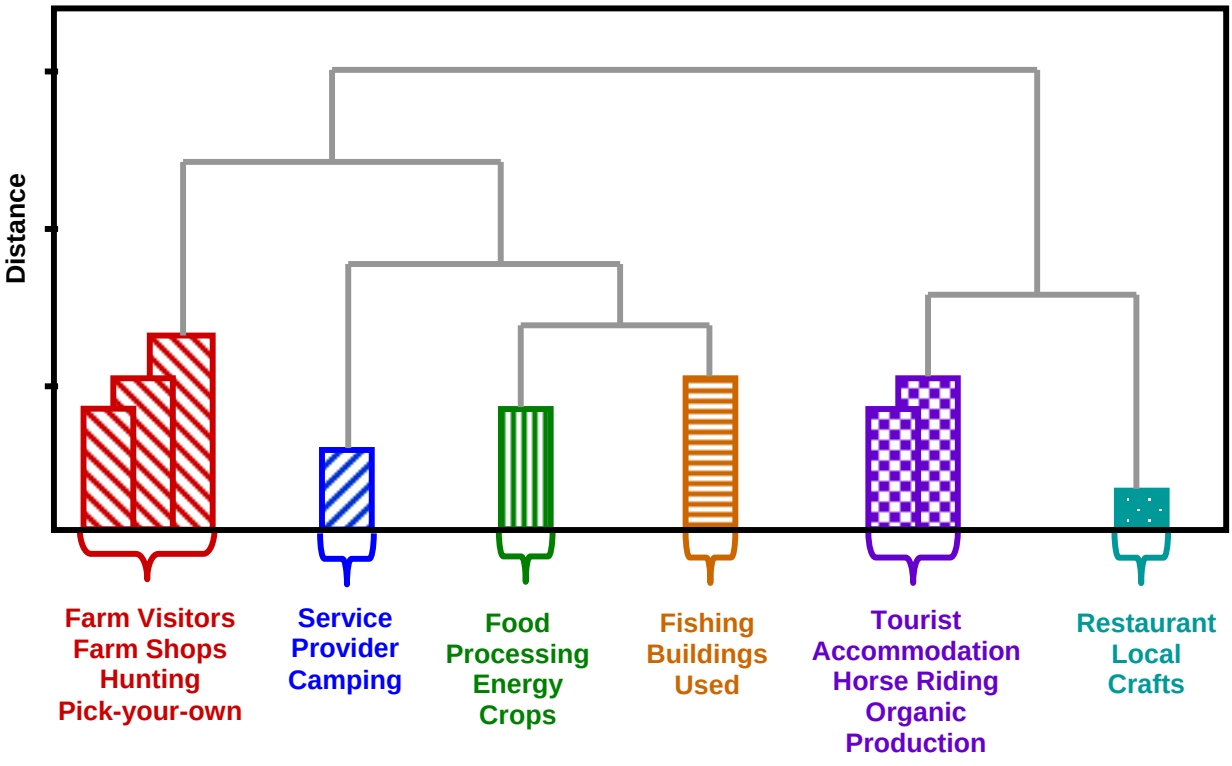
We are witnessing a convergence of farmer initiative to solve their economic problems, policy measures to support rural social and economic renewable, and interventions by service agencies such as education and health to stimulate change. Diversification is already strongly developed. In the UK, for example, some 48 % of farms are involved in diversified enterprises, the income from which in 2004 was £ 300 million (about € 429 million), which represents 10 % of national farm income and an average of £ 5000 (about € 7145) on each diversified farm. Much of this income is dependent on visitor attraction aimed at urban people, with whom these are clearly new forms of farmer interaction, both actual and potential.

Study of the situation in the Czech Republic (Rolls, Slavík 203) gives an indication of the change. Of 411 farms in the survey, 68 % had diversified enterprises. Among the 15 kinds of enterprises reported, farm visitors, farm shops and niche ecological products were most common; camping sites, restaurants, and local handicraft production were least common. Interestingly, diversification appears to be a multiple or serial action by farmers. In 2003, 46 % had one or two enterprises and 22 % had three or four. These figures were anticipated to change in future to 40 % for 1-2 enterprises (a fall) and 40 % for 3-4 enterprises (a substantial increase). The management of such activity is obviously complex and seems to be something involving the farm family rather than the farmer (most commonly male) alone. Overall, 52 % of the farmers expected to have more diversification in future, 40 % about the same level, and only 8 % less.

Farmers currently involved in diversification were significantly younger (21-47 yrs) than the other farmers (over 48 years), but for future intentions this association was much weaker. The converse applies to the level of education; for the future, higher levels (Secondary, Vocational and University) of education were significantly associated with more diversification, though at present this correlation was weaker. Those with University education were likely to be the most active.

An interesting finding emerges from cluster analysis of the linkages between different diversified enterprises. Six clusters are evident, of which five involve considerable contact with the public.

Fig 1. Linkages between farmers' diversified enterprises (Rolls and Slavík 2003)



The clusters of enterprises (horizontal axis) are shown in decreasing levels of linkage as the distance between them is increased (vertical axis).

Bridging the Agriculture – Public gap

The situation appears to be that the present generation of farmers involved in diversification in the Czech Republic, and especially those with higher levels of education (about 43 % were University graduates) and with special agricultural education qualifications (about 83 % are in a position of good contact with the public, and this fives them opportunities to popularise (reinforced by actual example) the mission of agriculture that has been suggested in this paper (Rolls, Slavík, Miller 2000).

The role of education

the argument advanced is that the lack of understanding by the public concerns not only farming practices and food. More seriously it concerns the fact that agriculture ha become a production industry dependent on technological intention (in genetic stock as well as production systems), and a service industry able to after a range of public (and only partly marketable) goods, for its future. If this is acceptable, participation by all those involved is essential if what are currently conflicting needs and interests are to be reconciled.

Education has a broad and complex role to play in achieving this. There is scape to link University, School and Combining Education for adults in the drive for better understanding. Within this, some specific tasks for education are to:

- Give a broad understanding of what is involved in developing agriculture as a production and service industry to present farmers and other professionals involved, and especially the general public.
- Support farmers' activities that bring them into close contact with the public, and through which they can demonstrate the new resource possibilities that are being developed.
- Devise curricula for students who are future farmers and professionals, that place agriculture within a context of rural development, with appropriate rigour and definition for an academic field of study, and prepare them for the public relations role that is now needed.

Conclusions

Seen from principles of Education, the challenge of achieving a better informed and supportive public understanding of modern agriculture is severe. Higher Agricultural Education ha an important role to play in this, the focus of which could usefully be on clarifying the objectives and production and service functions of the agriculture industry, using criteria that can be simply explained and (where possible) are capable of evaluation or measurement.

In terms of changing public behaviour towards farming and agriculture it is arguable that farmers themselves have now an opportunity and responsibility to develop a stronger public relations function. This is through their increasingly close and frequent interactions with the urban population in new, diversified enterprises that take the form of visitor attractions. The imagination and creative thinking that have gone into concerning of new ways in which farm resources can be used for income generation are also valuable attributes to employ in changing public perceptions and expectations of European agriculture.

It is through linkages and collaboration between all sectors of the agriculture industry that the conditions for successful agricultural and rural development are most likely to be achievable.

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# Public Awareness about 'Sustainable Rural Environment' via Higher Education: An 'Elixir' vis-à-vis Ecological Degradation!?

