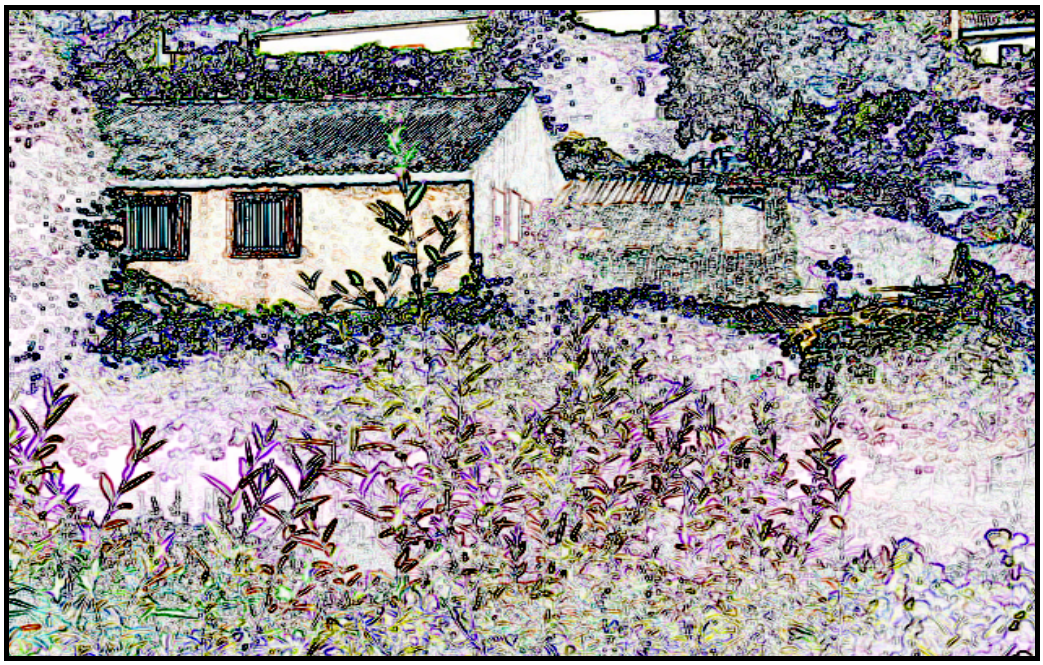
Master's in Environment, Science and Society 2004/05
Department of Biological Sciences

University of Essex

Factors affecting the ecological and economic sustainability of organic farming in central Portugal

Implications for the development of Sustainable Agriculture



Ambra Christiane Sedlmayr
Supervisors: Rachel Hine and David Smith

Abstract:

The rate of conversion of small-scale mixed farming systems to organic farming is lagging behind the rate of conversion of other farming sectors in Portugal. 8 case-studies were carried out to shed a light on the ongoing processes that affect the adoption of more sustainable farming practices in the small-scale farming systems of central Portugal.

It was concluded that social and economic factors hinder the expansion of more sustainable farming practices in a policy environment at farm level perceived as almost indifferent. The limited awareness and initiative of farmers and the deficient organization of the organic market hold the expansion of sustainable farming practices back.

The findings suggest that sustainable agriculture could spread significantly within the current legal and economic settings. However, an adaptation of actual agri-food policies, away from the productionist paradigm, is highly recommended for an active promotion of an ecologically and economically sound farming sector.

Acknowledgments:

In the first place I wish to thank Professor Helena Freitas for supporting my interest on sustainable agriculture, helping me in many ways to find my way.

Special thanks are also due to my supervisors Doctor Rachel Hine and Professor David Smith for their timely advice and kind support throughout this research work.

My friends Célia Machado, Myriam Kanoun-Boulé and Cláudia Robles helped me hands-on and through stimulating discussions to carry out this study.

A special mention for Angela, Agnes, Rebecca and Álvaro, who share my enthusiasm for sustainable agriculture and with whom I hope putting it into practice.

Many thanks are also due to my interviewees, who shared their knowledge and experiences with me.

This study was funded by the Portuguese National Science Foundation (Fundação para a Ciência e a Tecnologia) through the master's grant BM/SFRH/2004/19991, that enabled me to take part in the very enriching learning experience at the University of Essex.

Contents:

List of abbreviations and acronyms:

AEM – Agri-environmental Measures

CAP – Common Agricultural Policy

CSA – Community Supported Agriculture

EU – European Union

Ha - hectare

IDRHa – Institute for Rural Development and Hydrology

IFADAP - Institute for Financial Support for the Development of Agriculture and Fisheries

ISAP - Indicator of Sustainable Agricultural Practice (according to Rigby *et al*, 2001)

WTO – World Trade Organization

1. Introduction:

For ecologically sustainable forms of agriculture to become widespread it is essential that they are economically viable, that is, at best, able to compete with conventional agriculture[1]. This is especially difficult because conventional agriculture has historically received much state support in the European Union and its negative social and environmental side effects are not accounted for by the pricing mechanisms of the market. This leads to a distortion of market prices of conventional agricultural products making them artificially cheap, thereby frequently out-competing ecologically sustainable farming systems.

Recently the principle of integrating environmental concerns into the main areas of European Union policy lead to an official promotion of a sustainable and multifunctional "European Model of agriculture" (Cardwell, 2004). Policy measures aimed at helping farmers through various types of financial support to reduce economic losses that might result from the adoption of more sustainable farming practices in an environment of unequal competition emerged. In addition to recognizing environmental and social drawbacks of the current financial support system for agriculture, the shift away from market intervention and direct payments for farmers is required by the WTO's Agreement on Agriculture (O'Neil, 2002).

