



D430 Bsc Hons in Organic Agriculture

***Addressing Complexity: Challenges for Higher
Education in Organic Agriculture***

A case study of the University of the Azores

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Declaration of Originality

“I certify that the work on which this study is based is my own independent work, except where I have received help as stated in the acknowledgements and text. All quotations and summaries of works of others have been acknowledged.

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“A case study is an empirical enquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between the phenomenon and the context are not clearly evident; and in which multiple sources of evidence are used”

Yin (1989)

Summary

This investigation gave rise to and subsequently analysed the transformation process within a higher education institution (University of the Azores – UA), arisen from the commencing delivery of an organic agriculture scheme. Proposals were made to the UA to include such a scheme in their Agriculture Sciences Department through co-operation with the network of European universities already engaged delivering the subject at various academic levels. Once this co-operation was established and the course had been designed, a series of interviews were carried out with different stakeholders in an attempt to understand the issues affecting the implementation of the new scheme, with view to identify the actions required in order to achieve desirable outcomes.

The results obtained from the interview analysis showed that such a process of change offers considerable challenges. Whilst there were several motivations for change, the driving force behind the need to change was clearly student recruitment. The main challenges identified were tied in with: changing teaching methods and contents to target the needs of the future professionals in the sector; facilitating change in perceptions and attitudes; and the need for professional experience to be gained by the teaching staff in the subject of organic agriculture. Findings suggest that students are open to more participatory approaches, action research and experiential learning as means to improving their problem-solving ability in real-life situations.

The findings were consistent with the literature, suggesting that there is recognition of the limitations of the traditional learning environment (with emphasis on the failure to address complexity in areas such as organic agriculture), and a will to change. Systems education seems to provide an adequate framework for that to happen, as proven by the examples of success in Northern-European universities.

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Chapter I: Introduction

Organic farming has seen considerable growth in European and worldwide markets over the past decade (Lampkin, Measure and Padel, 2002; Hamm, Gronefeld and Halpin, 2002). In order to sustain this growth there is a need for trained professionals to fulfil positions requiring the skills and knowledge that this new and complex challenge brings to today's agriculture.

There is a distinct gap in the provision of higher education courses in this area. Many European countries have made use of EC reg 2078/92 funds for training and do provide a variety of technical courses, mainly aimed at converting farmers. However, there remains a need for educating at higher level those who will be managers or researchers in the organic sector, without whose expertise and specialised knowledge its growth and development could be severely hampered.

In light of many authors' perceptions, the complex nature of subjects such as organic agriculture are not adequately addressed through traditional methods of teaching, which need to be complemented and re-designed. There is a call for change in order to provide students with a learning environment that adequately equips them to deal with the problems they will find in real-life situations.

After setting out the main issues surrounding the perception of this need for change, the investigation reviews the current European provision of higher education in organic farming. After this comes the case-study: the first aim was the creation of a new higher education course in organic farming in the University of the Azores (UA),

Portugal, via its integration in the existing network of European universities with schemes in this subject, thus expanding it and increasing provision in Europe.

The second aim was to follow the process of change in the university and the issues involved in “getting from here to there”.

The investigation draws on the experience of those who have established such courses and have experience of new methods of education management, as well as on the perceptions of some of the key stakeholders in the process at the UA, analysing these in order to clearly identify actions required to best meet the targets of this essentially human-centred activity.

Based on systems thinking and soft systems methodology, this work is intended to be an application of action research and experiential learning. In this light, the methodology used is at least as significant as the contents of the investigation itself.

Objectives

1. To review current thinking on the subject of higher education in organic agriculture
2. To describe the extent and nature of the current higher education provision in organic agriculture in Europe
3. To stimulate the creation of a new scheme in organic agriculture and to utilise this as a case study
4. To evaluate the process of change associated with implementing such a scheme and identify the challenges faced in that process

Chapter II: Higher Education and Organic Agriculture

2.1 – Times of Change

Many authors believe that there is a need to re-evaluate teaching methods and contents in the area of the natural sciences in general (and organic agriculture in particular), as a means to address the perceived lack of professional competency in dealing with the broader and complex issues of human-centred systems. It is pointed out that education has instead traditionally remained focused on the specific scientific disciplines concerned with the individual system components (Bawden, 1991; Cannon, Dietz and Dietz, 1996; EC, 1995; Francis, Lieblein, Helenius, Salomonsson, Olsen and Porter, 2001; Haarlem and Colpaert, 1993; Jacobson and McDuff, 1998; Lieblein, Salomonsson, Francis and Sriskandarajah, 1999; Lieblein, Francis and King, 2000; Noss, 1997; Meffe, 1998 and Woodhill and Roling, 1998).

Similar ideas were expressed by the European Commission (1995) in their report on the challenges and European strategies for higher education. They describe agriculture and food sciences as multi-disciplinary areas, recognising this as a key strength tied in with broad expertise of those involved and suggesting that they should take a leading role in the introduction of new courses (possible examples of “new” subjects were those concerned with natural resources, the environment and alternative farming systems). They highlighted the need for change in teaching methods and contents, stating that “whilst students ... should have a basic scientific grounding...there is a definite need to broaden the curriculum as a tool to increase diversification”.

They suggest that such changes should be regarded as an advantage in the context of the dynamic changes in industry, commerce and education itself rather than a threat to the dilution of existing disciplines. They emphasize that such diversification is welcomed and supported by students.

It was also recommended by the European Commission (1995) that developments in courses should consider European elements, both by facilitating mobility of staff and students and by the inclusion of issues such as socio-economic and policy considerations within a European context. This is interpreted as a drive to open up the education process, both within institutions and between them on a broader scope.

Multidimensionality and internationalisation in teaching were also recognised by practitioners as valuable complements to classic education (Lieblein et al, 1999), facilitating wider learning in students through contributing to a direct awareness of realities different to what they may be familiar with.

2.2 - Dealing with complexity

As suggested by the European Commission (1995), professionals involved in agriculture have a broad range of expertise and are in a good position to favour the inclusion of social sciences and link food production to wider issues, in an attempt to address increasingly complex issues in today's society.

Organic agriculture is regarded as a "holistic" concept, where the recognition of complexity forms the basis for the inquiry process that leads to improvements in the (integral) system. It therefore lends itself naturally to the development of new learning environments, where less emphasis is put on the individual components of a farming system and attention is given to the wider picture. Such environments should attempt to study the complex interactions and understand the multiple relationships which

give rise to problem situations, to form the basis for finding adequate solutions that meet the needs of all those involved. It would seem then, that it has an advantage in taking up the challenges of addressing complexity in the classroom due to its very nature and the thinking behind current theory on agro-ecology.

As summarised by Lieblein *et al* (1999): **“For ecological agriculture education, holistic learning is essential because the conventional approaches by disciplines fail to adequately address the multiplicity of interactions among components and the emergent properties of agricultural systems”**.

In this context, Francis *et al* (2001) describe the differences in developing learning environments for ecological agriculture as differing from conventional teaching in three fundamental ways:

1. Increased emphasis on food and production systems, expanding and complementing the traditional focus on their specific components
2. Introduction of research methods and learning objectives from social sciences, increasing the potential for students to grasp the complexities of food systems as human-centred activities
3. Inclusion of action research and education as a means to drive the learning activities into the real human and agroecosystems environment, where students can experience the complexity they will face when working.

These three fundamental cornerstones of change are viewed as an enhancement of the learning process, skills and abilities of students, thus better preparing them for the rapidly changing face of agriculture, society and the world today.

Such teaching approaches are rooted in systemic philosophy. This is what will be looked at next, since authors and educators alike view it as an adequate framework,

from which changes in learning environments can develop and be more likely to succeed.

2.3 - Systems Thinking and Agriculture

There are two different schools of thought within the broad “systems” movement. One approach seeks to design agricultural systems that are at once productive, stable and sustainable through techniques such as systems analysis and engineering, computer technologies and ecosystem biology (to this line of thought and practice the name “hard” systems is commonly given by systems agriculture practitioners, and it is the approach that most influences current practise in teaching methods and contents).

In the “soft” systems approach the systemic reality is transferred from the situation itself to the way of investigating it, putting the onus on the analysis of emerging patterns from the different interactions, of which human perceptions are generally the most important. More often than not this approach would lead to a different outcome than the previous approach is likely to yield.

The central thesis of systems agriculture is that the complex, dynamic and even chaotic nature of contemporary agriculture deserves a change in the way we perceive things as a prelude to the way in which we do them (Bawden, 1991).

Theorists view complexity as self-organising: independent parts that behave apparently randomly result spontaneously in complex organisation without external intervention. Interactive and dynamic “wholes” display results greater than the sum of the individual parts – they exhibit emergent properties (Ison et al, 1996).

Important to mention is the concept of the “farm-organism” (with its original roots in bio-dynamic philosophy) incorporating humans as the decision-makers, or the “head” of the organism, an un-dissociated and integral part of it. The farm as an organism will have a diversity of enterprises (the “organs” that it is made up of), which will interact with each other in a variety of ways (resource transfer and feedback mechanisms) and which will be self-regulating (health and immune system build-up being the most important illustration of this self-regulation).

The art of the farm manager in responding to change lies in balancing the level of control within the organism to promote creative conflict, communication, interaction and learning in decision-making and in finding the answers to management problems. If we want students to be able to either fulfil or in some capacity support this role, such challenges must be reflected in their education process.

In this way traditional roles (both in the farm and the classroom) become faded and, in the words of Richard Bawden (1991), **“all those involved behave as active inquirers with each assisting the others as part of an integrated system of inquiry which transcends the classical activities of research, education, extension and business management”**.

The conceptualization of systems education was best illustrated by Bateson (1972) with his “triple loop learning” theory:

- single loop, characterised by simple learning of skills and procedures (which has been often paralleled to training)
- double loop, which facilitates learning for increased effectiveness (thus assessing the learning paradigm)

- triple loop, opening the enquiry to the underlying “whys” of the system
(learning about the context of learning)

In order for the triple loop to be realised a range of methods in teaching, learning and researching should be adopted. These may include formal or informal surveys, modelling, simulation and case studies, the latter being singled out as a unique way of assessing context and an active learning environment that is consistent with one example in the real world (Lieblein et al, 1999).