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*Abstract*

Of late, people, across the globe, have been raising a lot of hue and cry apropos (of) several issues related with the environment surrounding us, especially, in the rural context, viz. global warming; seasonal variations; ecological imbalance vis-à-vis extinction of certain species of flora & fauna which happen to be 'vital' in the overall environmental & ecological scenario; etc. Further, the recent emergence of diseases like 'Avian flue/bird flue', 'Mad cow disease', etc. are also causing a crisis of public health. And, these events have flummoxed the public so much that their perceptions, assumptions and expectations vis-à-vis environmental and ecological imbalance/degradation have become an abyss of ignorance. Nevertheless, there is no need to give up the struggle in despair… as, there is always a light at the end of the tunnel! The least, which can be done to mitigate the problems on the environmental front, is, to pass on the relevant knowledge & information regarding various techniques of preservation of environment & ecological balance/eco-system among the students undergoing higher education… so that, future of the 'global environment' could be secured!! However, for that to happen, there is an urgent need to incorporate one specific course dealing with "rural environment" in the degree programmes of the varsities, across the nations of the world… as, only then, it might be ensured that the future generation(s) of people never ignore and/or underestimate the importance & relevance of environment & ecosystem in our day-to-day life… which, in turn, would help the present day students to update their knowledge and awareness about the ways and means to have a "Sustainable rural environment" !!! In other words, through this investment in the higher education, we may help those students to develop a sound "vision" vis-à-vis care and protection/preservation of our immediate environment.

## Introduction

Can we pass on the "environment", in which we are living, at present, to the next-generation people *in toto*!?The answer should be a definite 'no'! However, if we find ourselves unable to answer the afore-stated question in the affirmative, then, there is another alternative in front of us … and, that is, at least, we can help our next-generation people in maintaining the environment (Which we are leaving for them to live in) in an effective and sustainable manner!! And, by doing this, we may be able to ensure that even if the next-generation people are unable to improve upon the environmental standards, at least, they might manage to have a situation of *'status quo'* vis-à-vis environmental conditions !!! Or, in other words, through this act(s) of theirs, the next generation people would definitely contribute to maintain the existing environment in a sustainable manner… and, this assumption is applicable for both 'rural' as well as 'urban' environment… as, only then, we would be having a "Sustainable Environment" available for the human-kind, whether rural or urban !!!! In fact, environmental issues, of late, have always compelled the policy-makers & planners to look & think beyond the present generation while formulating developmental policies.

**Conceptual Orientation of Key Terms**

***Environment****:* In a broad sense, it encompasses the whole range of diverse surroundings, in which we perceive, experience and react to events and changes. It includes the land, water, vegetation, air, and the whole gamut of the social order. It also includes the physical and ecological environment (De & Jirli, 2005).

***Sustainable Development****:* Meeting our needs while protecting the environment is called "Sustainable Development". It is a means of meeting present needs in ways that do not impair future generations - and other species – from meeting their needs. Because the environment is essential for satisfying the needs of present and future generations, environmental protection is a key to its success (Chiras, 2001).

**Current Scenario**

Of late, people, across the globe, have been raising a lot of hue & cry apropos (of) several issues related with the environment surrounding us, especially in the rural context, viz. global warming, seasonal variations, ecological imbalance vis-à-vis extinction of certain species of flora and fauna, etc. Further , the recent emergence of diseases like 'Avian/ Bird Flu', 'Mad Cow Disease', 'Severe Acute Respiratory Syndrome (SARS)', etc. are also causing a crisis of public health. And, these events have flummoxed the public so much, that, their perceptions, assumptions and expectations vis-à-vis environmental and ecological imbalance/ degradation have become an abyss of ignorance!

**Need to Create 'Public Awareness'**

In order to mitigate the problems on the environmental front, the least which could be done, is "to pass on the relevant knowledge about environment & ecological balance, including eco-system, among the young generation of students undergoing higher education"! Only then, the future of the 'global environment' could be secured !! In other words, there is no need to give up the struggle in despair… as, there is always a light at the end of the tunnel!!!

**Things to be done (via Higher Education)**

- Introduction of the young generation of students undergoing higher education.
  to the 'root causes' of the environmental crisis as well as presentation of ideas meant for systems' reform(s) leading to sustainability
- These students must be taught the key concepts and principles pertaining to 'Sustainable Environment', especially in the context of a rural set-up.
- Efforts must be made to inculcate the sense of 'analytical & logical thinking' among such students vis-à-vis ways & means of keeping their immediate environment as 'Sustainable' in nature.
- Education must be imparted in such a way, that: the students know/ identify the 'root causes' of all types of 'environmental problems'; and, they also devise the ways to address such issues, in a positive & practical manner.
- The students must be encouraged to go for 'participatory decision – making' while deciding on the means & ways of conservation of natural resources and their judicial use by the people of the given locality/ community, wherein/ with whom, they work towards the cause of 'Sustainable Rural Environment'.
- They (the students) must be made to understand that: the earth is precious, and here supplies vis-à-vis natural resources are limited.
- The students must be encouraged to use the available resources much more efficiently,

thereby ensuring adequate supplies of natural resources for the people of future generations.

- Knowledge, combined with practical skills, must be imparted to the students regarding the ways and techniques of 'recycling' anything/ everything, one can. Further, they may be provided some practical exposure with respect to "making/ preparing things/ goods with recycled materials".
- They must be educated about the concepts like "renewable natural resources", "renewable energy supplies", "restoration of natural environment/ systems", etc.
- The students must be made to understand as well as comprehend the "managemental techniques with respect to sustainable resource management", thereby ensuring that future generations are not deprived of essential natural resources on account of depletion of such resources caused by excessive and/ or haphazard use of these by the present-generation people.

**Conclusion**

We all know that "Sustainable Environment" and "Ecological Degradation" happen to be the two sides of the same coin' and, these two are inversely correlated with each other ! The more we disturb the ecological order(s)/ hierarchy of the eco-system, the more difficult it becomes to have a "Sustainable Environment" for a longer period of time !!

In fact, if we seriously think of arresting the growth of "ecological degradation", in a larger perspective, then creating 'public awareness" about "Sustainable Rural Environment" among present-day students undergoing higher education may act as an "elixir ". However, for that to happen, there is an urgent need to incorporate one specific course dealing with "rural environment" (wherein, the main emphasis should be on "How to make this rural environment 'Sustainable' in nature !!") in the degree programmes of the varsities, across the nations of the worlds…. as only then, it might be ensured that the future generation(s) of people never ignore and/ or under-estimate the importance & relevance of environment and eco-system, in our day-to-day life…. Which, in turn, would help the present- day students to update their knowledge & awareness about the ways and means to have a "Sustainable Rural Environment"! In other words, through this investment in the higher education, we may help those students to develop a sound "vision" vis-à-vis care & protection/ preservation of the natural resources present in our immediate environment, thereby helping the cause of "Sustainable Rural Environment" !!