In the 1992 Mac Sharry Common Agricultural Policy (CAP) reform the compulsory introduction of Agri-environmental Measures (AEM) by member-sates was introduced under Council Regulation EC 2078/92. These schemes are part of the accompanying

[1] In this text *conventional agriculture* is the term used to contrast intensive and external input dependent forms of agriculture from multifunctional, less environmentally harmful farming systems.

measures of the “second pillar” of the CAP, and aim at promoting the introduction, expansion or maintenance of environmentally benign farming practices (DG-Agri, 2005). One of the schemes introduced in Portugal is an area payment for organic farming, as defined under EC Regulation 2092/91 (IFADAP and INGA, 2005).

Organic farming corresponds to one of the most widely accepted forms of sustainable agriculture (Guzmán-Casado *et al*., 2000), characterized by not making use of synthetic agrochemicals and aiming at the integration of ecosystem services into the productive process, thereby reducing the dependence on external inputs (e.g. IFOAM, 2005).

Since the introduction of area payments for organic farming in Portugal in 1996 the area and number of registered organic farms grew rapidly (Valadas de Lima, 2000), reaching 1.196 farms and 120.731 hectare in 2003 (see Figure 1).

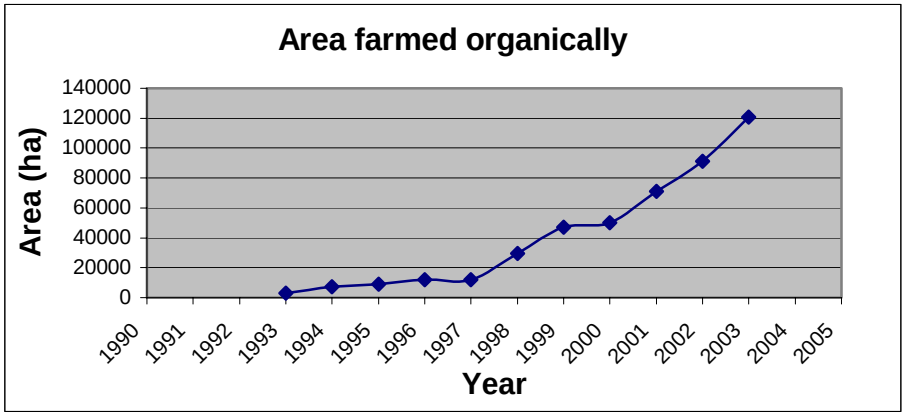


Figure 1- Growth of the farm area under organic production between 1993 and 2003. (Source: IDRHa, 2005).

However, Figure 2 reveals that most of the conversion to organic farming took place in traditionally extensively managed farming systems, such as pasture, olive orchards and

cereal fields of southern Portugal (Alentejo and Beira Baixa regions), that are easily converted (Crsitóvão *et al*, 2001b)

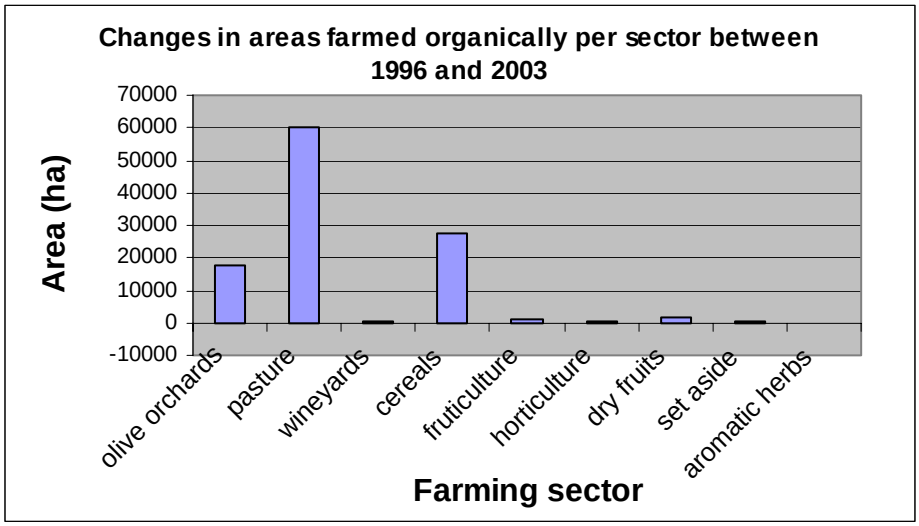


Figure 2 – Changes in area organically farmed per crop sector, between 1996 and 2003 (Source: IDRHa, 2005).

It is evident that diverse and mixed farming systems, as they are common in central and northern Portugal, have benefited less from the official promotion of organic farming (Firmino, 2000). Small-scale, mixed farming systems, propitious for horti- and fruticulture, occupy 58% of the total utilized agricultural area in Portugal (Baptista, 1995) and are specially important in the central region where up to 33% of the population is employed in agriculture (DG-Agri, 2003). Despite the widespread use of traditional farming practices these systems are very polluting, because of the careless use of agrochemicals (Conte de Barros, 1991). What are the distinctive challenges for these small-scale, diversified farming systems, to be ecologically sustainable and economically viable?

By analyzing the organic farming sector of central Portugal, using case studies to explore how economic, legal and social factors affect economic viability of ecologically

sustainable farming systems, this study aims at shedding a light on the factors and processes involved in the expansion of sustainable agriculture in that region.

This work is based on the analysis of factors affecting choice of sustainable agricultural practices. Sustainability of farming practices at case-study level is assessed and the role of social and economic factors to determine their choice is analyzed in two separate sections. Then the findings at case-study level are discussed with regard to their implications for the development of organic farming and sustainable agriculture in general in Portuguese small-scale farming systems.

2. Methodology:

2.1 Sampling strategy:

i) Selection of case studies:

It was decided to study the factors affecting sustainability of farming practices and economic viability of organic farms in central Portugal at case study level, to allow for the analysis of farms in their real context. According to Yin (1993) case studies are the most suited method to research a problem where the context is an essential part of the study.

Case studies where then chosen with the aim to obtain a diverse sample in terms of motivation and experience in the organic farming sector. A total of 8 farms were chosen, 6 of which were organic and 2 of which were conventional farms.