2.4 - Soft Systems Methodology (SSM)

SSM's are a current of thought and practise that proposes to deal with complex problem situations which are “fuzzy/ unclear”, badly structured and/or defined and that are associated to people (with different views and interests) who may have conflicting perceptions and opinions about solutions to the problem, thus not necessarily agreeing to objectives.

Daellenbach (1994) describes some of the characteristics of soft systems methodologies as:

- Structuring problem situations instead of focusing on problem solving
- Shifting the emphasis to questioning the nature of problems more than the means to solve them (So, more “what’s” than “how’s”).
- Requesting the solution to the problem from the stakeholders themselves rather than “the problem solver”.
- Shifting the role of “the problem solver” to one of facilitating dialogue and being resourceful in helping common perceptions, whilst relying on the technical (or otherwise) expertise of the different stakeholders.

Or as Bawden (1995) succinctly puts it:

“Soft systemics are appropriate for exploring human activities and hard systems methodologies are needed to explore strategies for change at a technical level.”

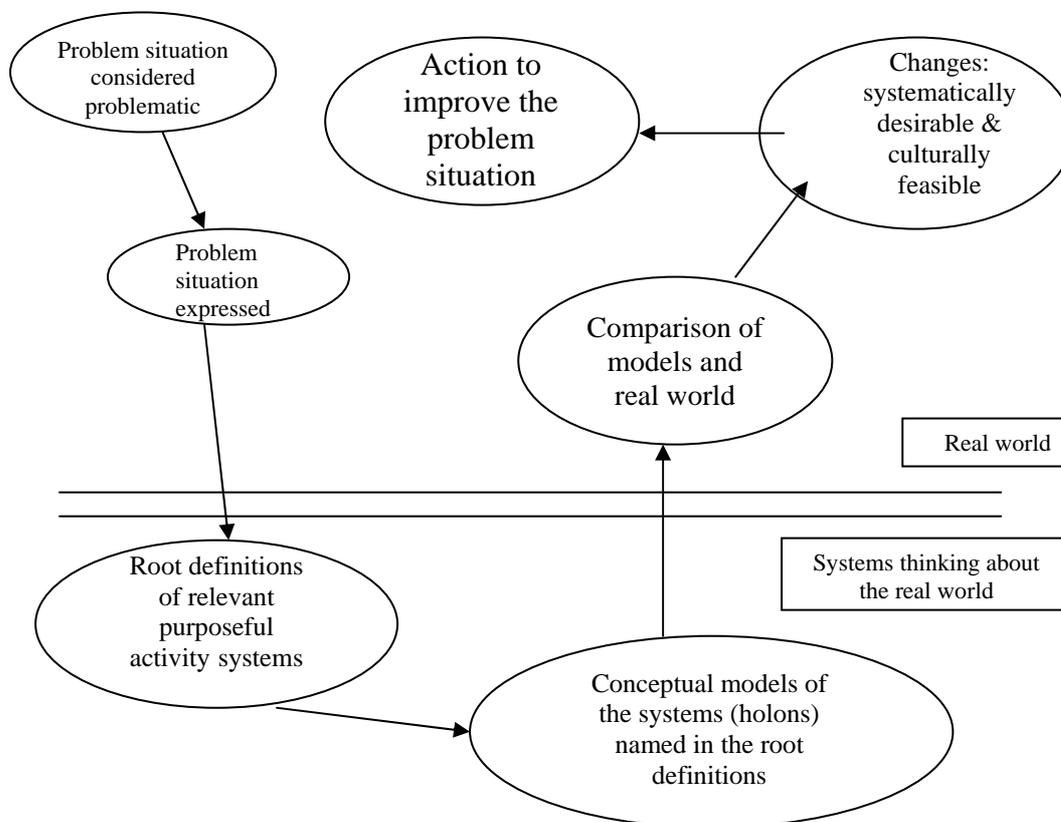
There are currently several types of SSM in practise, but by far the most used and better researched is Peter Checkland’s (Daellenbach, 1994).

Checkland’s SSM

Despite the fact that Checkland does not use agricultural examples in his writings his approach is well suited to them and has been used by most farm systems researchers.

His original model to describe the process of SSM (published in 1975) was presented in seven stages and is shown in figure 1 below.

Figure 1: Checkland’s original SSM seven stage model



He later (1999) developed a more complex and flexible model that he felt best describes the process, since it was felt that this earlier one was simplistic and prone to be taken too literally (i.e. seven precise stages followed in a compulsory sequential order, which could in practise undermine the whole process of enquiry).

Both models reflect the same process, just more or less enriched and thorough. It can be summarised in this way:

History of a particular system provides a background scenario in which a problem situation arises, this situation will have as primary stakeholders those who may improve it, the users of SSM. These people will in turn involve all other stakeholders and promote a collaborative approach to improvement, which is done through two streams of structured enquiry: one is a “logic stream of enquiry” by which models from the relevant systems are compared to real perceptions with view to change; the other is the “cultural stream” where the analysis is made of the intervention itself, of the situation as a social system and as a political one.

Changes implemented by SSM will modify the original problem situation, and in the new situation more issues will arise that will start the cycle again as the methodology stimulates further learning processes. As Checkland himself (1990) puts it: “...*It is in principle never ending and ending a systems study is an arbitrary act*”.

So, in review, there is an input-output process of transformation that needs to occur. This process itself is too bald to be modelled, and so root definitions are written, illustrating the core transformation. Well-formulated root definitions should be prepared through the conscious consideration of the main elements of the process,

which Checkland has identified and grouped in a useful mnemonic illustrated in table 1 below.

Table 1: Checkland’s CATWOE mnemonic, gathering all the elements to be considered in the formulation of root definitions

C	“customers”	Victims or beneficiaries of T
A	“actors”	Those who would do T
T	“transformation process”	The conversion of input to output
W	“weltanschauung”	The worldview which makes T meaningful in context
O	“owner”	Those who could stop T
E	“environmental constraints”	Elements outside the system which it takes as given

Checkland (1990) sees the root definitions and CATWOE as the source of purposeful “human activity systems”: a modelling process that constructs and structures the necessary actions to deliver the transformation process by shedding light on the different elements influencing it.

Finally, judging the process as successful or unsuccessful follows three criteria, which Checkland chose to be the three E’s:

- Efficacy (= is the means chosen successful at producing the desired output)
- Efficiency (= is it using a minimum of resources)
- Effectiveness (= is T achieving the longer-term aim)

It is up to the model builder to decide on the criteria of the three E’s that would suit the system under analysis.

Rich Pictures

One of Checkland's favourite techniques is the "rich picture". He prefers pictures and diagrams to prose, as he feels they describe best the dynamics of human relationships. There are no formal techniques and they do not follow a specific format, but the result is almost always helpful, as it should represent all the interests to take account of.

Rich pictures can be done for root definitions but their main technical purpose tends to be the representation of the problem situation itself.

2.5 - The Human dimensions

Woodhill and Roling (1998) point out how the human dimension is often forgotten in the discussion of "environmental" problems. This focus on the ecological consequences rather than their sociological causes means that the reasons for its occurrence remain untouched and the problem is thus perpetuated. They suggest that any type of environmental management needs "fresh modes of perception" which integrate the biophysical and human dimensions, the "two wings" of their metaphoric eagle – agriculture is undoubtedly one such type.

This very point, so illustratively made by Woodhill and Roling, is central to the fundamental change that is required of learning systems. Even for those who are not familiar with systems thinking or SSM, the lack of inclusion of human dimensions in analysing complex ecological systems is consistently identified as a major impairment to professionals. Brief research into this issue in the discipline of conservation biology (chosen as an adequate "relative" of organic agriculture) showed that educators and professionals in the field are deeply frustrated with the lack of inclusion of human dimensions in the conservation curriculum and the refusal to let go of the prevalence

of heavily scientific subjects (Baxter, Hockings, Carter and Beeton, 1999; Cannon et al., 1996; Jacobson and Mcduff, 1998, Noss, 1997 and Meffe, 1998).

As Noss poignantly puts it: **“With few exceptions, universities fail to train graduate students for problem-solving outside academia, largely because the professors themselves have no experience elsewhere”**.

It is impossible to forego here the opportunity for a quick preview of the case study later presented: the words of Noss were almost *Ipsis Verbis* those of the students interviewed, and were echoed by some of the lecturers.

2.6 - Looking ahead

It has now been established that education in the area of organic agriculture (and other systems of natural resource management) is in a prime position to instigate changes that may improve the teaching and learning environments, and, more importantly, equip future professionals with the necessary tools for increased effectiveness in their work. As such, experiential learning and holistic thinking are recognised as important competencies for new professionals in agriculture and that these can be fostered by systems thinking, as a discipline used to create a “learning culture” by educators and students alike (Vedeld, 2002).

Rasmussen and Kaltoft (2003) researched the topic of the level of motivation from students and teachers to radical changes in education, according to the Alternative-Conventional Paradigm Scale (ACAP-scale) which was found to be suitable for quantitative assessment of attitudes to agriculture in a broad context. They found a large variation between values and attitudes of both students and teachers and identified patterns such as “females and older students hold more alternative views

than males and younger students”, concluding that there is a call for new teaching methods which integrate values and attitudes.

While later in this investigation we will have the opportunity to experience in detail a case study of how these concepts are perceived and how people may adopt them, it is now worth drawing upon the experience of those who have undergone change processes in a quest to achieve more purposeful learning environments.

Lieblein et al (1999) published a paper reviewing experiential learning for systems research in ecological agriculture (EA), drawing on their experiences of a PhD course in Norway where the goals included: exploring methods of enquiry in systems research, use of case-studies as key elements and, by means of both, influence student decisions on the choice of methods for dissertation research. They did so by introducing a variety of innovative learning methods and evaluated the experience by means of surveys, questionnaires and the evaluation of the students’ research projects.