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# Meeting Expectations in Higher Degree Programmes through Education at Distance: a new paradigm for rural sector

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*Abstract*

This study aims to discuss EAD experiences on graduation and post-graduation level in Brazil, where the search for this source of knowledge and technology system is increasing every year. For better understanding of the subject, it was set the conception for Education at Distance and it was pointed out some relevant characteristics since the new education paradigm, which comes to attend the practical changing of teaching with the usage of the information technology. The Education at Distance (EAD) is addressed to young people and adults that are in need of learning and that are not attended by the traditional teaching model. It can be practiced by Higher Degree Programmes to addresses the assumptions and expectations of the public for the rural environment. In Brazil, this practice has legal support in a law from the Ministry of Education, which was published in 1996 in order to establish legislation for this educational paradigm. The superior educational institutions are increasing their growing perspectives more and more and developing themselves on the on-line mode to meet a considerable demand in graduation and post-graduation courses. This new paradigm of education is meeting students' expectations because they may study and work at the same, and they do not need to spend money and time to move from home to school every day. This saved time can be allocated for reading, exchanging ideas and information with other students, tutors and teachers by internet or free phone line. Thus, it can also be applied at higher education training in rural areas where the access to schools and universities are not easy and where parents or other family members need their work force in the farm. It is also concluded that this kind of teaching promotes self-knowledge and students' self-development. At the same time, it offers more possibilities to address social expectations and requirements in order to have more access to education, by using new technologies, even in rural sector.

*Key words*

Education at Distance, Information Technology, Teaching - Learning

## 1. Introduction

Education at Distance (EAD) has appeared as a kind of improvement for human being formation which searches in this method some advantages, such as facility in using and unlimited possibilities in searching for information that add value at the individual learning, apart from the elimination of geographic barriers. EAD concepts and characteristics are relevant to better understand this new method of education, which generates changes upon the traditional education models, for there is no need the student presence, but a good student/professor interaction and student/student through the multimedia environment.

The Law of Directives and Basis normalized EAD, in Brazil, on December the 20$^{th}$, 1996, through the Law n° 9394. This law guides the supply of under-graduation courses and technological professional education. The universities and educational institutions have to apply to the Brazilian Culture and Education Ministry (MEC) to get authorization and

accreditation to operate on this new sort of education model. Thus, EAD shows itself up in the educational scenario as a growth-propelling tool and as the education/learning individual development that may improve the pattern of life in Brazil. For this reason, this kind of research is valuable to disseminate information which is not properly spread yet, but is very important to get new followers for this new education paradigm in different areas.

For this reason, this study aims to discuss EAD experiences on graduation and post-graduation level in Brazil, where the search for this source of knowledge and technology system is increasing every year. In other words, this study aims to identify contributions from Education at Distance in order to meet students' expectations trough this new educational paradigm.

## 2. Distance Education Model

### 2.1 Conceptualization

According to Reis (1996), it is possible to define Education at Distance as a way of education such that the professor/instructor is geographically distant of the student/trainee. On of the ways to teach at a distance is using the Internet, gathering information together and making them available. Offering opportunities for the creation of new ways of education and learning and integration of multiple medias in a single tool: Text, image, audio and video.

This same author states the main advantages identified by using the Web were: Easy to use, Elimination of geographical barrier, student-professor/trainer-trainee interaction and student-student/trainee-trainee in several in loco and not in loco ways; Unlimited information search possibilities; Enormous possibilities information updating; Modern motivation instrument for the learner; It is an incentive to the learn to learn.

For Landin (1997), the Education at Distance is a systematically organized way of self study in which the student instruct himself from the study material that is presented to him and the follow up and the student success supervision are accomplished by a group of professors.

Though, the Education at distance presents the following elements, under the perspective of Reis (1996, 38): “Physical separation between professor and student, that distinguish itself from the in loco education; educational organization influence (planning, systematization, plan, project, tutored organization etc), that make it different from the individual education; utilization of communication technical means, usually printed, to unison of the professor and student and to transmit the education contents; forecast of a bi-directional communication, in which the student gets the dialog benefits, and the possibility of initiatives bi-directional; occasional encounters possibilities with didactic purposes and of socialization.”

### 2.2. EAD characteristics

Landim (1997, p.2-4) enumerates, based in his studies about superior education at distance and in the works of Borje Homberg, Anthony Kay and Greville Rumble, the following education at distance characteristics.

a) **student population relatively spreading:** due to geographical position reasons, application conditions, physical disability etc. A great number of students, mainly adults, at the same time they have a great need to go on with their studies or achieve improvement, by many reasons, and mainly the by impossibility to be under certain time and local discipline as in the *in loco* classes, don’t get access to education.

b) **prevailing adult student population:** it is recommended that the courses be mediated by trained educating tutors trained to stimulate the youth and give importance to the self Education. Exercises and practical experiments, linked to the Young students' reality must be a continuing education process. It is fundamental that we observe the need of a strong logistic and institutional support that set permanent means of social stimulus and self motivation, be it incorporated to the social institution, or strongly focusing communication means with emotive appeal. In the case of the adult population, that is the majority of the Education at Distance client, is fundamental that the projects have, since the beginning, the valorization perspective of the self experience, not only to the point where it refers to the subject to be studied but, mainly, in the contents treatment from the students life experiences and culture.

c) **course that intends to be self-instructive:** before the elaboration of the independent study materials, having clear objectives, self-evaluations, exercises, activities and complementary texts. These courses should be self-sufficient and constitute in a guideline to the set of other texts, raising the observation and criticism capacity and multiplicity of ideas, especially valuable aspects in the university studies. It is also essential to get interest in expanding the choice possibilities of the students, offering alternative visions about the same problem an complementary material that help in the critic and analytical thought formation.

d) **massive communication:** once the courses are prepared it is possible, convenient and economically advantageous, to use them for a great number of students. It is indispensable, however, to adequately test the material in situations that make possible a precise evaluation. Otherwise, costs could be enormous and the results relatively small.

e) **self study:** this aspect have been pointed out specially by Montenegro and Barros (1998), showing up as fundamental the aspects related to the separation between teacher/professor and student, that will set the ways that communication between them is performed.

f) **inclination to adopt flexible curricular structures, via modules and credits:** such structures allow a greater adjustment to the possibilities and individual aspirations for the student population, without affecting the academic quality of the instructional material.

g) **costs decreasing per students:** after the high initial investments, when a numerous student population is combined with an efficient operation, EAD may be one of cheapest.

These characteristics show the potential of long distance teaching and learning not only in Brazil, but worldwide.

### 2.3. EAD Action Field

The EAD constitutes one of the education fields that is growing very fast. So, it is possible to consider it as an important instrument to reach youngsters and adults whom learning needs were not satisfactorily met by the traditional educational system. In this way, as per Litwin (2001) the Education at Distance action field focuses on:

a) **Provide access to knowledge to all society:** it is the main constitutional goal to be achieved in accordance to the Brazilian Federal Constitution, from 1988, art. 214. The education at distance may perform multiples roles that run since specific knowledge updating to professional formation. The education at distance may be used as a complementary way of education, updating concepts and knowledge, given support to the permanent taking of conscience of professional about the thrusts into their specifics areas, and, mainly by generating a continued accessing process to the knowledge cumulated by human being of million of citizens.

b) **Professional formation and capacitating**: it was just through this way that the Education at Distance begun its development. Either on basic professional formation or at university levels, the education at distance has demonstrated to be a modality with great potentialities, and much more because it is a means of massive education.

c) **Capability and professors updating:** it is important to point out, that it is not enough to create sporadic professor formation so that the magisterial capability problem be minimized. There is a need to promote integrated and permanent actions, involving local capabilities and social institutions. Though, even if there exists a great lack in the technical qualification, it is not recommended that professors training projects be based only on the professors particular technical specialization, this may be better achieved if the core of the education processes were the citizenship construction.

d) **Open education and continued through EAD**: it is possible to promote the proliferation of experiences of great social reach, for the culture of formation of the nationality, allowing education to reach large contingent which are away from the formal educational institutions, or having difficulties to access them.

e) **Education for citizenship:** a significant set of educational actions may be brought through with the EAD, transforming civic processes mandatory by law into process really participative and conscious. Fundamental themes of the society contemporaneous existence must be treated in a systematic way through courses, or systematic educative means, capable to increase the responsible participation level of the society in the nationality construction process.