6 organic farms:

- 2 farms which were organic prior to the introduction of organic farming subsidies in 1996 (referred to as O1 and O2). Farmers of the early days of the organic movement in Portugal are said to be idealists, viewing organic farming as a holistic response to environmental and social problems (Cristóvão *et al*, 2001a).

- 2 farms organic post 1996, where additional sources of income exist besides farming (referred to as O3 and O4). When farming is not the

only source of income, decisions on farming practices do not have to be based necessarily on economic rationality.

- 2 farms organic post 1996, where farming is the only source of income (referred to as O5 and O6). When farming is the only source of income, profitability of the farm influences decisions and farming practices to a large extent (Fowler, undated).

2 conventional farms for reference (referred to as C1 and C2); to assess factors inhibiting transition to sustainable farming practices and factors common to organic and conventional farming that affect ecological sustainability and economic viability of farms.

Using the website of the Institute for Rural Development and Hydrology (IDRHa, at http://www.idrha.min-agricultura.pt/agricultura_biologica/), the organic market of Coimbra and snowballing, farms fitting into the previously defined criteria where selected.

ii) Geographic location of case studies:

In order to obtain a sample reflecting the existing diversity of ecological and economic conditions, the case studies were selected in different areas of the central region, where small-scale, mixed farming systems and specifically horticulture are predominant. Figure 3 shows the location of the case study farms and the region where the interviewed experts are based.

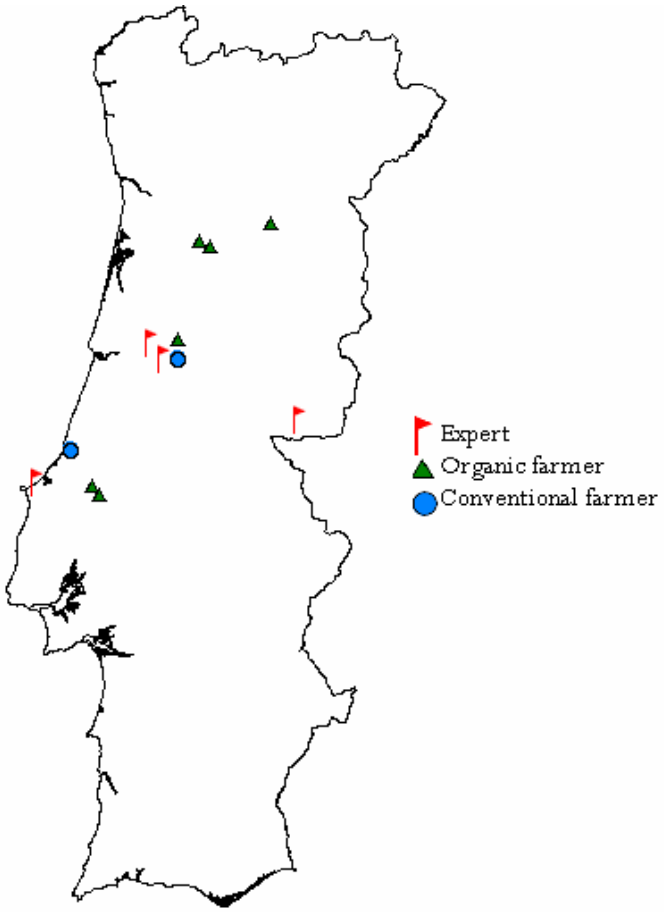


Figure 3 – Map of continental Portugal, showing locations of the organic and conventional farms and the places where the interviewed experts are based.

2.2 Methods used in research:

i) Semi structured interviews:

To obtain information on farm management and farmers outlook to farming it was decided to conduct semi-structured interviews. Semi-structured interviews are the most commonly used tool in qualitative research and their strength is that, in addition to covering predetermined relevant topics, they allow for the inclusion and follow-up of issues that arise during the interview, thereby allowing for the explanation of complex phenomena in detail and context (Mason, 1996).

The semi-structured interviews had duration of approximately 1h30 and were conducted with the head of each farm enterprise during a visit to the farm carried out in July 2005. The interviews were followed by a visit to the farm, allowing for direct observation and confirmation of interview data.

The semi-structured interview (see Appendix A) was designed to obtain an account of the economic and legal factors affecting ecological and economic sustainability of the production-marketing cycle, and simultaneously to gather information on human and social capital assets.

The interview was divided into the following topics:

- *Demographic information:* to compare farmers according to age, and experience in farming.

- *General characterization of farms and farmers' commitment to organic farming:* to obtain information on farm type and history as well as social factors affecting farm management.

  The outcome of agricultural policies is largely determined by the interpretation and perception of the structural situation they produce, by local actors (Long, 1992). Social and human capitals play a major role in determining sustainability outcomes at local level (Pretty & Smith, 2003). Therefore being aware of farmers' life-worlds is important to understand how decisions that affect ecological sustainability of farming practices are made.

  The topics covered were:

  - Farm area and main products;
  - Conversion (motivation of farmers to switch to organic production and perceived changes);
  - Learning opportunities for sustainable farming (technical training and extension services);
  - Associations (cooperation among farmers at production level and among different actors at marketing level).

- *Ecological sustainability of farming practices*: the farmers were asked to describe which farming practices they use for fertilization, pest and weed management, crop management, seed sourcing and irrigation, to asses the overall ecological sustainability of farming practices at farm level. In

addition, the reasons for opting for each farming practice were enquired to evaluate the relative importance of each factor affecting farmers' decisions.

- *Marketing*: economic viability of farms depends on the marketing practices, that are legally regulated and whose success is influenced by the overall economic situation of a country. The organic market chain does not coincide with the conventional market chain. Certification, adding value and direct marketing are of special importance to guarantee organic farmers a bigger share of the final price of their products (Pretty, 2002). These characteristic aspects of the organic marketing chain were inquired.