Their conclusions were that:

- New methods can be effectively introduced in a course when associated to real-world farm situations and they may be useful to students’ own research
- High levels of interest and positive feed-back by students when using a farm-level case study are not sufficient to assure adoption
- An intensive course in EA research methods broadens the perspective of students toward their research

Later, Lieblein et al (2000) published “The conceptual framework for structuring future agricultural colleges and universities” modelled on the experiences of the courses held by NOVA in Agroecology, both in terms of the integrated contents and

the participatory methods of learning. Below are the diagrammatic representations of the “old” and the “new” educational institution.

Figure 2: Schematic diagram of current university structure with conventional departments, one-way flow of information, and disconnect among natural resource, farming, and urban environments (from Lieblein, Francis and King, 2000).

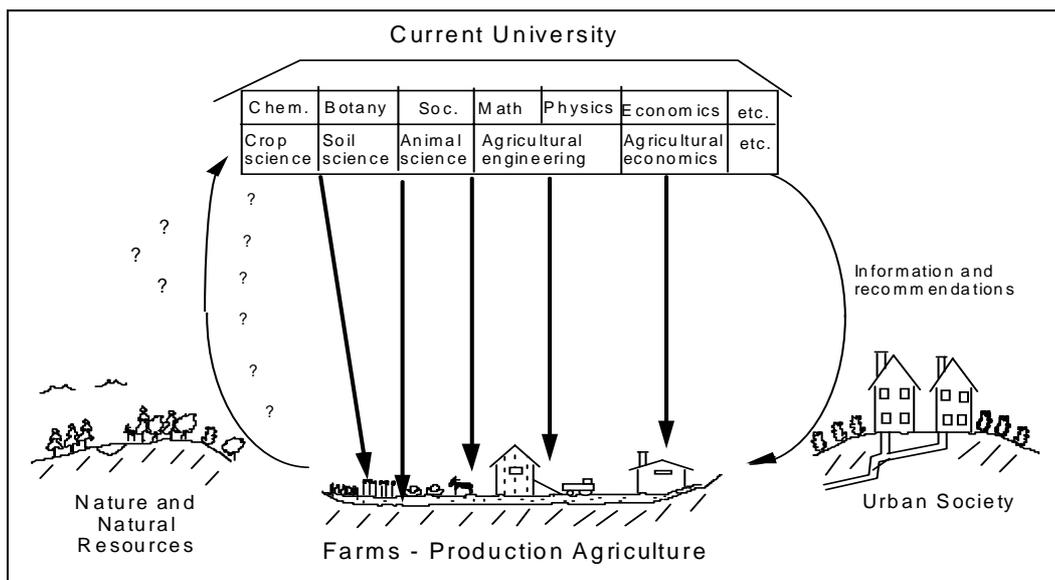
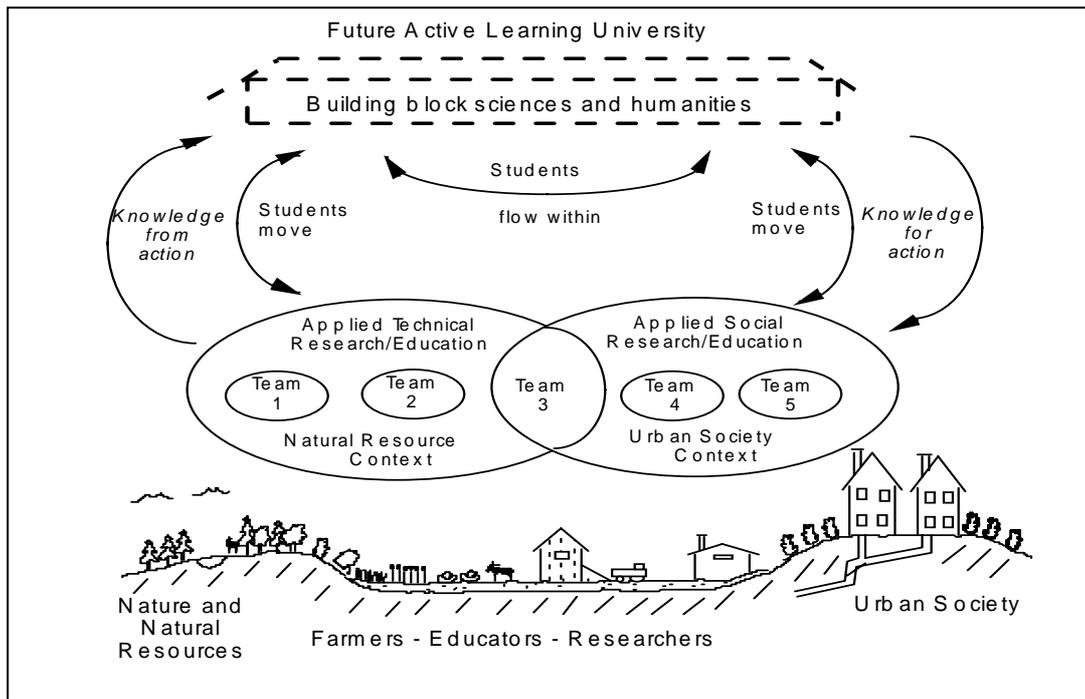


Figure 3 : Idealistic structure of future universities designed for active learning and research, with movement of students, faculty, and information, and a close integration of natural resource, agroecosystem, and urban environments (from Lieblein et al, 2000).



Chapter III: Current Provision in Europe

This chapter aims to provide an overview of the existing provision of higher education (HE) courses in organic agriculture in Europe.

It does not claim to be comprehensive, and indeed focuses on a group of universities that have formed a network of HE providers in this subject area. There are many other universities in Europe carrying out research and providing modules and/or specialisations on organic/sustainable/ecological agriculture, and an even bigger number of colleges and professional schools/polytechnics doing the same.

The choice of focus on the network came as a natural process in the research, as it seemed to be where efforts are concentrated both in terms of teaching and of research carried out in the organic sector.

3.1- European Network of Higher Education in Organic Agriculture

History

The network was first formed in 1995 as a Socrates-funded curriculum development initiative, with view to facilitate information exchange, increase student mobility and streamline HE in organic/ecological agriculture as a response to its rapid expansion in most European countries and an increase in public perception of the human and environmental risks of intensive agriculture production methods.

The main purpose and outcome of this network was the development of a common European programme of study at university level, which provided students with an integrated learning package. It set out to broaden the scope of agriculture education, with different institutions providing specialised knowledge on different areas of organic agriculture, thus optimising available resources and giving students the best

quality and expertise available as well as experience of different countries' agriculture and teaching reality.

Since the curriculum development work was completed in 1997/8, the network of universities had continued to collaborate on an informal basis, with a particular emphasis on exchange of students under the Socrates programme.

The Universities

There are currently fourteen universities in the network, representing thirteen different European countries, as illustrated in table 2 below.

Table 2: European universities in the network of organic agriculture providers

	<p>University of Wales- Aberystwyth, United Kingdom (GB) www.irs.aber.ac.uk</p>
	<p>The Royal Veterinary and Agriculture University, Copenhagen, Denmark (DK) http://kursus.kvl.dk/ea</p>
	<p>University of Kassel - Witzenhausen, Germany (DE) www.wiz.uni-kassel.de</p>
	<p>ISARA, Lyon, France (FR) www.isara.fr</p>
	<p>University of the Azores, Portugal (PT) www.angra.uac.pt</p>
	<p>Agricultural University of Norway (NO) www.nlh.no</p>
	<p>Wageningen Agricultural University, the Netherlands (NL) www.dpw.wau.nl/biob</p>

	University of Helsinki, Finland (FI) www.mtkk.helsinki.fi
	University of Tuscia, Viterbo, Italy (IT) www.unitus.it
	University of Torino, Italy (IT) www.agraria.unito.it
	University of Maribor, Slovenia (SL)
SLU	Swedish Agriculture University, Sweden (SE) www.cul.slu.se
	Agricultural University of Warsaw, Poland (PL) www.sggw.waw.pl
	Budapest Agricultural University, Hungary (HU) www.anubis@omega.kee.hu

3.2- Available courses

The common curriculum

The BSc- level curriculum developed in a way that enabled close contact between universities and the incorporation of two specialisation semesters on Ecological Agriculture into different schemes on all universities. These semesters are delivered through English medium by the UWA and the Royal Veterinary and Agricultural University, Copenhagen (KVL), and are entitled Ecological Agriculture I and II. They are also available at other universities through German or Italian medium.

KVL deliver the spring semester, with an emphasis on crop production, soils and engineering whilst the UWA deliver the autumn semester specialising in livestock and grassland-based production systems, business and economics and the environment.

These two are complemented by a two-week intensive summer course on the human/social aspects of organic agriculture, delivered on an annual rotating basis, with different universities hosting it every summer. Together, these three courses form the specialisation for ecological agriculture, with the base year and the final year generally being provided by the home universities (depending on their individual requirements).

These are also available to students at MSc level, as it is a specialist subject area, but the project stimulated the development of an MSc in Agroecology, supported by Nordic universities, with progression links between the two levels.

The basic outline of the study framework is as follows (please note that the exact year of study and full length of the degrees are dependant on the model adopted by the home institutions):

BSc Level (applied, management focus)	MSc Level (research/science focus)
Year 1-2 : Foundation in general agriculture – Home university	Year 4: Understanding and investigating ecological systems (NO)
Year 2-3 : Specialisation in organic agriculture Spring-Summer semester - DK, DE or IT Intensive Summer course – Rotating Autumn-Winter semester – GB, DE or IT	Year 4-5: Specialisation modules – Free choice of discipline areas and potential for mobility between universities.
Year 3-4 : Advanced courses and final project/thesis – Home university	Final Year: research project, again potential for mobility.

(The country initials are as indicated in table 2 above.)

The individual courses

Not all the universities follow the common curriculum format, and there is great diversity in the amount and nature of courses offered. Most of them incorporate links within the study schemes to partner universities in Europe, and some have established and/or are establishing links to universities in other parts of the world, such as Canada, Australia, New Zealand, and Asian countries, through a variety of initiatives. Table 3 below shows the courses that are available in some of the universities, illustrating the variety of levels and specialisation areas that are already available.