In this context, it is possible to state that EAD has a great potential in several levels and niches in the society. This methodology has shown a new paradigm that permit access to much more people to the universities, as well as the improvement of the qualitative level of the professors who has not much time to upgrade themselves, mainly in Brazil where most of primary and high school teachers dwell in more than one school to complement their salaries which are very low.

## 3. Methodology

Based on Mason (1996), the researcher sought the application of the descriptive research technique to development and implement the hereunder study in consonance to the bibliographic revision. National authors with recent publications and up to date information taken from the internet helped to deal with this study. Apart form the research about Brazilian institutional environment on the Education at Distance field in the last few years and it was performed a secondary data gathering on web pages from the Ministry of Education and universities that works with this paradigm of education in under-graduate and post-graduation level.

It was also performed a search in secondary sources about legislation on EAD in Brazil and a search on institutions accredited by the Brazilian Education Ministry to offer Graduation and Post-graduation course at distance in Brazil. Another search was carried on the webpage from a consortium of six public universities in Rio de Janeiro, in order to get information about this experience in the state.

## 4. Paradigm change in the Brazilian Educational System

### 4.1. Brazilian Legislation on EAD for educational institutions

In matters related to EAD, one important step performed in relation to the Brazilian legislation, was the inclusion in Directives and Education Basis Law (LDB) published in 1996. The LDB states in its article 80 that:

> "Art. 80. The public power will motivate the development and spread information about education at distance programs, in all education modality levels, and the continued education.
> § 1º. The EAD, organized with opening and special regimes, will be offered by institutions specifically authorized by the Government.
> § 2º. The Government will regulate the requirement to the performing of examinations and certificates registration related to the EAD.
> § 3º. The normalizations for production, control and EAD program evaluation and the authorization for implementations, will be under the respective education systems, and will accepted the cooperation and integration among different systems.
> § 4º. The EAD shall be entitled to have differentiated treatment, which shall include:
> I – reduced transmission costs in commercial broadcast channels and of audio and images;
> II – Channels concession with educative means exclusively;
> III – Minimum time reserve, without charge for the Government, by the commercial channels consortium".

From what is set by LDB, the federal government issued complementary measures that offered to the educational institutions opportunities to participate in the EAD context which is being implemented step by step, such is the complexity of its effective installation. According to the legislation we have the following definition for EAD:

> "EAD is a sort of education that allows the learn-by-yourself method, with the mediation of didactic resources systematically organized, may be isolated applied or combined, and broadcasted by the communication means".

However, it was the Decree n. º 2.494, from February 10th, 1998 that has regulated LDB article 80 (Law n. º 9.394/96) through the governmental decree nº 301/98. This governmental decree has established the rules for the institutions credentials and courses at distance at the graduation level. All this is part of the EAD first steady insertion step into the Brazilian educational system.

On April 3rd, 2001, the Resolution n. º 1, from the National Education Council has established the normalizations for the port-graduation *lato* and *stricto sensu* at distance (MEC, 2004). According to the Culture and Education Ministry (2004), they are ten the basic items that shall have the attention of the institutions that prepare their graduation at distance programs:

1. politics integration, directives and defined quality standards for the superior tuition as a whole and for the specific course;
2. project design: the education at distance identity;
3. multi-disciplinary professional team;
4. communication/interactivity between professor and student;
5. educational resources quality;

6. infrastructure support;
7. continuous quality evaluation and comprehensive;
8. joint ventures and partnerships;
9. information about graduation courses at distance;
10. implementation costs and graduation at distance maintenance.

Public or private institutions with legal credentials for the superior tuition at distance, through the National Education Council advice, with authorization issued by the Education Ministry through governmental decree published on the official government press, in terms of the Law nº 9.394/96 (LDB), Decree 2.494/98 and Issue Document MEC N° 301/98, are entitled to offer higher degree courses at distance.

### 4.2. EAD Experiences in Superior Educational Institutions

According to the Education and Culture Ministry (2003), there were 30 universities and institutions with credentials to offer graduation courses at distance and 40 to offer post-graduation lato sensu. Among these experiences, two of them are presented ahead in order to show, in some details, the action of these institutions.

**The Brasilia University** (UnB) is a pioneer institution offering education through the EAD modality. This pathway begun in 1979, when UnB starts the Education at Distance, offering the course named "Introduction to the Politics Science", that turn to be the pilot-project for the implantation of the Education at Distance Program – PED.

The PED experience has shown that, in 1989, the UnB has created the Open Continued Education Center – CEAD aiming to develop EAD modality. In seven years more than 10.000 people were benefited by this modality of education/learning. The development of the new communication technologies applied to education takes UnB to create, in 1998, the Virtual University. One of its goals is to foment and consolidate national and international partnership with other education institutions, aiming to establish a collaborative network for developing and sharing information on shared education.

**The Santa Catarina Federal University** is another spot that has already remotely trained more than 174 thousand students. "When we speak about education at distance in Brazil, it is essential to mention the Santa Catarina University Laboratory of Education at Distance (LED). It was founded in 1995 to produce educational videos, the LED today produces courses on Master Education, specialization and capacity training mixing classes at distance and *in loco classes*. The laboratory is connected to the Post-graduation Program in Production Engineering (PPGEP) of the university, but it develops project in any area. The connection with the PPGEP does not prevent us working with any other sort of program or content at distance. LED has a model, a remote education methodology, for every requirement" – states LED's commercial manager, Eduardo Lobo (UFSC, 2004).

The LED clients are not composed of individual students, but companies, that order training programs for their employees. From these companies needs, the lab team traces the instructional design for the courses, defining more adequate medias case by case. Among LED clients are: Siemens, Fiat, Eletrobrás, Alcoa Alumínios, IBGE, Embrapa, Senai, Sebrae and Senac. At Siemens, for example, there are master classes in Marketing and Business Management, Logistic and Finances.

### 4.3. The CEDERJ partnership experience

Another initiative that deserves to be pointed out in Graduation context is the CEDERJ partnership, as one can observe on the brief presented as follows. The state of Rio de Janeiro Government, through the State of Science and Technology secretary (SECT), take the political decision to use the Education at Distance to make possible the formation of people that has been excluded from educational process for their location or by lack of time to attend the traditional classes. One of the aspects that influenced this decision was the students' difficulty to move from the countryside towns to bigger cities where courses are installed.

The number of students attending examinations for graduation courses in Rio de Janeiro state was of 111.620 individuals, in 1998. This number increased to 322.760 in 2000. These figures show that search for graduation courses increased almost three times in 2 years. This demand shall increase in near future. Taking also the crescent search for capable professionals in the working market into considerations, it is necessary to look at new measures in order to offer to the population another qualification horizon. In this context, the State Secretary of Science and Technology (SECT) initiated, in 1999, a work with the objective of improving superior education access opportunities (mainly inside the State of Rio de Janeiro) using education at distance, by means of partnership among public universities in the state. State University of Rio de Janeiro – UERJ, Rio de Janeiro University – UNIRIO, State University from the Fluminense North – UENF, The Federal University of Rio de Janeiro – UFRJ, The Federal Fluminense University – UFF, and The Federal Rural University of Rio de Janeiro – UFRRJ take part in this project.