- *Policy incentives and impact at farm level*: farmers outlook on farming subsidies and on other policies impacting on their farm were surveyed. Area payments for organic farming under EC Regulation 2078/92 are supposed to enhance economic viability of farms during conversion to organic farming, therefore their impact at farm level was given special attention.

ii) Additional information:

In order to supplement the information gathered in the interviews with farmers, it was considered relevant to interview stakeholders of the organic farming sector to gain a more detailed understanding of the issues raised by farmers. With the aim of obtaining diverse insights and specialist opinions 4 people considered to be experts in different areas related to organic farming were selected. The experts selected were:

- Expert 1 – Agricultural engineer and responsible staff for the demonstration project of organic farming from the Portuguese national Nature Conservation NGO *Quercus*. Considered to be relevant for a perspective on the involvement of associations in the development of sustainable agriculture.

- Expert 2 - Agricultural engineer teaching on organic farming courses, he also owns a specialist shop and therefore has experience in the marketing sector of organic products.

- Expert 3 - The director of one of the 3 Portuguese organic farming certification enterprises. Considered to be relevant for his long involvement (over 15 years) in the organic sector and specialist knowledge on certification.

- Expert 4 – A forestry engineer belonging to a forestry association financially supported by the Ministry of Agriculture[2], responsible for receiving the applications for agricultural subsidies in 3 municipalities. Expert 4 can be considered to be a delegate from the Ministry of Agriculture and was indicated as the most appropriate interviewee by the local office of the Ministry of Agriculture of Lousã. It was preferred to search for an interviewee of the ministry in a small town rather than in the capital city of the central region, to achieve a more representative response.

Interviews to organic farming experts were confidential and largely mirrored the semi-structured interview conducted with farmers.

In order to gain a deeper understanding of the issues raised during the interviews and the observations carried out at farm level, relevant literature was reviewed and websites and publications of organic associations were consulted. In some cases additional information or clarification was requested from associations.

[2] Ministério da Agricultura, Desenvolvimento Rural e Pescas (MADRP), for simplification referred to in this text only as *Ministry of Agriculture*.

2.3 Data Analysis:

The data generated during the interviews was tape-recorded and transcribed as a translated English summary. Later it was indexed according to content in an Excel spread sheet allowing for a thematic analysis and comparison, applying the methodology for qualitative data analysis as described by Ritchie *et al* (2003). Data related to the ecological sustainability of farming practices was additionally analyzed using the methods described below.

- *Farming practices:* for each farming practice the methods used were depicted and scores of ecological sustainability were ascribed according to the Indicator of Sustainable Agricultural Practice (ISAP) as proposed by Rigby *et al* (2001).

- *Indicator of Sustainable Agricultural Practice:* the Indicator of Sustainable Agricultural Practice (ISAP) (Rigby *et al*, 2001) is constructed on the basis of theoretic knowledge on ecological sustainability of farming practices rather than on the effects at individual farm level. Farming practices have a defined score that is summed up to obtain the ISAP that varies between -16,5 and 26,5, undergoing a linear transformation to obtain a scale between 0 (most sustainable) and 1 (least sustainable). In this case-studies the most relevant farming practices are analyzed and not exhaustively the practices in use on each field. If farmers describe two methods as being important on their farm the scores are averaged, representing a use of the practice on 50% of the farmed area.

- *Factors affecting choice of farming practices*: in order to assess the relative importance of various factors for determining the sustainability of farming practices chosen, the factors cited by farmers as affecting their options were categorized and analyzed according to the following typologies:

    - *Economic factors* – considerations regarding cost-effectiveness;
    - *Legal factors* – compulsory prescriptions laid down by law;
    - *Knowledge of the practice* – farming practice used for good experiences with it, lack of awareness of alternatives or ecological considerations;
    - *Availability* – resources or practices used or not for possibilities of obtaining them;
    - *Advised* – option for farming practice based on technical advise of agricultural extensionist or other farmers;
    - *Other* – factors not described above.

3. Overview of case-studies:

Out of 8 farmers 2 farmers were under 40 (O4 and O5), 5 farmers were aged 40-65 and 1 farmer was over 65 (C2). 3 farmers were women (C2, O1 and O5). The conventional farmers and O1 and O3 worked as farmers since more than 20 years. The other farmers started in the 1990's.

All 6 organic farms and 1 conventional farm analyzed were mixed farms, even though this work focuses on crop production only. Farming was the only source of income for the two conventional farmers and for the organic farmers O5 and O6. Farmer O4 derives almost all of his income from farming; however he retails conventional products together with his own. Farmers O1, O2 and O3 derive a minor proportion of their income from agriculture.

Farm size varied between 2 and 40 hectare, out of the 8 farms only 3 were larger than 10 ha. Table 1 gives an overview of the 8 case study farms. A short description of every case-study farm can be found in Appendix B.

Table 1 – General characterization of the case study farms: Farm code, age of head of farming enterprise, date of conversion to organic farming, motivation for conversion, farm workers, farm area under organic production, conversion and conventional farming and main crops produced.