Many of the remaining universities either have not replied to questionnaires or only offer modules that do not lead to qualifications entitled organic or ecological, similar to the University of Maribor in Slovenia, where there is an option for specialisation or final thesis subject but not a complete course of study

Table 3: Examples of different courses available in Europe

UWA, United Kingdom	<ul style="list-style-type: none"> • BSc Organic Agriculture • Post-graduate certificate/diploma in organic agriculture
KVL, Denmark	<ul style="list-style-type: none"> • BSc/Msc Ecological Agriculture semester (24 ECTS) • MSc Agroecology (with NLH) • PhD module: Linking ecology and organic farming (6ECTS)
NLH, Norway	<ul style="list-style-type: none"> • BSc Ecological Agriculture • MSc Agroecology and Farming systems / Food systems (choice) • MSc Agroecosystems
WAU, the Netherlands	<ul style="list-style-type: none"> • BSc Organic Agriculture • MSc Organic Agriculture • MSc Ecological Agriculture
UA, Portugal	<ul style="list-style-type: none"> • BSc Ecological Agriculture
UNITUS, Viterbo, Italy	<ul style="list-style-type: none"> • BSc Ecological Agriculture • MSc Agroecology
University of Maribor, Slovenia	<ul style="list-style-type: none"> • MSc Agronomy, specialising option on organic agriculture

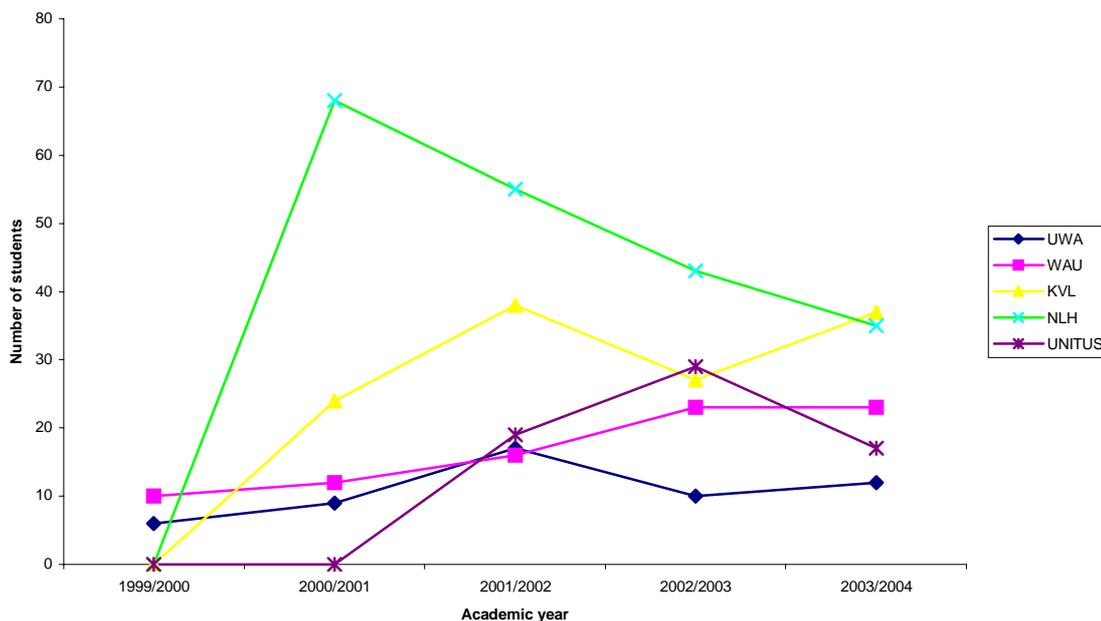
3.3- Recent Trends

Although student numbers are falling generally and in agriculture in particular, most of the courses provided seem to attract sufficient numbers, with some being on the increase, as can be seen in the chart in figure 4. Courses tend to run with relatively small numbers by comparison to other mainstream courses, often designed in a way that students can take the necessary modules from other courses, making use of existing resources. It tends to be in the final year that resources are mobilised specifically for the organic/ecological courses, at which point numbers are justified by the influx of guest students. Alternatively, some universities are exclusively providers of “building blocks” in the degree, and these tend to be made up almost exclusively of guest students, as is the case with KVL’s Ecological Agriculture I.

All the universities in the network were contacted for a breakdown of the numbers of students attending organic courses in the last five years, or for as long as they have been running.

Figure 4 below shows the total number of students undertaking organic courses in each university over the last five years and it points towards general stability in student numbers. It includes information from universities who replied to the questionnaires sent out, and the criteria for choice of institutions was that they had fully organic schemes and for a comparable amount of time.

Figure 4: Total number of students registered in organic courses at some European universities



NLH, although attracting the highest number of students seems to have declined steadily from the start. However, it is only UNITUS that seems to also have declined considerably in this academic year, with KVL, UWA and WAU showing either stability or increase in numbers from the last academic year to the present one. The schemes are all very young and it is difficult to analyse or predict trends, because there simply is not enough information. But bearing in mind that these are in fact very new schemes and that they are probably still not that well publicised or widely respected for their track-records, the chart in figure 4 shows that the schemes are able to run in the way they were designed to and that there seems to be a yearly intake of new students, with numbers rising often and the viability of the courses not yet being challenged. The chart also suggests that those courses that are most flexible are also the most in demand, like KVL where the semester is in English and can be awarded at both BSc and MSc level, without institutional constraints on the numbers of students coming in from abroad (This varies from country to country and institution to

institution, as a balance is aimed for between the inflowing and outgoing numbers of students on exchange programmes).

Numbers are still considerably lower than in conventional agriculture degrees, which shows that it is still not much more than a niche subject-area, far from a mainstream option for students. It also raises the inevitable question of how these courses would cope if there was a major increase in recruitment and whether they would be able to maintain the teaching quality that they seem to provide.

Summary

The availability of courses in organic agriculture at higher education level is a relatively recent phenomenon. Academic recognition of organic agriculture as a subject area in its own right has only really taken hold during the nineties, even if there might have been sporadic attempts at it in the previous decade.

Around the mid-nineties, a few European universities decided to link up their efforts in order to provide a more substantial choice to prospective students and thus strengthen their individual positions. Today, there are a variety of courses on offer at

different academic levels and with a good network of possibilities for mobility within European universities and increasingly to universities elsewhere in the world.

Contents, methods of teaching and possibilities open to students are still very different and depend on the home institutions' traditions, ability to adapt and initiative to link up with others.

Despite the current trend of falling student numbers, courses in organic agriculture seem to provide somewhat of an appealing alternative to students, as we could see from the relatively stable numbers reported. It is important to note that these are still very low numbers, representing little more than an educational "niche". This raises questions about how and if courses would manage if recruitment was much higher.

Chapter IV: Understanding the Process of change

In the first part of this chapter is included the methodology and a description of the case study and its background. The second part focuses on a set of interviews following the process of change and aiming at understanding the factors affecting that change.

Part I: Methodology and Case study background

4.1.1- Methodology

While there were a few universities in northern Europe that figured as prime candidates as a case study (namely KVL and NLH), there seemed to be more use (and in many ways, more interest) in trying to get a new university to deliver an HE course in organic agriculture. In this way, provision in Europe could be enlarged and the process of change within the institution followed from the beginning.

Designing the investigation

It was established that a case study should be sourced in Portugal, as this was one European country which had no university level courses in organic agriculture and there were good contacts, cultural and linguistic background and a personal interest that made the investigation easier. The idea was that preliminary contacts with a few universities would be established, with a view to initiate a process of communication. This would hopefully lead to the generation of enough interest for one of the institutions to wish to pursue the opportunity of joining the European network through the proposal of the internal creation of a new scheme on organic agriculture. This would enjoy the benefits of knowledge and information transfer from the University of Wales, Aberystwyth (UWA) and the opening up of available human resources, drawing from the expertise of professionals from the other universities in the network. It was then intended for the process of change involved in the creation of such a course to be followed and the issues surrounding it be thus better understood and evaluated. That was to be done through an evaluation of the current situation, the target system and a series of interviews with the stakeholders in the process.

Carrying it out - the description

Three Portuguese universities were contacted via e-mail with a brief outline of the European network and a proposal/offer to establish the necessary communications for them to join the network. They were also asked if they had any interest in developing a new scheme on organic/ecological agriculture, incorporating the European common curriculum semesters, through the establishment of bi-lateral agreements through the Socrates programme. It soon became evident that the University of the Azores (UA) was the only institution open to such a proposal and a meeting was arranged with one of the vice-principals in order to present the case. This went very well and the management of the UA seemed very receptive to the idea, passing the information and contacts on to the department of agricultural sciences who would be the ones to execute any possible developments. After a series of fruitful communications with several members of the department (notably Prof. Joao Batista, who took responsibility over developing the proposal), the next step was to ensure the presence of the UA in the annual co-ordination meeting of the network. This would enable their entrance to the consortium to be formalised and could initiate the process of curriculum design and submission to relevant home authorities. This was achieved by a letter of invitation to the meeting by Dr. Nicolas Lampkin at UWA¹, which was very well regarded in the UA and initiated the internal process of preparation for submission of a new scheme. The co-ordination meeting took place in Witzenhausen, Germany and was the turning point in solidifying the link with the UA and its inclusion in the network². There was a parallel, informal short meeting with Prof. Joao Batista and Dr. Nicolas Lampkin to provide some background and support to the design of the proposed curricular structure for the new course at the UA, which should be similar to the existing course at the UWA. The process from then on was

¹ For a copy of the letter, see appendix I, p. 69

² For a copy of the minutes of the meeting, see appendix I, pp. 70-80

followed from a distance and left to Prof. Batista to develop within his department and university, both in terms of design of the course and the several stages of submission to different internal organs/ councils of the university and later to the Portuguese Ministry of Education.

Dr. Lampkin and I later visited the UA, when the process was nearly finished and the university was waiting only for the approval from the Ministry in order to run the course. There already were posters advertising the new course throughout the department, in a visible effort to recruit students³.

This visit was an opportunity to meet with some of those who would be involved in the delivery of the course and to see the Department of Agricultural Sciences. The meeting with the academic staff proved to be of benefit, with many questions and much discussion and debate on many aspects of the course delivery, as well as research and the possibilities for the establishment of partnerships.