After one year working together, SECT and the universities celebrated the establishment of the partnership Education at Distance Center of the Rio de Janeiro State – CEDERJ, signed by the honorable State Governor, by the honorable State Secretary of Science and Technology and by the Magnificent public university Deans in the State of Rio de Janeiro, on January the 26$^{th}$, 2000.

The CEDERJ objectives are: contribute for the take free and good quality superior education to the countryside in the State of Rio de Janeiro, contribute so that access to the superior education is available to the ones that could not attend the traditional time-table; acting at distance for the continued formation of professionals in the State, with special attention to the updating process for the professors engaged on State primary and secondary schools, and to increase the vacancy offering in the graduation and post-graduation courses in the State of Rio de Janeiro(CEDERJ, 2001).

In the year 2000, it was launched the first course with 160 places for Mathematic from the partnership with UFF and UFRJ. In 2005, it was opened 9.864 vacancies for 5 graduation courses (Mathematics, Biology, Physics, Pedagogy, and Computing) all over the State. The students have access to the didactic material in a book form, they have in loco attendance in the places called *polos*; attendance at distance through a free phone line, and they are also a attended by E-mail, forum or chat in a platform with tutors for each subject. The main evaluations are done in loco in the *polos* and the students still cumulate evaluation points taken from the evaluation at distance performed in the platform (CEDERJ, 2005).

Early this year another 200 vacancies were opened for its new course on Management, which attend 5 municipalities spread around the state. Thus, nowadays the partnership counts with 6 *at distance polos* located in the university' s campus, 5 Science Spaces, and 20 Regional *Polos*. All that without mentioning the social pre-exam (*Pré-vestibular Social*), to prepare candidates to the university selection test (*Vestibular*) free of charge and other extension courses to prepare the State public primary and secondary school network teachers. The first students graduated last year and the certificates were offered by

the university in the partnership in which the students were connected to, during the whole course.

This kind of educational system is of great value for many people and it seems to be useful to spread knowledge in different sectors. This new paradigm of education is meeting students' expectations because they may study and work at the same, and they do not need to spend money and time to move from home to school every day. This saved time can be allocated for reading, exchanging ideas and information with other students, tutors and teachers by internet or free phone line. This kind of teaching promotes also self-knowledge and students' self-development by adopting new technology systems. It is also good for education institution that may decrease their expenses with energy, labor force and other expenditures.

## 5. Conclusion

EAD in Brazil has got a long way to go yet, however it is showing a significant growth in the last few years. The year 2005 ended up with surprising data, for the first time in Brazil, this education model was considered one of the priorities for the Education and Culture Ministry (MEC). The reason is the great demand for vacancies, mainly in higher education, and the spreed of information and communications technologies that make it possible and yet give a great increment to education in classrooms.

The Education at Distance modality in Brazil is growing motivated by the demand of many students finishing their secondary school courses, and other people from different age and background, that begun to use the on-line training as a way to update their knowledge. One of this experiences is CEDERJ, in partnership of 6 universities in the state of Rio de Janeiro. Almost 10.000 students are enrolled in its graduation, teacher training and social pre-exam courses.

Many other universities in Brazil are also adopting this kind of teaching and learning model in different perspectives and for different purposes. The results from the experiences in Brazilian educational system it is possible to stated that Education at Distance is a new paradigm of education that can be applied at different sectors. Extension workers, for instance and other people involved in rural training can also be benefited by this kind of experience.

This new paradigm of education is meeting students' expectations because they may study and work at the same, and they do not need to spend money and time to move from home to school every day. This saved time can be allocated for reading, exchanging ideas and information with other students, tutors and teachers by internet or free phone line. Thus, it can also be applied at higher education training in rural areas where the access to schools and universities are not easy and where parents or other family members need their work force in the farm. It is also concluded that this kind of teaching promotes self-knowledge and students' self-development by adopting new technology systems. At the same time, it offers more possibilities to address social expectations and requirements in order to have more access to education, by using this kind technologies, even in rural sector.

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# SEA – an example of public involvement

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*Key words*
SEA, Strategic environmental assessment, public hearing, SEA Information System, National Strategic Plan for Fishery

## Introduction

SEA – Strategic Environmental Assessment is a process of dealing with intentions which could have impact to the environment. Environmental assessment was established in the Czech Republic in 1992 according to the law no. 244/1992 Sb. and since then it was several times changed. At present the law no. 100/2001 is valid.
The goal of SEA is to protect environment and its parts as the air, water, soil, rock environment, ecosystems, climate, landscape, natural courses, fauna and flora, public health and cultural heritage. In comparison with EIA (Environmental Impact Assessment) SEA does not deal with concrete plans or intensions like a realization of a new car factory, but it officiates strategies or conceptions. For example agriculture conception, power industry conception, transport conception and so on and their changes. Under SEA procedure are also conceptions funded from European Communities funds.

The SEA process consists of three bases: 1. Experts, 2. Public, 3. Authorities
1. Experts – only a highly educated person can participate on the SEA. The head of the SEA team must be registered by the Ministry of Environment and must receive authorization from the Ministry. Each part of the assessment has its expert, e. g. potential risks to public health is elaborated by hygienic expert, potential risks to soil by geologist and so on. All these experts are independent and can not participate on any realization of SEA intension to avoid any conflict of interests. It also means that there is a guarantee of independent and highly qualified assessment.
2. Public – since the Czech Republic is covered by internet, which is used by most of the proactive people, everybody can download and study every public document. Ministry of Environment operates a special SEA and EIA information system. There are all documents and all authorised experts, so every one can gain related information to each plan undergoing SEA/EIA assessment. Very important part of the whole SEA process is a public hearing. The public hearing is called by the authority, strategy proponent or by assessing body. According to our experience participants of the hearing are usually members of NGOs, authority officers and agents of private companies. During public hearing and afterwards every one can submit their remarks to the matter in. The authority and the assessor of the conception have to pay attention to these remarks and they have to include them to the final statement of the conception. The public hearing leads to avoid misunderstanding between experts and public which can have different opinion to the conception.
3. Authorities – here it means that the authority officers can receive feedback from the public. Each successfully finished SEA assessment is a source of information which could be used in a future for better understanding and better work results. Approved SEA projects are source of

information for all levels of the authorities, schools and universities, private companies and NGOs. These can use it for better decision-making.

**Issue**

The university background is very suitable for making assessment, exchanging information and people meeting. The university thus plays important part in the environmental assessment. Principal advantages are: independence, neutrality, expertise.
No one is supported by any of the strategy proponents. The university is financed from multiple sources. University employees are not under pressure of their employer, so they do not follow any other extra benefits. University employees are experts participating in scientific researches. This gives them new perspective. It means that the final assessments follow high professional standard. All knowledge is gained from the latest scientific articles and research, to which the university has access. The university has also good reputation in public, so the people trust the professors and university mentors.
University campus is very suitable for meeting people. Because of its independency everyone is equal on the university ground. The university has good presentation background, is apolitical. People can feel better here, they do not have to be worry about theirs opinions.
All knowledge, experience and skills are shared with students. Students can study special subjects like EIA and SEA, Ecological applications in landscape and others. The students are more open-minded. In lessons, conclusions from SEA assessment are discussed with them. It belongs to education and moreover students often become part of the SEA team. The best students participate in the real cases.