Farm	**Age**	**Year of conversion**	**Motivation**	**Farm workers**	**Area**			**Main crops**
					organic	**Conver.**	**Conv.**	
C1	40-65		Too costly in labour requirements and knowledge intensive	Farmer 7employees	0	0	10ha	Horticulture: lettuce, cabbage, carrots
C2	>65		Lack awareness	Variable, seazonal workers	0	0	5ha	Tobacco, corn, oats, potatoes
O1	40-65	1981	Health and environment	Farmer sporadically family labour	2ha	0	0	Horticulture: potatoes, cereals
O2	40-65	1994	Environment	Farmer 2 full time employees, seasonal workers	40ha	0	0	Dry fruits, marmalade, wild aromatic herbs and horticulture
O3	40-65	2001	Environment and financial incentives	Farmer 1 employee, family labour	27ha	0	0	Horticulture: potatoes; sheep and feed cereals
O4	<40	2000	Environment and health	Farmer 4employees seasonal workers	9ha	1ha	0	Horticulture: potatoes, onion, garlic, carrots, lettuce
O5	<40	2003	Health	Farmer and husband 1employee	1.2ha	1.7ha	0	Horticulture: lettuces, cabbage, tomatoes, peppers, potatoes.
O6	40-65	1998	Health and environment	Farmer 21employees sporadic family labour	15ha	0	0	Aromatic herbs, seedlings, horticulture

4. Ecological sustainability:

4.1 Farming practices:

In this section the sustainability of farming practices in use on different farms is compared. A summary of farming practices in use on each farm can be found in Appendix C.

i) Fertilization:

7 farmers use animal manures to fertilize their fields (excepting C2). Conventional farmers additionally use synthetic fertilizers while organic farmers use compost. Farmers O1 and O5 mainly use compost. 2 organic farmers (O2 and O6) also said to use corrective mineral fertilizers, fertilizers made of algae, fish and guano. However animal manures and compost were preferred because they can be produced less expensively on farm. Figure 4 shows the scores of the Indicator for Sustainable Agricultural Practice (ISAP) obtained by each farm for fertilization practices in use.

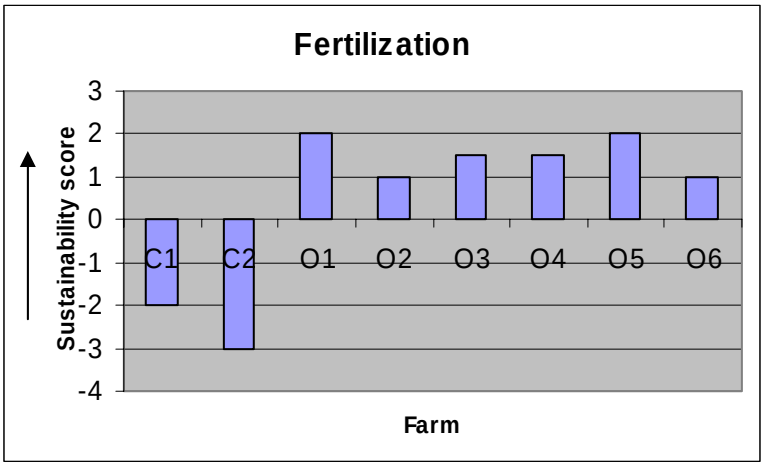


Figure 4 – ISAP scores obtained for ecological sustainability of fertilization practices for each case-study farm.

ii) Pest control:

Conventional farmers use pesticides for pest control. Out of the organic farmers 4 (O1, O3, O4, O6) said that the control is mainly preventive, through crop rotation and intercropping. Farmer O3 said that he did not need to use any type of pest control because his farm was on "*kind of an ecological equilibrium*"[3]. 2 other farmers (O1 and O6) focusing on pest prevention use self-made organic mixtures and natural pesticides allowed in organic production if there is a pest attack. The remaining 2 organic farmers (O2 and O5) also used crop rotation but pest control is made mainly with purchased products allowed in organic framing. Farmer O2 retails organic inputs and applies them if needed on his fields in addition to mechanical and cultural pest control. Farmer O5 has difficulties in accessing organic inputs and therefore relies mainly on Copper sulphate that is also used preventively.

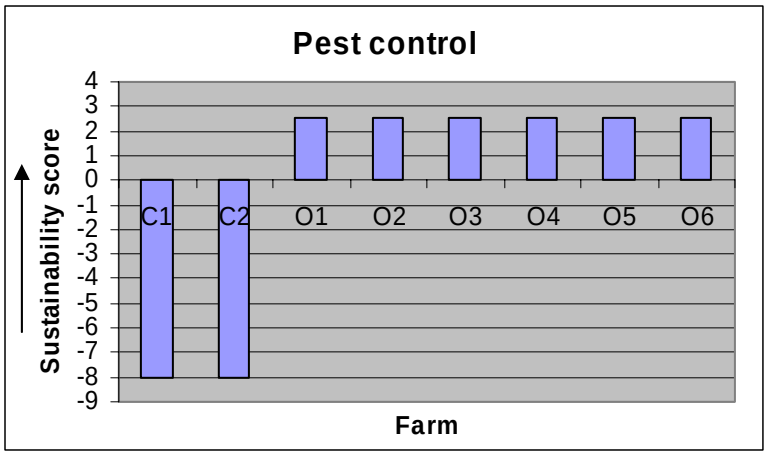


Figure 5 – ISAP scores obtained for ecological sustainability of pest control practices for each case-study farm.

[3] Note: All citations of farmers have been translated from Portuguese and shortened with the aim of briefly illustrating farmers' views. Any responsibility for interpretation is the authors own.

iii) Weed control:

All farmers rely on manual weeding. C1 usually uses herbicides but he cannot use herbicides on lettuce and therefore uses manual weeding. C2 does not use herbicides; she uses manual weeding and a weeding engine by animal traction (a donkey). 5 organic farmers use additional techniques to manual weeding, such as thermal and mechanical weeding, solarization, soil mobilization, intercropping and biodynamic mixtures to target specific weeds. Farmer O3 uses preventive weed control in the most effective way, relying on special cropping and irrigation techniques.