The Ministry of Education approved the course a week after this visit and the institution opened its doors to its first students on the course in September 2003.

Time and space

It may be wise to put in perspective the logistics of the investigation and the timeframe that it was worked to, in order to best understand both the investigation itself and its limitations.

The concept of this investigation was first expressed in the autumn semester of 2001. After formulating an outline plan of the purpose and scope of the proposed action research, it was quickly realised that to achieve the point where a transformation process was actually occurring, much background work would have to be done. So

³ For a copy of the advertising poster, see Appendix I, p. 81

instead of initiating the research a year or so before it was due for assessment, it had to be started on immediately: to get a university with which there was no previous contact to deliver a new course was going to be achieved neither quick nor easily.

There were considerable amounts of travel undertaken and the process evolved over the course of two and a half years.

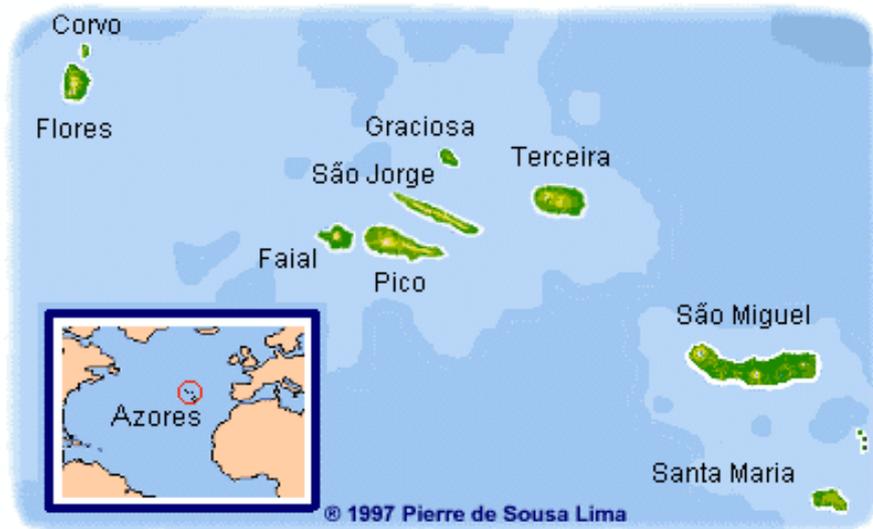
As a result, the information was gathered as and when there was an opportunity to do so, taking advantage of circumstances that allowed proximity to some of the key players (such as regular leisure travel to the Azores and studying at KVL during the spring semester of 2003), as well as planned travels for the sole purpose of the investigation, such as the trip to Germany (September 2002) and the trip to the DCA in Terceira island (April 2003). This means some of the interviews were undertaken in spring of 2003, whereas some were carried out up to the spring 2004; some of the contacts made and the meetings attended are over two years old whereas some were done much more recently, and so on.

4.1.2- The University of the Azores (UA)

About the Azores

It is worth providing a short background on the location: the Azores form an archipelago of 9 volcanic islands approximately 2000km west of the western-most point of continental Europe as depicted in the map and inset of figure 5.

Figure 5: The geography and location of the Azores Islands, Portugal.



Source: www.vdiest.nl/europa/azores.htm

Discovered in 1427 by Portuguese navigators it has since been under the rule of Portugal; the Azores became an Autonomous Region with its own regional government and assembly in 1979, shortly after the Portuguese democratic revolution, in a process similar to the devolution experienced by Wales in the UK.

About the University

The University of the Azores (UA) gained its full status in 1980 (it was previously classed as an educational institute) and offers a variety of courses in both sciences and the humanities, distributed over 10 departments. It is divided into three centres, based in different islands of the archipelago. The central administration and management reside at the main campus in Ponta Delgada, the capital city of the Azores, in S. Miguel island. It is a small university in the national context, but one which is widely recognised and respected due to the unique social role it fulfils and the fact that (due primarily to its location) it carries out specialised research in many fields of the natural sciences, notably marine biology among others.

The department of Agricultural Sciences (Departamento de Ciências Agrícolas - DCA) is based in Angra do Heroísmo, Terceira island, and is the branch of the university that this project focuses on.

The DCA offers a range of land-based courses, including Agriculture, Zoology and Environmental Science, with a total of 400 students at degree level and approximately 80 at masters level. It was founded in 1976 and started delivering degrees in 1980 when the university gained its current status. It has 48 lecturers, 35 of which have doctorates, being the department in the university with the highest qualified staff.

4.1.3- Institutional and wider context

Student Recruitment

The DCA has seen a marked decline in the numbers of students in agriculture and other land-based courses, just as in other universities throughout Europe. There is a consensus that measures need to be taken to increase those numbers and attract interest to agriculture or the viability of the courses may eventually be questioned. It is important to note that this is a relatively new phenomenon in Portugal, where agriculture degrees are traditionally popular and enrolment in most universities was increasing or stable until the late nineties, when they first began declining. This is somewhat different to the reality in other European countries, especially those to the North and West of Europe. These are issues clearly tied in with the different stages of economic and industrial development of different European countries as well as their political circumstances: Portugal's democratic rule is a mere 30 years old, it is a country with relatively little industrialization and a small economy; a very large part

of the population is still employed in agriculture, which remains one of the most important economic activities of the country.

As a consequence, Portuguese universities still enjoy a total number of students in agricultural departments that is often higher to that of other European universities, which is even more significant when we look at the size of the Portuguese population (e.g.: roughly 10M in Portugal compared to 60M in the UK).

This does not however mean that the problem of declining student numbers is any less significant for a Portuguese university, quite the opposite. It is a real problem and a driving force for change, present in everyone's mind, as it became clear in the interviews.

The course on organic/ecological agriculture

Previous attempts had been made to start a scheme of a similar nature to the one now being proposed, under different titles. These met with some resistance from the University, who saw this as an area that was not very developed or academically robust and would therefore have little interest from the public, and perhaps attract negative publicity or affect the credibility of the institution. None of these previous attempts were successful and the University of the Azores had no such courses when they were approached in the context of this project.

The curriculum of this course was devised in such a way that students from many other land-based courses (e.g. agriculture, zoology, animal production, etc) could internally transfer after the first year without necessarily having to do any extra modules. While this may not make a difference to the university in terms of recruitment, it could certainly strengthen the position of the department and of the

course itself, allowing for expansion and increased institutional and public credibility in the area of organic agriculture.

The Innovation factor

This is, in effect, the first HE course in organic agriculture to be offered by a University, not just in Portugal but on the entire Iberian Peninsula, as far as any of those involved are aware. This means that the provision could extend to many Portuguese students and even Spanish ones, providing a new subject until now simply not available. The structure of the curriculum enables students from other universities to transfer from an agriculture degree (conventional), without necessarily losing any credits in the process, depending on which stage of their degrees they may be at.

The fact that it features links to other universities in Europe and that it gives students the opportunity to study abroad as an inbuilt feature of the course is quite innovative in Portugal and, needless to say, in the Azores too, where the chances to travel beyond the islands are few and far between due to both the geographical location and the low incomes typical in the region.

Another important innovative factor is the structure and content of the course, which has a much more practical and management focus than its counterparts. Degrees in Portugal are very heavily scientific, with a traditional duration of 5 years which has only recently begun to change as a result of the Bologna convention and the move towards standardisation of HE courses in Europe. This means that the new course could prove to be attractive and more purposeful, especially to those who wish to have a direct contact with the practice of agriculture. It is often joked about in

Portugal how graduates tend to fill posts which demand little to do with the practical knowledge of agriculture and how in fact no-one who graduates from such a degree even considers becoming a farmer or farm manager, a status which is not socially well regarded in the country.

So, in a sense, this vocational course could provide the missing gap between the traditional, overly academic degree courses and those at lower academic levels that perhaps have insufficient scientific background and place much emphasis on practical/technical dimensions. It would appear to combine the best of both worlds and introduce a new concept of HE that could be successful; it is, after all, the model that has been successfully adopted by many throughout Europe.

The competition

It is worth noting that there are other universities in Portugal providing modules in organic agriculture or encouraging students to write projects or thesis on the subject, such as the University of Beira Interior and the University of Tras-os-Montes, and also many where research into the subject is being carried out, sometimes with international links. These are, however, sporadic and still fall short of providing a qualification that is organic/ecological in its title or indeed that offer more than an introduction to the area.

Also important to note is that there is a course in organic agriculture in the Instituto Superior Politecnico de Beja (Beja Polytechnic Institute), through their Escola Superior Agraria (Agriculture School). This is not a University and the course, though at HE level, is not a degree and is generally considered to be of a practical nature,

much like Higher National Certificates/Diplomas at Further Education colleges in the UK.

Polytechnics are relatively new institutions in Portugal and whilst they have come to fill a much needed gap in the Portuguese education system they have also diverted a considerable amount of potential students away from universities and into these new courses which often prove to be more effective in meeting the vocational needs of the students. This is especially true for agriculture and related areas, where there is a tradition of attracting students with lower grades and who are less academically inclined. This has been a determining factor in the decline of agriculture students in Portuguese universities and was consistently mentioned by all the Portuguese interviewees.

What it means to the wider public

It also has many impacts beyond the University gates, as it will provide a nucleus of research and information transfer to a much wider audience of professionals. The fact that the UA is hosting such a course and the consequences that it will bring to research, the land management practises adopted and the general position of the university on organic agriculture can open up a range of opportunities for farmer-participatory research, standards development with certifying bodies, partnership work with local and regional authorities, NGO's, etc.

In the Azores especially this could accelerate much needed initiatives on the conservation of the unique habitat provided by these lost islands in the middle of the Atlantic Ocean.

Agriculture there is characterised by what is often referred to as “dairy cow monoculture”, with very few other significant enterprises, apart from sugar beet production, tea and tobacco plantations and forestry. Most of the landscape is characterised by a patchwork of grazing fields, hardly ever utilised by animals other than dairy cows. The production systems are not particularly kind to the local environment and have been consistently linked to the eutrophication of lakes in the islands, as well as many other undesirable environmental impacts. As in any island ecosystem, environmental concerns are of a high importance and difficult to ignore. Organic agriculture could provide at least part of the answers to the agricultural pollution problems in the archipelago.