**Conclusion**

After political changes in 1989, the people were keen on environmental issues. The new democratic government passed new basic environmental laws. Many NGOs were established. In that time, there were many activities for supporting clean environment like happenings, demonstrations or volunteer work. Partly because of new law, partly because of economic recession and partly because of finance from abroad funds and new technologies, the pollution of environment decreased. During the late 90's the Czech Republic came closer the European standards. The life style has been changing. The people have wanted to approach EU life standard. In accord with new life style promoted by media most of the people lost their enthusiasm for environment, because there were such many new opportunities for leisure time. And everybody felt the environment has improved. Public have been interested in environmental issues only when authorities decided to built a new highway or a nuclear waste dump. In 1997 and 2002 there were serious floods in the Czech Republic. Even after floods, the public discussion was more interested in the damage caused by high water level and how to protect residential areas technically than in the discussion about flood prevention.
At present it is good time to educate Czech public. Above all the young people should be educated, because they have open mind and after some time, they will be in the decision making positions. The SEA process as part of the training courses in the university leads to discussion with students. It evokes questions and produces answers. The students can see the concrete example of environmental science implementation in reality. They can feel the possibility to influence something real, which is going to be realized within next few years. When they leave the university, they are able to speak with other people and they have ability to spread out the principles of sustainability and environmental-friendly behavior. They also have seen that involvement in public issues is not worthless and that everybody can take a part in authorities' decisions.

# Embedding an Ethical Issue in the Curriculum: Lecturers and the Sustainability Agenda

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*Abstract*

Of all the ethical issues confronting rural education, that of sustainable development is surely the most wide-ranging and topical at the beginning of the 21st century. Encompassing issues such as social justice and economic welfare as well as environmental concerns such as climate change and pollution, sustainable development has become the target for higher education initiatives across Europe. Like all ethical issues, it can be viewed from a variety of standpoints, often antagonistic to each other, and academics are often suspicious of what can been seen as attempts to impose a particular moral epistemology on their teaching. This paper reports on a research project based in the University of Plymouth, forming part of the activity of the University's Centre for Sustainable Futures (CSF), a government-funded Centre of Excellence in Teaching and Learning. The first phase of the research, an email survey of academic staff in the University and its Partner Colleges, was designed to provide a broad picture of lecturers' current understandings of, and attitudes towards education for sustainable development (ESD). Crucially, the questionnaire asks lecturers in a variety of different disciplines about their views on appropriate pedagogy for ESD, and gives insights into the potential opportunities for and barriers to the incorporation of ESD into Higher Education. Although the work relates to a large, multi-discipline university, the results have valuable implications for higher education in agriculture, food and rural issues.

*Key words*

Education for sustainable development; ethics; pedagogy, sustainability

## 1. Introduction

Sustainable development (SD) is an ethical issue, or rather a bundle of ethical issues surrounding inter- and intra-generational equity, the rights of nature, fair treatment by the North of the South, and so on. It has become a highly political, politicised issue, partly reflecting moral concerns but also the more expedient necessity to avoid major disruption to dominant but currently unsustainable production and consumption patterns. Its educational outcropping, Education for Sustainable Development (ESD), is becoming increasingly promoted at all levels of the educational system including Higher Education (HE), with major initiatives at UN, EU and national levels (ARIES, 2005; Tilbury, 2004; UNESCO 2005; (HM Government, 2005)). The ethical dimensions of ESD make it both fascinating and problematic. They take teacher and learner away from the mere mechanics of environmental, social and economic issues and into the exploration of values and ways of thinking about those values – anthropocentricity, deep ecology, holism, environmental pragmatism to name but a few. Questions are invited: what is considered valuable, in a moral sense? Is moral value created by humans, or is it something already in existence in the world? What, if anything, is of intrinsic value? Can any one ethical approach be sufficient for all situations?

Fascinating *but* problematic. At the risk of over-generalising, the applied sciences are not as comfortable with philosophical questions as are the social sciences, and feel more confident when dealing with rationality, 'facts' and prescriptions. When it comes to openly *promoting* an ethical stance, we tend to regard it as antithetical to the spirit of a liberal education (although it is already frequently subverted through political and efficiency agendas), and we may be further troubled if we suspect that in expecting us to do so, universities are dancing to a political tune merely to secure funding. If we are concerned to help students learn *how*, rather than *what*, to think in moral terms, we may be daunted by the sheer complexity of the task, especially if constrained by large class sizes and crowded curricula which inhibit debate and active student participation.

## 2. The current study

It was in this context that the research presented here was conceived. The study, initiated by the Centre for Sustainable Futures (http://csf.plymouth.ac.uk) at the University of Plymouth, was undertaken in order to investigate the possibilities and problems with engaging academics in curriculum change regarding ESD. The research involved a two-stage approach: a questionnaire survey of lecturers across the institution, reaching approximately 28% of lecturers in the University plus others in its partner colleges (N=328), followed by a series of in-depth interviews. It is the first stage that is reported here. Caution is needed in interpreting the results, given the probability that those who responded to the survey are likely to have a better understanding of sustainable development than non-respondents.

## 3. Findings

The survey identified a substantial range of potential understandings of sustainable development. Most respondents felt that they had at least a 'fair' level of understanding, although the detailed responses suggest that there was a greater awareness of issues relating to the natural environment than other issues. This is in line with the research on student teachers (in geography and science) by Summers *et al.* (2004) - in which environmental factors (rather than social or economic factors) were the most commonly cited elements of sustainable development - and suggests that this interpretation of sustainable development may be fairly widespread rather than being simply a result of the disciplinary concerns of those student teachers. It also indicates a somewhat narrow view of sustainable development amongst academics (and perhaps a confusion about the distinction between environmental education and education for sustainable development), suggesting the need for wider debate on these issues. As in the literature, the survey revealed substantial controversy around the use and interpretation of different terms, supporting Reid and Petocz's (2006) assertion that the majority of academics currently lack a shared language for discussing sustainable development. However there was no clear disciplinary bias in responses to the questionnaire, providing encouragement for those who wish to implement a cross-institutional agenda for ESD: the belief that the latter is both important and relevant was not limited to the more traditional environment-focused subject areas.

The quantitative results from the questionnaire showed fairly positive attitudes in general towards the concept of sustainable development. Around 80% of the respondents could be described as broadly anthropocentric and mildly technocentric in their attitudes towards environmental issues – 'pale green' in cruder terms. However the verbatim responses suggested that even within this group there was a substantial diversity of opinions,

emphasising the difficulty and dangers of trying to create clear-cut typologies in a contentious arena. Over half of the respondents (55%) agreed or strongly agreed that SD was central to their teaching interests and to the subject generally: though caution is needed in extrapolating this to the whole population, for reasons indicated above. Approximately 35% were neutral for both of these questions, indicating a degree of uncertainty about if and how SD might be relevant to their teaching or their discipline. Surprisingly, there was no clear subject bias in these responses – it might be expected that SD would be viewed as more clearly relevant to some disciplines (e.g. geography, environmental sciences) than others.