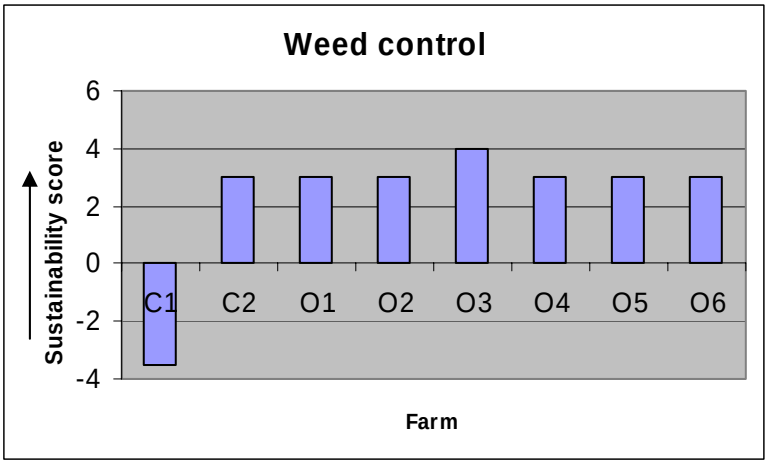


Figure 6 – ISAP scores obtained for ecological sustainability of weed control practices for each case-study farm.

iv) Crop management:

Conventional farmers use monocultures, even if these were not exceeding half a hectare each. Farmer C1 uses crop rotations whereas farmer C2 only occasionally changes the crop type grown on each field. Organic farmers mainly had small beds of each crop type or rows of different crops in alternation. Farmers O1, O4 and O5 mainly use crop

rotation. Farmers O2, O3 and O6 use rotations and intercropping, but the extent of intercropping is biggest on farm O6.

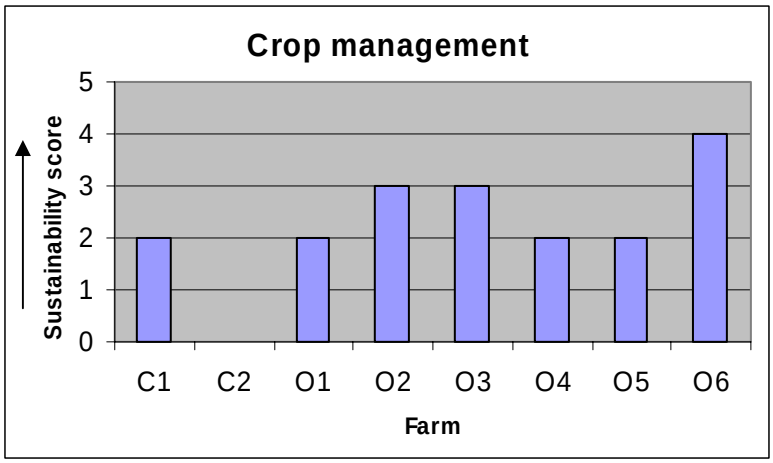


Figure 7– ISAP scores obtained for ecological sustainability of crop management practices for each case-study farm.

v) Seed sourcing:

Conventional farmers use high yielding hybrid varieties. All organic farmers keep at least seeds of some varieties from one year to the next. 2 farmers (O2 and O3) produce almost all seeds and seedlings they need. 3 farmers (O1, O3 and O4) use landraces of some crops.

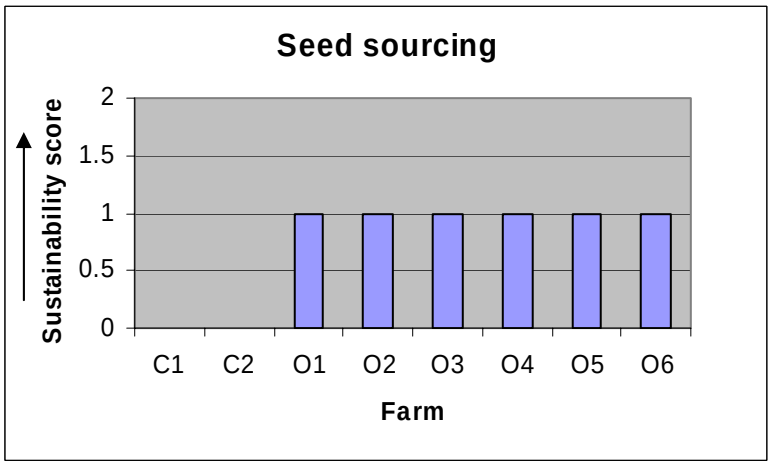


Figure 8 – ISAP scores obtained for ecological sustainability of seed sourcing practices for each case-study farm.

vi) Irrigation:

The year 2005 was unusually dry and therefore farmers had many problems regarding irrigation and some had to abandon fields after planting because of lack of water. The water sources were mainly natural and artificial wells and the main forms of irrigation were micro and macro aspersion, and flooding. Farmers C1, O4 and O6 were observed irrigating during the hot midday.

4.2 Indicator of ecological sustainability of farming practices:

The Indicator of Sustainable Agricultural Practice was determined according to Rigby *et al* (2001). The values obtained for the indicator underwent a linear transformation to obtain the ISAP. Figure 4 illustrates the relative sustainability of each farm studied.

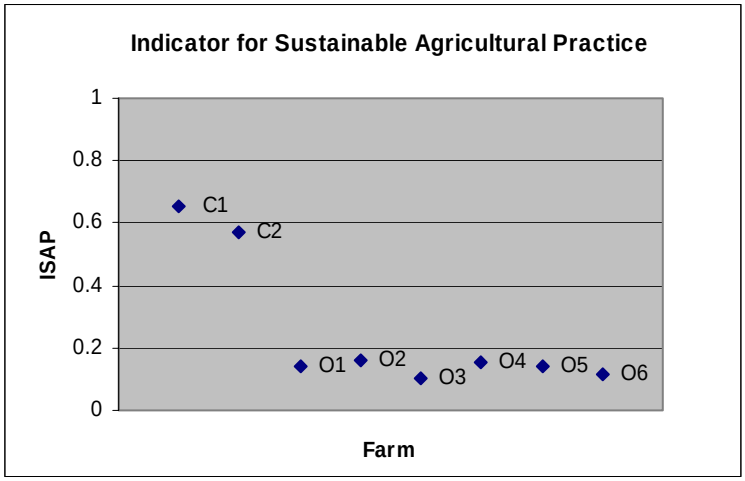


Fig. 9 – Relative sustainability of farming practices according to the Indicator of Sustainable Agricultural Practice (ISAP). Sustainability decreases from 0 (most sustainable) to 1 (least sustainable).