Part II: The Interviews

4.2.1- Methodology

Formulating and carrying out the interviews

The unstructured interview method was advised for this research and as such interviews were formulated in a way that would allow the interviewee space to let the information flow on the subject of the questions, even when it might not have been directly meaningful to the investigation. The questions were designed to instigate relatively long answers and ones which could hopefully bring to the surface the real issues behind the problem situations, without having to “put words in peoples mouths”, so to speak. This also allowed for a very broad range of information to be taken in; this gave the interviews more flexibility to explore various issues, as the exact scope of the investigation had not taken full and final shape when the opportunity for some of the interviews arose. The questions mainly focused around the motivations, benefits, and challenges of the new course and on how it could directly affect students.

Three different sets of questions were formulated⁴: one for staff members of the UA (i.e.: those who are directly responsible for initiating, carrying out or hindering the transformation process (T) and who also are beneficiaries of it), one for students of the UA (i.e.: those who will be beneficiaries of T), and a third one for those who are lecturers at other universities with similar courses (i.e.: those who have previous experience of T). All individuals within the same “category” answered the same set of questions.

Interviews were carried out with a tape recorder in order to ensure reliability and encourage a more relaxed atmosphere. The rotations on the tape were noted down on the questionnaire as each answer was given, so as to be able to go straight back and listen to a particular issue as and when required during the transcription or the

⁴ For blank copies of the interview questionnaires, see appendix II, pp. 83-85

analysis. This proved to be of most value during the analysis, when certain statements in the transcription seemed either contradictory or unclear, and it was possible to just listen to them without much time being lost.

The informal and unstructured nature of the interviews proved to encourage speaking by the interviewees, who were very often thorough in the answers given.

This has meant that certain answers were given in the sequence of an earlier question, in such a way that the relevant question was then dropped and notice taken of the tape rotation in which it had already been answered. As a consequence, some questions are blank in some of the interview transcriptions, as the answer is already provided earlier. The copies in the appendixes do not show the rotations as it was thought to be of little value to the reader.

Transcribing the interviews

Consideration was given to utilising codes prior to the interview transcriptions as a method of analysing them directly as they were being transcribed. However, it was felt that this would restrict the flow of information too much and that assumptions would contribute to furthering the bias that qualitative data already lends itself to. Instead, interviews were transcribed directly, with minor editing so as to leave sufficient information before it became clear how it would be organised and how much of it would be relevant⁵. This proved to be a prudent approach, as different individuals placed emphasis on very different areas of the problem that could have lead to early formulation of conclusions that would later prove wrong but which would have already shaped some of the interpretation of information. It was only

⁵ For copies of all the interview transcriptions, see appendix II, pp. 86-106

when the analysis of the data began taking place that it became clear how the information could and should be coded. This has contributed to the already chosen systems view, in which all information is related and mutually relevant, in a constant feedback process.

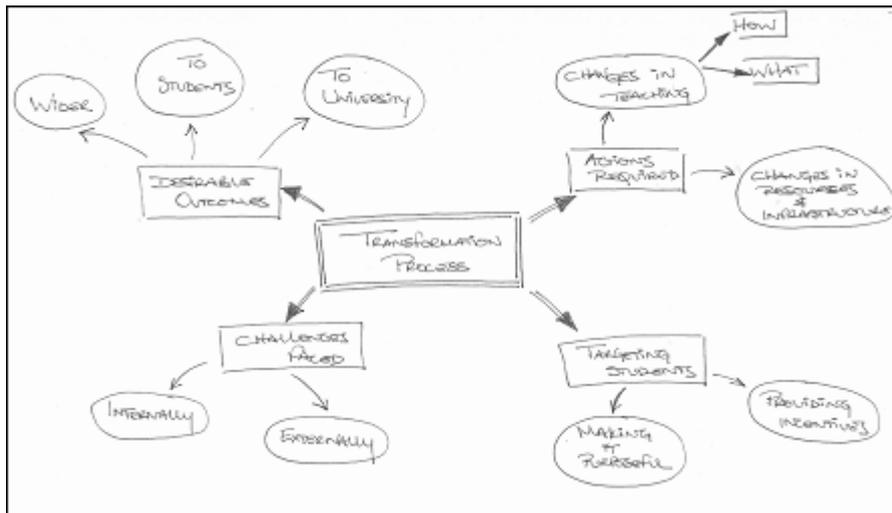
So the interviews were thus almost literally transcribed as “raw data”. Many of the interviews were carried out in Portuguese and those were simultaneously translated as they were being transcribed.

Analysing the data

Mind maps were used as an analytical tool as they provide a constant visualisation of all the issues touched upon and how they interact with each other. The practise of mind mapping was adapted to the requirements of this investigation, the flow of information being allowed to unfold through a series of rounds of looking at the interviews and placing information under the relevant category.

The initial mind map focused on the transformation process (T), out of which arose four main categories, areas found to be highly relevant to T. Each of those categories was divided into key ideas as shown in figure 6 below, overarching concepts that summarise the many different issues and opinions expressed.

Figure 6: The man mind map driving the interview analysis, with the four main categories and their key ideas

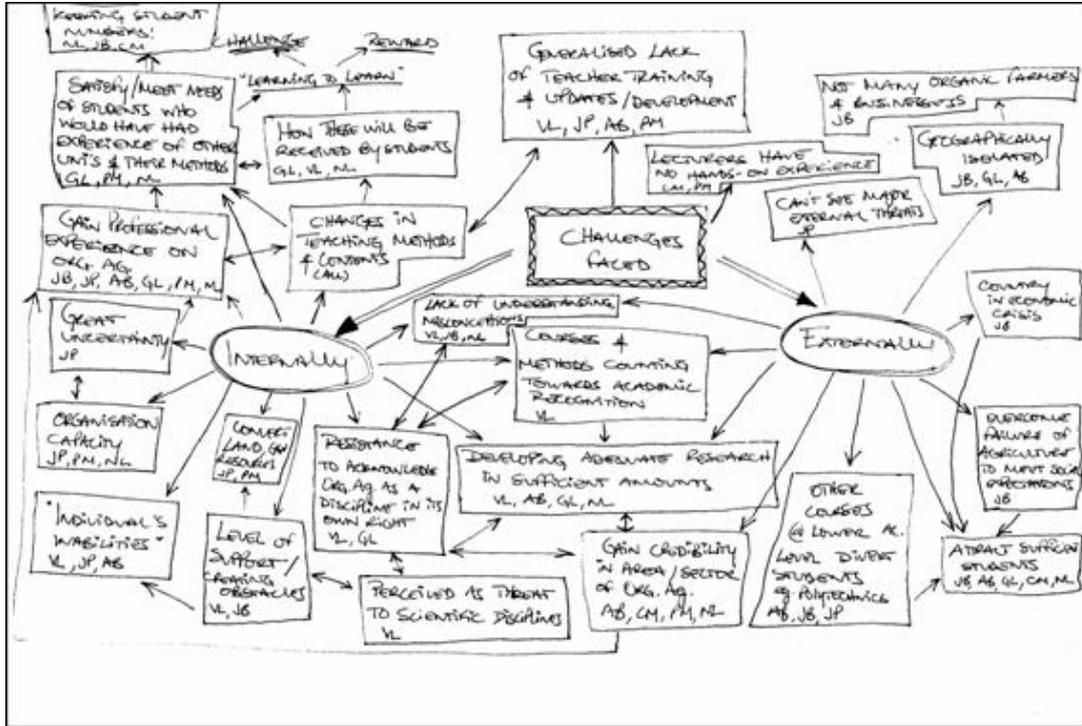


Then a further series of mind maps was generated⁶, with each of the four individual categories and their key ideas taking a central place in the maps, to which were added the answers/thoughts of the interviewees as they appeared on the transcriptions. All the interviewees are mentioned by their initials, which were added to each bubble accordingly, so that all the issues exposed can be traced back to who touched upon them, as can be seen in figure 7 below.

This was useful to distinguish which issues were more important to whom and to determine what issues there is solely by what came across in the interviews (as opposed to what the interviewer might regard as a potential issue). It was also interesting to notice how the interviewees proportionally mention certain subjects and this was interpreted as a measure of significance. As each interview was analysed, the issues mentioned were highlighted and put on the mind map, or the initials of the interviewee added to an issue already identified by the previous analysis of another interview. The highlighting of the different issues was colour coded by categories in copies of the transcriptions, so that a thorough revision of the issues was made at the end of the mind maps thus ensuring nothing had been left out.

⁶ For copies of all the mind maps produced, see appendix III, pp. 108-112

Figure 7: A detailed mind map, gathering the information sought in one of the identified categories: Challenges



It was found that much of the information was relevant to more than one category, again illustrating the interconnectedness between the different issues discussed. The decision was made to include each issue where it was most relevant, in an acceptance that any kind of data analysis is limited to some form of processing in which some information is always lost. It was done also with the knowledge that this interconnected nature of problem's different dimensions is accepted and taken for granted when looking at each area individually and the category division recognised as a tool rather than an end in itself.

The choice of categories

At the centre of the mind maps was the transformation process. It was chosen as the main bubble after considering the purpose and scope of the investigation:

There is a problem situation, and a possible solution model to follow: so how do we get from here to there? That is the crux of the investigation: understanding the process of change within the institution and the factors affecting it, in order to best ascertain how to achieve desirable outcomes. And thus the process of change itself must be the driving idea behind the analysis, with the information unfolding from this central focus.

The challenge was then to identify the relevant categories that stem from it. It was attempted to use models seen in the literature or to use categories that would directly link to soft systems methodologies such as Checkland's (1990) CATWOE mnemonic or his classic seven-stage model; none of which seemed to quite serve the purpose. Finally, it was decided to categorise according to the real main issues that had become evident in the course of the research and which turned out to be, in fact, just simplified versions of those found in the literature.

The key questions were asked:

- Why is there a need for change?
- What can be achieved by changing?
- How can change occur?
- What could hinder or stop the change from taking place?

And the four chosen categories were derived from those:

- There is a need for change due to the decrease in student numbers and popularity of agriculture, so there is a need to find ways of **targeting students**.