Over 50% of the questionnaire respondents were expecting to include elements of sustainable development in their teaching in the coming year. Respondents from the Faculty of Arts, Architecture and Humanities, the University's Partner Colleges and Social Sciences and Business were significantly more likely to include SD in their teaching, and respondents from the Faculty of Health and Social Work, Peninsula Medical School and the Faculty of Technology were significantly less likely to ($p<0.001$). 47% respondents claimed that they were likely to include elements of SD in their teaching next year, but there were also several respondents who felt that SD was simply irrelevant to their discipline. Others felt that it was inappropriate for them to be teaching about issues of a controversial nature:

- *I am wary of imposing my own beliefs on students when they would not see relevance. ID46*
- *There is no reason for any doctrine to be included in our teaching. ID80*

Nonetheless, 54% of respondents stated that teaching about aspects of sustainable development influenced their learning/ teaching methods. This suggests that a significant number of respondents considered there to be a distinct pedagogy for teaching about sustainable development. Of the 62 respondents who expanded on their response to this question, explanations provided can be grouped into four main categories:

**(a) Modelling good practice (6 responses)**

In this explanation, the modelling of good practice by the lecturer is key to teaching students about sustainable development issues:

- *I try to use electronic resources in place of handouts wherever possible because it ensures you 'practice what you preach'. ID39*

The focus on resource use was the most common exemplar, though some respondents provided more general comments such as 'practice what you teach'.

**(b) Controversial subject (12 responses)**

The largest number of explanations provided in response to this question raised the complex or controversial nature of the subject, which they felt led to the need for different teaching methods:

- *Because it is such a contentious issue, particularly in relation to the priority of actions, their relative costs and their effectiveness, that need to be initiated. ID25*
- *Because its complexity requires a diversity of theoretical and practical approaches and the evaluation of evidence from a variety of sources. ID120*

Encouragingly, these respondents were not deterred by the controversial nature of SD issues, but saw them as an opportunity for enhanced learning through debate or discussion:

- *Often there are no, or limited hard facts, people are required to make value judgements about particular courses of action. Students need to be able to debate objectively on this area. ID103*
- *Because it is current and fluid, it is best served by class discussion and debate. Students tend to see black and white rather than shades of grey before discussions take place. ID321*

**(c) Experiential learning (9 responses)**

In this explanation, teaching about sustainable development is linked with the use of an experiential approach. Use of practical real-world examples was viewed as essential to aid students' understanding and involvement in the subject, and role plays/problem-based learning were suggested teaching methods:

- *students are encouraged to confront the issues at first hand (site visits), develop case studies and argue them through role-playing, so the focus on sustainability determines the choice and sequence of methods. ID64*

**(d) Empowerment (5 responses)**

A small number of respondents linked sustainable development with empowering students to take action (participatory/transformative education). These responses link teaching about sustainable development with political literacy – providing students with the skills to empower them to take action in a democratic society.

In contrast to the above responses, there were also those (6 respondents) who felt that a specific pedagogy was not required:

- *I choose the best method for helping students to attain the required learning outcomes at the highest possible level and try to make a powerful but positive impact. ID93*

## 4. Discussion

There was apparently strong support for sustainable development amongst the lecturers who responded to this survey. However, although there was seemingly widespread agreement on the importance of sustainable development, it is not always clear what respondents were actually agreeing on. Wals & Jickling (2002) note that:

> *…sustainability talk can, when used by advocates with radically different ideas about what should be sustained, mask central issues under the false pretence of a shared understanding, set of values and common vision of the future.* (p. 223)

The concern of some respondents about including SD in the curriculum, either because it was seen as irrelevant or because it was seen as too controversial, echoes previous disquiet about the inclusion of environmental education into the school curriculum (see Gayford, 1991), and also reflects ongoing debate in the literature about ESD. For example, Wals and Jickling (2002) note concerns that the prescriptive nature of some conceptions of education for sustainability run counter to the notion of education (particularly in HE) with its focus on autonomy and self-determination:

> *To educate for sustainability is not necessarily educational when sustainability is fixed, pre- and expert-determined (i.e. academics) and to be reproduced by novices (i.e. students).* (Wals & Jickling, 2002, p. 224)

However, concerns about including ESD in the curriculum were raised surprisingly infrequently in the survey, and a significant proportion of respondents appeared to recognise that experiential and active learning approaches have particular value in this field. Whilst this may suggest that these lecturers have sophisticated understandings of ESD as an "on-going learning process … rather than a message or level which must be achieved" (Aries, 2005a, p. 2), it may also reflect the skewed nature of the sample – indicating that the respondents were more committed to the notion of ESD, and more aware of the dangers of prescription, than the average academic. There may be a gap between desire/intention and actual implementation, and further research would be valuable to evaluate the experiences of lecturers engaging with new pedagogies as well as new curriculum content, and their needs for support in so doing.

## 5. Conclusions

The implications of these findings for ESD within the University of Plymouth are generally positive. There is a reasonable level of understanding of the issues and of support for sustainable development generally and for the notion of incorporating SD into the HE curriculum. However, there are also indications of the problems which may emerge as universities grapple with the institutional change needed to embed ESD across all curricula. Apart from respondents who simply considered sustainable development irrelevant to their subject area or too controversial for inclusion, others may have differences of opinion which are masked in a general discussion of sustainable development but emerge more strongly when specific changes are proposed. Above all, universities will have to address the fact that, as an issue with a significant ethical content, *real* learning about SD is incompatible with the low staff-student ratios which are commonplace in European higher education, and that many staff will require considerable assistance in acquiring new knowledge and developing pedagogical skills.

Finally, it is worth reflecting again on the enthusiasm of governments for projecting such a value-laden issue into a higher education system which is often unprepared for it, in the sense that in most university courses students are otherwise little exposed to discussion of ethics and the moral aspects of decision-making. It may be that, rather than struggling with questions of whether we devise new modules on SD, or try to permeate SD throughout the curriculum, we would be wise to conclude that a comprehensive grounding in ethics is an essential curriculum requirement for all first-year students, in which SD features as one of a number of applied ethical issues. In this way we might better empower students to engage with moral issues on a wide front, and to equip them to make their own challenges, on SD and other issues, to the overt and hidden agendas which colour all their studies.

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# POSTERS

# Perceptions regarding methods, strategies and devices used to teach at Moscow State Agroengineering University

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Introduction

During the Soviet era in Russia, a teacher-centered educational system developed a strong basic education in science and math. However, the end of the Soviet block provided the freedom for countries to reform their education and to form new systems to educate Russian citizens. European Higher Education has initiated an educational reform known as the "Bologna Process" which aims to increase the mobility and competitiveness of European higher education graduates in the world market. In order to participate in the process, countries have to modernize curricula, reform educational systems and improve the quality of teaching.

Purpose of Poster

The purpose of the study is to share identified teaching methods and strategies used to teach at Moscow State Agroengineering University (MSAU). In order to provide an overview of the quality of education, agricultural undergraduate students in their third year of study were purposefully selected to participate in the research. Three hundred students were purposely sampled to participate in this study.

Results

Students at MSAU sometimes experience learning groups, videotapes, field trips and the use of Internet (WWW) as methods and strategies of instruction. Teachers often apply case studies, transparencies, models, simulation, problems and computer programs in their teaching. Students tended to agree that teachers most frequently use lectures, test and examinations, chalk board/white board, laboratory work, independent study, examples, group report, student papers and presentations, reading books and drill and practice.