The conventional farmers where the least sustainable, but C2 had a better ISAP score because of not using herbicides. Out of the organic farmers farm O3 was the most sustainable, according to the ISAP.

4.3 Factors affecting choice of farming practices:

In Figure 10 the relative frequency of each factor cited as important for the decision of the farming practices is shown. In most cases (48%) farmers seemed to be satisfied with the practice actually in use or unaware of other options to reach the desired outcome. Economic factors made up 31% of the reasons cited for choosing certain practices. No single farmer cited legal factors as important for the choice of the farming practices.

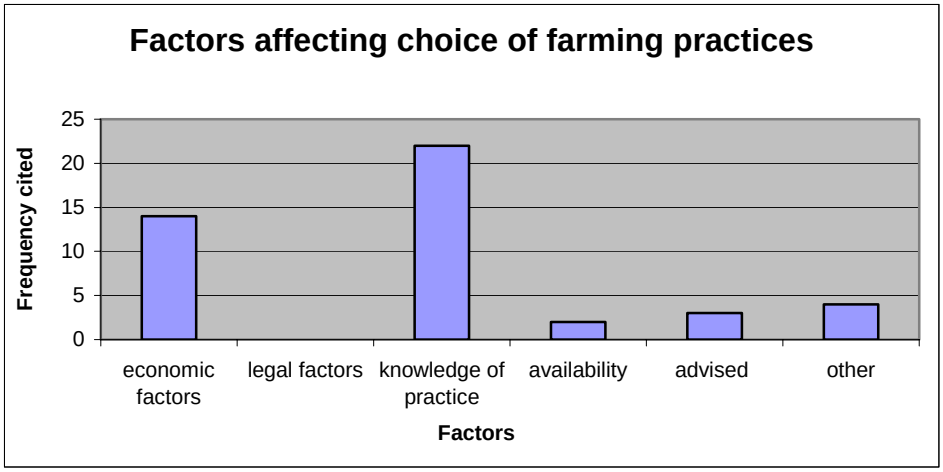


Figure 10 – Frequency of each factor being cited as decisive for choosing farming practice.

i) Economic factors:

The importance attributed to economic factors in determining choice of farming practices was different for each farmer. Figure 11 shows the frequency of economic factors being cited by each farmer.

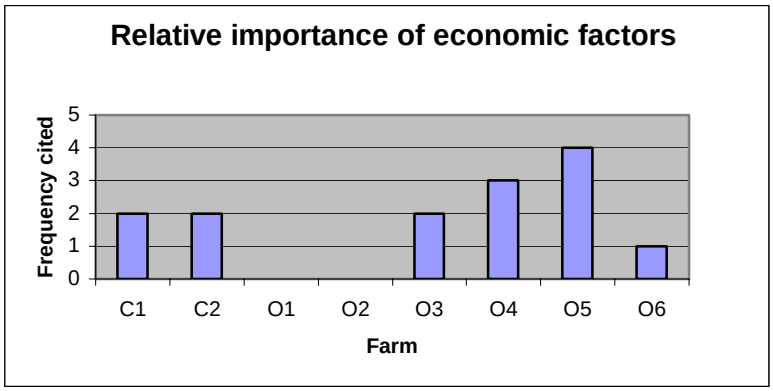


Figure 11 – Relative importance of economic factors as affecting the option of farming practices for each interviewed farmer.

The farmers who started to farm before 1996 attributed little importance to economic profitability for choosing farming practices. This can be explained through the fact that for both organic farming was not the main source of income. Farmer O5 attributed most importance to economic factors, trying to reduce the production costs through maximizing the use of on farm resources. Farmer O6 did not refer much to economic factors, but his enterprise is largely influenced by an orientation for profit, as is revealed by it having 21 employees and over 100 marketing outlets.

Reflections about economic costs and benefits can lead to a reduction of the use of external inputs in organic farming. Farmer O5 does not buy organic fertilizers or organic seeds, but rather produces them by herself to reduce production costs. Farmer O3 started to grow his own seedling because of the costs of buying seedlings from farmer O6.

Conventional farmers preferred hybrid corn varieties in order to get higher yields and increase profits. Farmer O4 produces some traditional varieties but only in small quantities as he has difficulties in marketing them. The traditional tomato variety he planted is not round but has saliencies on the top and this looks like an imperfection to

consumers who are used to completely round tomatoes. These tomatoes also have more seeds and water than conventional varieties, and consumers do not feel attracted by this, according to the farmer. He also produces a traditional potato variety, but here the problem is that the skin is very thin and easily damaged by the machinery, and then the product does not look as good as conventional varieties. The farmer also suggests that traditional varieties are big sized and these big sizes are not convenient for small households, as they are common nowadays. This idea might reveal a certain prejudice that traditional varieties are unpractical.

ii) Knowledge of the practice:

Almost half of the reasons given for using certain farming practices were related with knowledge of the used farming practice and overall satisfaction with the results achieved or lack of awareness of other options. In special farmers O1 and O3 found the practices used adequate for the ecological conditions of their farm and considered them to be successful enough to be continued (reflected in Figure 12). Farmer O5 who gave most importance to economic factors does rely less on her knowledge of farming practices.