- Change will bring about benefits to a range of people, and these are the **desired outcomes**.
- For it to occur a number of **actions** are **required** on the part of those who can bring about the change.
- Any process of change is bound to have **challenges to face**, and these will be key to its success.

It seemed that (as previously mentioned) many categories overlapped, but that it still allowed for a full and balanced spread of the information gathered. Targeting students was a category which was considered to be largely part of the desired outcomes, but emerged as a category of its own as it became evident that it was an important means to the proposed ends

4.2.2- The interviewees

As previously mentioned, these were chosen on the basis of both logistical ease and appropriateness to the investigation. In table 4 below is the description of the interviewees, which should be self-explanatory as to their role or contribution in and to the process of change.

Table 4: The interviewees

<u>Interviewee</u>	<u>Country and institution</u>	<u>Position</u>	<u>Initials</u>
Joao Batista	University of the Azores, Portugal	Lecturer, Course manager of the degree in Ecological Agriculture	JB

Alfredo Borba	University of the Azores, Portugal	Lecturer, head of DCA	AB
Jorge Pinheiro	University of the Azores, Portugal	Lecturer in the Ecological Agriculture course	JP
Cesar Medeiros	University of the Azores, Portugal	Student of conventional agriculture, final year	CM
Placido Miranda	University of the Azores, Portugal	Student of conventional agriculture, transferred to the new course at UA & taking part in international semesters this academic year	PM
Geir Lieblein	Agriculture University of Norway	Lecturer, course manager of the MSc in Agroecology	GL
Viebeke Langer	KVL, Denmark	Researcher and lecturer in several organic courses	VL
Nicolas Lampkin	UWA, United Kingdom	Researcher, senior lecturer and course manager for organic agriculture degree and PG; director of Organic Centre Wales	NL

4.2.3- Interview analysis

As in the mind maps, interviewees are referred to by their initials when their contribution to the issues highlighted is of particular relevance.

Targeting Students

Although never directly asked “how would students best be targeted?”, many of the questions were designed to try and understand what would be perceived by the different stakeholders as motivations and benefits to students. It was done in an attempt to address the issue of recruitment, which was clearly a major factor identified from the start and later mentioned by all interviewees (except PM) at some point in their interviews. JB emphasised it by saying: “the course came about as a result of the failure of conventional agriculture courses to attract sufficient students or satisfy the changes in society and agriculture in our country today”. As a back-up, many stated

that it represented a new vision, a way of thinking, change, and used adjectives such as exciting and engaging, when asked what some of the benefits of teaching and learning this new area could be.

Direct advantages to the students seem to be perceived somewhat differently. Whilst the lecturers from UA saw the opportunity to travel abroad and learning about a new concept as the strongest advantages, lecturers from other universities and the students themselves focused more intensively on advantages brought about by changes in teaching methods, such as encouraging critical views, having more dynamic classes and developing problem solving abilities. JP stood out somewhat, making remarks throughout the interview about how changes in teaching could benefit students. As we will see later, most UA lecturers did mention changes in teaching methods often, but more in the context of “challenges” and “actions required” suggesting caution rather than comfort.

Students mentioned that their choice of agriculture was tied in with an interest in practical things and that they were less inclined towards academic subjects (which was reflected in NL’s opinion that the strength of students in this subject was that they were generalists). They emphasised that observing and understanding the dynamics in agriculture provided them with “real knowledge” thus making them better professionals, which is a very systemic vision.

When looking at the job opportunities available to graduates, another pattern emerged: government and public sector positions (particularly related to agri-environment regulations) in advisory and extension work were mentioned by all interviewees, being the clear favourite and agreed upon by all parties. However, there

was again a divide between lecturers from the UA and the remaining interviewees (with minor exceptions). The first concentrated their answers on public posts and certifying bodies, with JB suggesting also teaching. The former added to these: research, international organizations and, importantly, farm management. Whilst “research” and “international organizations” are clearly areas that were not mentioned because they may still seem out of reach to the Portuguese given the lack of initiatives in organic agriculture in the country (supported by the fact that the students did not mention them either), the fact that “farm management” is not an option that naturally occurs to the UA lecturers perhaps reflects what has been referred to as “the engrained idea that degrees are not meant to produce practical workers”. This was acknowledged by JP, CM and PM through suggesting that there should be less reliance on pure sciences as a measure to making degrees in agriculture more purposeful; CM further reinforced this idea by suggesting that programmes should include more participation of speakers from industry and both students mentioned how important it is for lecturers to also have practical experience themselves, in order to enable discussion and debate beyond a theoretical level.

As with all categories, it seems many issues overlap and are relevant to different areas for different reasons. Overall, the issues most relevant to targeting students revolved around the contents and methods of teaching and how they may provide the alternative to existing courses as well as improve students’ preparation for employment.

Challenges faced

Interviewees were directly asked what they believed were the main challenges for the UA in starting this new scheme.

Many of the answers were in some way related to attracting and maintaining student numbers, which was also mentioned directly by 5 of the interviewees. Of major importance in this, for the UA staff, was the relatively recent phenomenon of polytechnic schools with a variety of courses at a more practical level representing a direct threat to recruitment. Other external challenges to recruitment included overcoming the negative social perception of agriculture, gain credibility in the subject (including academic recognition), and overcoming geographical isolation (and consequently an almost inexistent organic sector) and the current economic crisis in the country.

A major internal challenge was the required changes in teaching methods and contents, mentioned by all interviewees without exception. Issues around these changes included the need for professional experience in organic agriculture; teacher training and updates to develop new practise, and a marked sense of the new and unexpected from the staff at the UA. Another issue directly linked to these required changes in methods was of the impact of this on students, noticeably only mentioned by students themselves and lecturers from other universities. On the one hand, students will have (by design of the course) experience of other institutions and methods, and therefore have models to compare to, carrying the increased level of demand that is likely to lead to. On the other, some students may react to changes with resistance, learning to learn has its rewards but also many challenges, as was highlighted by all the lecturers from other universities, revealing their experience.

Other internal challenges included the level of support for the new scheme, the organisation capacity of those involved, the conversion of land and the development of research in the subject in sufficient quantity and quality. Another area that

emerged in a few answers and that was, again, exclusive to lecturers from other universities, was the possible obstacles to the recognition of organic agriculture as a discipline in its own right, misconceptions and lack of understanding, as well as issues of organic agriculture and its generalist nature being perceived as a threat to scientific disciplines. Whilst staff from the UA did mention similar difficulties faced in the past, there was a distinct feel of positive attitude following what seems to have been a very well received and commended project within the institution and beyond. Whether such levels of support will carry on being enjoyed remains a question.

Overall, there was a visible emphasis on the capacity of individuals to overcome or deal with the challenges faced.

Actions required

Although in some of the interviews there were questions that directly asked what may be required to address certain aspects of the transformation process, many of the actions identified came from answers to other questions, especially as many of the interviewees would mention them following the challenge they are meant to overcome.

One of the areas requiring action was the required changes in resources and infrastructure, including the conversion of land and enterprises to organic production; the human resources were characterised by the need to gain professional training and experience in organic agriculture.

The main action point however was that of changes in teaching. There was a perception that there is a need for recognising the current limitations in order for these to come into being through the adaptation to new concepts, and staff from the UA seemed confident that there was a positive open attitude and will to learn. Lecturers

from other universities all mentioned that changes in teaching required for this course could lead to changes in other subject areas.

Actions required in teaching were divided between those changes pertaining to the “how” and those to the “what”. Actions in “what” gets taught included changes in curricular contents, a shift of focus to be more practical/management oriented in order to strengthen problem-solving ability, and the inclusion of values. Actions for “how” to teach were tied in with adopting new tools and methods, such as participatory methods and inter-disciplinarity and a more informal approach, with less overhead projections and straight exposition and encouraging of amore debating environment where students are made to draw on their own knowledge and experience for the collective learning experience. Other actions identified were the need to broaden the scope of farm analysis, encouraging lateral thinking and critical analysis.

Overall, the actions required seem to be centred around the teaching and learning experience, in a shift from traditional, heavily scientific lecturing to more practical and inclusive environment.

Desirable Outcomes

These were divided between those which affected only the institution and those which have a wider remit. Some of the desired outcomes directly benefit both, and these are the opportunity of internationalisation and isolation breaking and to expand research and development in a subject which provides an alternative to conventional agriculture thus gaining public and media support.

Wider benefits were mainly associated to supporting environmental initiatives, providing an example of good practise in a region that relies on quality products and

thus also follow the lines of the Common Agriculture Policy and its recent reforms. Another marked benefit was the increase in provision of this subject in Europe and the expansion of the existing network, helping to produce better qualified professionals for the sector. These wider benefits seem to have been perceived not only within the institution but beyond it, as the staff from UA mentioned the approval and support of the Ministry of Education for the new scheme was amply felt.

There was a strong sense that the desired outcomes for the university were mostly linked with the opportunity to renew, to open up and to change. This was made clear by the use of words like exciting, engaging and mind-opening when asked what they thought of this new scheme and the emphasis put on the opportunity that this brings to renew pedagogical approaches and revitalise other courses, creating greater interaction between students and teachers. It was also seen as a desired outcome the adoption of models more similar to the rest of Europe and the opening up of external support and links which is perceived as desirable and displays a high degree of openness. In AB's words: **"there must be an opening of minds: if we don't change now, we will never change"**.

4.2.5- The interview process in review

HE and Organic Agriculture

When assessing the findings from the interviews, certain considerations should be made. First it should be noted that none of the interviewees from the UA had professional background in organic agriculture and therefore their appreciation of many of the issues (both technical, educational and institutional) was limited at the time of the interviews. Similarly, students from the UA only had introductory notions

of organic agriculture and very little experience or even substantial information on the new course. On the other hand, interviewees from Nordic countries and UWA had extensive professional background on the issue and, perhaps more importantly, work within very different education systems (not to mention culture, etc) and so it was difficult to assess the extent to which their experience could be directly relevant to the Portuguese case study.