Conclusions

Educators in former Soviet states should be encouraged to rapidly accelerate their use of modern technologies to enhance their students' ability to compete in the world market. The University should increase the variety of methods in order to stimulate students learning. At the same time, if the university aims to prepare students for a competitive workforce the use of the Internet (WWW) should be strongly adopted as a teaching tool. Case studies, panel discussions, and collaborative learning methods are among the options to build important skills on graduates. These methods will allow students to reflect from different perspectives and to strengthen their problem-solving skills.

Educational Importance

In a country that is aiming to be part of European Higher Education, it is important to acknowledge the quality of teaching before improving it. This assessment provides a benchmark on methods being used and it will help the university to identify points of improvement. MSAU has multiple challenges to overcome regarding the quality of teaching and one of them is the use of technology in the classrooms. As universities seek funds to up-

date equipment and for human resources, studies like this document the need to develop student-centered education which is at the heart of the Bologna Declaration.

# Determination of Tourist Attractiveness and Intensity of Recreational Use of Prague Suburban Forests

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The questions of definition, use and management of suburban forests during recent years have been and are an important part of forestry research. The intention to spend free time in the forests surrounding Prague can be considered from two basic aspects, namely the accessibility and attractiveness of the target.

Contrary to the situation abroad, here in Czechia, a specific phenomenon of weekend recreation in small weekend chalets is encountered in the vicinity of Prague. This phenomenom has been in vogue for more than a hundred years, and significantly directs the visits into the nearby large forest complexes. There has also been an increase in the number of other facilities geared to provide services and attractive accommocation in traditional chalets for short term vistors - (half-day and one day).

Therefore, an analysis of chalets located on forest land was a part of the project objective. The intensiveness of recreational use was analysed, as regards the coincidence of touristic attractiveness and the number of Prague inhabitants living within accessable distance from the forests.

# Research in Photovoltaics at the CUA in Prague

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Solar energy is not yet a concurrent of the high capacity power stations, but it is effectively used as an additional energy source, and is produced and used more and more nowadays. The development and the rapid increase of the world solar photovoltaic panels production is the real trend. PV conversion of the solar energy should be the most important energy source after the year 2040.

We would like to increase the amount of energy produced from PV panels. The usage of the tracking stand TRAXLE TM was appropriate for our requirement. Passive solar tracker TRAXLE TM was developed in co-operation of the CUA in Prague and fa. Poulek Solar, Ltd. This small solar PV system was constructed and installed at the Czech University of Agriculture in Prague. Both versions (on-grid, off-grid) were tested there. Two identical PV panels were compared. One panel was fixed and the second panel was located on the tracking stand TRAXLE TM. In the case of the on-grid version the direct current from the PV panels was changed to the alternating current in DC/AC inverters. The inverters were connected directly to the grid. The data output to the computer allowed us to read and save data not only about instantaneous power from the PV panels, but also about the amount of energy produced and about the instantaneous direct voltage of the panels and alternating voltage in the grid. The DC/AC inverters synchronise the alternating voltage with the grid, and automatically disconnect this connection for safety reasons, in the case of power failure in the grid. In the case of the off-grid version, the PV panels were used in off-grid configuration for charging of the storage batteries. The solar tracking system yielded an energy surplus up to 30% during a sunny spring day- 2nd May 2005- under the local conditions of Prague (50° of north latitude). It yielded even a maximum energy surplus up to 39% during a sunny summer day - 19th September 2005.

Results of our experiments with the small PV solar system correspond with our theoretical calculation. The energy surplus corresponds with the lower price of the solar energy. Economic calculation shows that the solar system with a tracking stand is cheaper, when we compare two systems which produce the same amount of the energy - one system with a tracking stand and one system with a fixed stand. The tracking stand is more expensive than fixed, but we can save some PV panels, and the price of the PV panels is the most significant part of the price of the whole solar PV system. The work was supported by research project MSM 6046070905.

# Improving Relations between Higher Education and related Business Sector

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This contribution describes a real experience with a project, and shows the advantages and difficulties of this cooperation. Close relations between the business sector and the higher education sector seems to be more important then ever before. These relations in many specific situations are traditional in the wood processing area. The traditional intermediary between applied research and the business sector was the Research and Development Institute of Wood Technology. With the transformation of the economy in the Czech Republic from a socialistic system to a market economy, many Research Institutes were also transformed. Transformation of Research Institutes mainly included a reduction of their research activities. Small and middle businesses in the wood processing sector are undercapitalized in the Czech Republic. This fact is limiting their future investments. Together with this problem, small and middle business are also faced with worse access to information about technological innovations, mainly due to their limited time availability.

All these factors seemed to be supporting wider cooperation of small and middle businesses with the academic sector. From research carried out at the Department of Wood Technology and Science, it is obvious that the major part of companies would like to cooperate with universities. What can these companies achieve and what are their expectations? The Department of Wood Science and Technology (DWTS) at the Faculty of Forestry and Environment has been establishing a Wood Technology Consulting and Educative Centre.

The formation of the Wood Technology Consulting and Educative Centre was adherent to and contingent on the long time research activities of the DWTS. The research activities of the DWTS are focused on increasing the efficiency of small and middle sawmill business and interrelated wood-processing business. These entire research theses are confronted with ideas of sustainable forestry industry development and innovative technologies. The Wood Technology Consulting and Educative Centre is intensifying cooperation betweeen the DWTS and the business sector in the area of technological innovation.

# Natural Medicinal and Aromatic Plants and Rural Environment

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Consumption of medicinal and aromatic plants (MAPs) has increased significantly in the past 20 years. In fact, medicinal and aromatic plants are either cultivated or collected from the natural flora. Therefore, conservation of plant biodiversity and also sustainable production of plant materials are very important issues. The natural flora of Antalya is very rich and diverse, with almost 2.000 plant species - therefore that diversity attracts local people, herb traders, essential oil producers and exporters. Local people traditionaly utilise natural plants as culinary herbs, herbal tea, medicinal drugs and natural dye plants etc. Generally, they have low incomes and are not well educated people. Thus, herb traders find workers among the local villagers for plant collection. Local villagers know where to find herbs to be collected and how to collect them.

Although, such activities increase local people's income, there are some significant problems in terms of biodiversity and quality of plant materials. Traders and even local people never consider biodiversity, endemic species and endangered species during plant collection. In addition, they collect very heterogenous stages etc.) plant materials (mixed species and populations, plants at various stages of growth) which reduce drug quality significantly.

There are several actions to be taken to solve these problems:

1 Education of local people and traders to teach them importance of biodiversity and good harvesting techniques

2 Domestication of commercially collected wild plants.

As a result, plant biodiversity will be conserved and sustainable production of quality plant materials will be achieved.

# Organic Agricultural Production in Turkey

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The main goal of this paper is to examine the current status of organic agricultural production in Turkey and to underline implications for coming years. Organic agricultural production and consumption is increasing in many countries, and exporting of organic products is gaining great importance in many developed countries. The development of organic agricultural production in Turkey is expanding gradually, but that is not the case for domestic consumption. About 85 percent of the organic agricultural production is exported. However, in recent years there is also a relatively high demand for organic agricultural consumption in Turkey. It is more likely that developments in organic production and consumption in Turkey will create an interest in organic products among Turkish farmers and policy makers. It is suggested that farmers should be informed of the economic potential of organic agricultural production by the agricultural extension people. Furthermore courses about organic agricultural products and marketing should be taught in the agricultural faculties.

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