Quality of the information

As mentioned before, the interviews were carried out wherever and whenever possible to reduce costs of travel. This has meant that while the interviewees in the UA were well targeted as they were all present at the time of visiting the institution, many of those from other institutions in Europe (including students) were not always the most relevant or the most experienced, with higher profiles or even in sufficient numbers. It could have been further enhanced by the contribution of other key individuals throughout Europe and, upon reflection, sending out questionnaires via e-mail (instead of only personal interviews) might not have been such a bad choice and would have provided larger amounts of data from which to derive perhaps more appropriate conclusions. Having said that, most of the interviewees that were chosen did seem to have a similar range of issues that they believed were fundamental, which leads to a possible interpretation that those would also be brought up by others.

It was also unfortunate to forego the opportunity to have a student focus group on the issue, which could have been organised in Aberystwyth during the autumn semester when many international students join the study scheme. This could have added much to the student perspective, as well as perhaps helping to temper the interpretation bias

of some of the qualitative data previously gathered, were it to include an overview of it. Time and logistical constraints proved to defeat the idea.

Working with people- the analysis in review

Inspired by systems thinking and SSM, it is fully recognised that this investigation is highly subjective. Working on perceptions and thought patterns expressed by people, it does not enjoy the factual simplicity of a quantitative analysis, which is compounded by the language and cultural barriers between who supplies the information and who processes it. The sheer fact that nearly all those interviewed are in one form or another working with education in organic agriculture also represents a shortcoming in that views are automatically channelled down particular paths. Interpretation issues are subject to personal bias and difficult to overcome in an investigation of this type.

One of the strengths of the analysis could be the systematic way in which the information was processed, and the fact that categories were chosen as a consequence of the interviews contents' rather than set *a priori*. Nevertheless, a student of organic agriculture analysing education issues in organic agriculture will inevitably have a bias given the educational background, experience and interests which would be reflected in both the design of the investigation and the interpretation of the data.

Considerable amounts of time were taken in debating and discussing the arranging of the data and that contributed to very rewarding experiences and a marked sense of the dynamics and interactions within the problem situation: it was and is not a static reality and that inevitably means that this analysis is now almost certainly outdated.

Summary

This investigation followed the systems thinking theory and SSM in an attempt to practise action research. After the topic was chosen and the investigation designed, information was collected in a variety of ways from a range of sources in Europe, over a period of two and a half years. The data gathered was mostly qualitative (with one exception to look at trends in student recruitment) and derived from unstructured interviews; the method chosen for its analysis was mind-mapping.

The categories chosen to code the information were derived from the general impressions got from the interviews and fell under the broad headings of Targeting Students, Challenges Faced, Actions Required and Desirable Outcomes. Findings were largely consistent with the literature, with the following points being worth a particular mention:

1. Students were very aware of the issue of complexity in agricultural systems and the failure of universities to address it. They consistently highlighted in their own words shortcomings of the education process that are in line with those identified in the literature, made all the more striking because they were unfamiliar with either systems thinking philosophy or concepts such as action or experiential learning.
2. Staff from the UA came across as being very enthusiastic, open and willing to learn. Whilst they consistently identified areas of challenge within the teaching methods which are in line with the literature, it was evident that they did so from a theoretical/conceptual point of view rather than actually grasping some of the complex issues that make up both causes and consequences of such changes. In other words, they were very aware of **what**

needed to change, but did not expand much on **why** and **how** or what **consequences** might arise if and when changes are implemented.

3. More experienced staff from other universities were, conversely, more ready to identify the elements that bring about changes and more cautious of the impacts it has on both staff and students, denoting their experience and a better understanding of the complexity of the interactions involved. They were more student focused (from perspectives other than recruitment) and quicker to mention broader issues and opportunities.

Overall, the degree to which all the issues are interdependent and the difficulty in trying to categorise and not repeat information is illustrative of the complexity of real life situations and the need to view them as a whole rather than trying to isolate specific targets whilst ignoring the relationships affecting them.

The chapter finishes by reviewing the interview process and the quality of the information, highlighting its strengths and weaknesses and suggesting ways in which it might have been improved.

Chapter V: Discussion

It became very clear that the issues and challenges faced in HE (in particular the land-based courses), although perhaps partly overcome by some of the courses in organic agriculture, are neither new nor exclusive to organic agriculture. In other words, they are issues in HE methods and approaches and in the natural sciences in general, not just agriculture, not just organic. This made evident how futile it was to try to establish causal relationships, such as that organic education is or should be “better”

than conventional. All interviewees and authors agreed that traditional methods of teaching within the natural sciences in general need reformulating, with organic or ecological agriculture seeming to take a leading role. This is due perhaps to its relative young age in academia and the predisposition of its agents to adopt systemic views and methods.

Even so, this is not a standardised approach and institutions and individuals vary greatly in the extent to which they adopt new methodologies. Not only are the prevailing educational models in any one institution dependant on a variety of socio-economic factors, large variations on the wider perceptions of scientifically valid methods and contents must be taken into account when looking at improving education systems. Experience, access to information and readiness to adapt and co-operate are all equally important considerations.

The importance of internationalisation was recognised by legislators and educators in the literature cited, and taken into account in the investigation through the initial proposals for the new course including semesters in other universities and in-building a high degree of co-operation with other universities. These proposals were readily taken up by the UA and integrated in the design of the curricular structure of the new scheme, showing consistency with many author's perception of their intrinsic advantages. It is believed that this will prove to be a major strength for the new scheme, increasing the quality of the educational experience and broadening perspectives, hopefully to the benefit of both students and staff.

Evaluating this entire investigation and the process of change followed using Checkland's "three E's", it could be said that:

1. The means chosen to produce the desired output can be judged as being successful, since a new course did start, provision in Europe was increased and a case study was sought that fulfilled the needs of the process of inquiry that was aimed for. Therefore, the process can be evaluated with positivism on its **Efficacy**.
2. The **Efficiency**, measured by the minimum use of resources, can also be judged as successful. This success is two-fold: on the one hand the investigation itself made use of contacts, travel and visits which were (for the most part) already available to the author or planned for purposes other than those directly relevant to the case-study; on the other hand, the structure of the new scheme itself is based on a combination of existing resources within the UA and in the wider network of universities. It thus at once avoids the proliferation of similar courses in Europe and strengthens the scheme contents by allowing specialist subjects to be taught by those who have the most experience on them. In addition, this also contributes to a reduced workload and expenditure to the UA in delivering the scheme, as well as allowing some time for those who lecture to be introduced to the subject area without too many immediate pressures in professional development.
3. The measure of **Effectiveness** is the most difficult to analyse, since the transformation process has only recently been initiated and the longer-term aims of it are by nature multiple and complex. It is thus unclear at this stage how effective the transformation process will be. However, there has been a degree of limited success in that some of the desired outcomes have been achieved (such as initial recruitment, internationalisation and opening of opportunities to students), but it would be unwise to comment on their

sustainability, future development or sensitivity to change. Other aims such as the development of research in organic agriculture, the revision of pedagogical approaches and the implementation of new learning environments do not lend themselves to any degree of serious evaluation at this stage and would have to be considered after some time of the scheme running. This is an illustration of how the stream of inquiry and the transformation itself are on-going, constantly leading to further questions and challenges in a possibly infinite processes. The defining arbitrary decision of ending this particular systems study being closely tied in with hand-in dates for graduating purposes...

Chapter VI: Conclusions and Recommendations

It is fair to conclude that the process of initiating a new scheme in organic agriculture at the UA was fairly successful, and that it did initiate a process of change within the institution, providing an opportunity to review traditional practise and thinking on the subject of improving learning environments. It seems that a crucial aspect of the success of the initiative was the possibility of communication and contact with other

institutions and the realisation of how new teaching approaches are not only well regarded but in active implementation at a few universities in Europe.

The process of change is not ended and this investigation touched only upon initial perceptions and expectations of those directly involved with it; the opinions and experience of those who have been involved in similar cases and are now further down the line of the transformation process illustrate the increasingly steep learning curve that any such change (when taken seriously) is bound to provoke.

In terms of student recruitment, it can be concluded that organic agriculture does seem to provide a desirable alternative for students and that elements of change in both the contents and methods used would be largely welcomed by students. It should be noted that recruitment is still at comparatively low levels and does not represent a direct substitute for the much higher fall in numbers applying to study agriculture.

Recommendations:

- The European consortium would greatly benefit from an external source of funding, in order to best organise the co-ordination meetings without putting strain on the individual budgets from departments and universities. This would also help organise and structure the network further, including improvements in publicizing the courses available.

- Learning to teach: teacher training initiatives should be encouraged, with particular emphasis on systemic teaching methods and tutorial systems. This would benefit not only those who are new to the network and the experience of teaching in agro-ecology, it would also help streamline approaches by those already in the network. It could perhaps be done in the form of workshops at the same time as the annual co-ordination meetings and could be lead by those involved in the Nordic universities network, as they have the most experience of action research and participatory education.
- Student representatives could be included in the network's annual co-ordination meetings as a means to obtain feedback and open discussion of issues further, with an important end-user perspective.
- As a new member of the network, the UA should support the teaching staff in their professional development by encouraging those who lecture on the Ecological Agriculture course to take part in the annual summer course (along with the students or in a lecturing capacity), or alternatively to travel to one of the institutions with most experience in action and participatory education, such as KVL or NLH.
- The UA should invest in resources available to students on the specific subject of ecological agriculture, so as to allow them adequate scope for their investigations. This would include library resources such as books, journals and periodicals, but also physical resources such as organically certified land and a range of enterprises of sufficient quality to exemplify good practice and serve other educational and research purposes.

- Further research would be required to assess the longer-term aims of this transformation at the UA in order to measure the effectiveness and meaningfulness of the experience beyond the limitations of the current study.
- The changes to the learning environment that have been discussed here prove to be effective in delivering a professional competency that is highly valued in the industry and that could improve the efficiency of land-based work in a variety of enterprises, including those of public service and interest. With this in mind, policy makers should push for a reform of the educational systems in Europe in order to facilitate and accelerate the process of adoption of new methodologies and frameworks for the learning experience. Such policies should be backed up by sufficient funding to encourage student and staff mobility and help support the costs of bringing the real environment into the classroom.

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