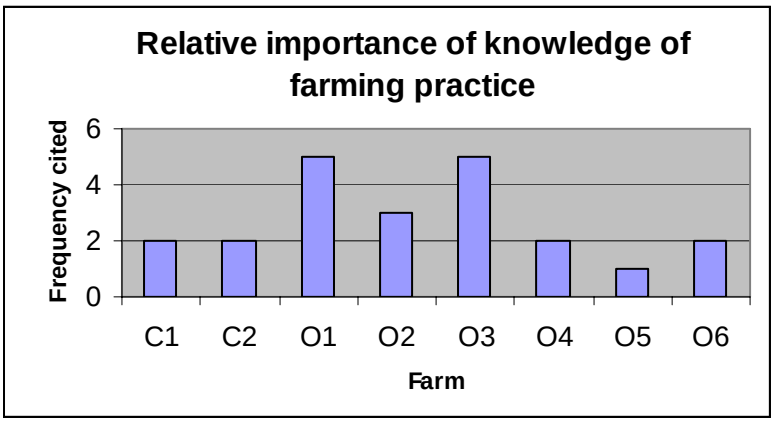


Figure 12 – Relative importance of knowledge of the farming practice as a factor affecting the option of farming practices, for each interviewed farmer.

Lack of awareness of other options led conventional farmers to use ecologically unsustainable practices. Farmer C1 had some awareness regarding the negative environmental impacts of his farming practices, but he considered that he could not have a good productivity without using conventional fertilization and pest control practices. In this vein farmer C2 complained to "*have to buy the fertilizers throughout all our life, we cannot make them ourselves.*" Asked why she used the bought fertilizer she answered "*Because the tobacco does not grow well without them. Neither the corn, nor the potatoes… If we don't add a special fertilizer to each crop they do not develop well*." Farmer C1 would like to irrigate in the evening to avoid evaporation, but as he shares the water canal with many other farmers he sees no other option than to irrigate at times when most water is available, this is during the hottest hours of the day when other farmers do not want to irrigate.

In the case of organic farmers, lack of awareness of alternative options did not necessarily compromise the sustainability of farming practices, because farmers might have learned a set of sustainable practices that are working well on their farms and so they do not feel the need to experiment or learn new possible practices to achieve the same outcome. In the case of weed control 3 organic farmers took preventive action, the other 3 farmers were unaware of the possibilities of using other methods than weeding. Farmer O4 revealed both to have a good knowledge on what the most sustainable farming practices are but also a belief in having no other options than using less sustainable practices in some cases, for economic reasons.

iii) Availability:

Farmers O1 and O2 use organic pesticides that they import from Germany and Italy. Farmers O5 and O6 who have limited access to organic inputs reduce their use. Farmer O5 utilizes Copper sulphate mixtures that are available in every agrochemical retail shop and allowed in organic farming while farmer O6 produces his own organic fertilizer and pesticide mixtures.

The reduced availability of inputs for organic farming may increase the sustainability of the farm if more sustainable alternative practices are found. However, in the case of farmer O5 the difficulty to access organic pesticides might lead to an excessive use of Copper sulphate.

The farmers produce their own seeds and seedling because of the limited availability of organic propagation material. Farmer O6 produces seedlings for sale. Farmer O2 started to produce his own seeds and seedlings since his usual supplier "*Triplanta*" discontinued production. Farmer O5 uses the seedlings that are self propagated on the border of the beds of the plantations of the previous year.

Farmers use animal manures for fertilization because they keep animals on farm. Farmer O6 keeps animals for purpose to obtain organic animal manures that he can apply to the field, as there is no place where he could buy organic manures.

iv) Technical advice:

Conventional farmers receive technical advice from an agrochemical retail centre (C1) and from the Tobacco cooperative "*Agrotave*" (C2). These advise specific "*products*" for each crop type and each phytopathology. Farmer C1 receives a visit every Friday from the extensionist employed by the agrochemical retail enterprise. He is happy to receive free technical advice and says "*like the physician advises medication for man, the extensionist advises agrochemicals for the plants*". This suggests that the advice of the extensionist is respected in a similar way to the advice of a physician, being hardly contested.

Organic farmers receive technical advice from the organic farming association they have to join for receiving the Organic area payment and also exchange information with other organic farmers. Farmer O1 tried milk and farmer O5 tried vinegar for pest control after advice given by other farmers. (Extension services available will be discussed under the heading *Learning opportunities* in the next chapter).

4.4 Perceived changes since conversion to organic farming:

The farmers were asked to evaluate the development of ecological, economic and social sustainability of their farm since conversion to organic farming by describing changes in biodiversity, productivity and priorities for farm management.

i) Biodiversity:

Five organic farmers say that the biodiversity on their farms increased since conversion. They report mainly more insect species but also farm birds (O3). Two farmers (O4 and O5) regretted that also pest species are more diverse on their farm than on neighbouring conventional farms. Farmer O2 noticed that his fields that lay close to conventional farms are more biodiverse than those. Farmer O1 did not speak about an increase of biodiversity because the farm was abandoned before it was farmed organically, so there were changes in wildlife associated to this change of land use.

ii) Productivity:

All farmers noticed changes in the productivity of their farm. Generally they noticed an initial decrease in productivity, but 4 farmers refer that with time productivity increased again. Farmer O5 refers that she can sell more produce since she converted to organic farming and so she also intensified production in some areas. Farmer O4 took part in an experimental trial of organic potato production and obtained ever higher yields during the 3 years of the experiment, ending up with higher yields than conventional farmers in the last year. He explains this as due to the building up of nutrients and organic matter in the soil of his fields, contrasting to the gradual depletion of natural fertility occurring

in conventional farms. Farmer O3 notices patchy changes in productivity: in areas with direct sheep grazing productivity increases but at whole farm level he noticed a decrease in productivity.

iii) Priorities for farm management:

Out of 6 organic farmers 4 say their priorities for the development of their farm changed since conversion to organic farming. These farmers say they learned many things about the environment and the negative impacts of conventional farming and so they would not return to conventional practices. The two other farmers (O1 and O2) started directly as organic farmers and so their aims for their farm did not change significantly since they started to farm.

5. Social capital and sustainability of farming practices:

In this section aspects of social and human capital that affect sustainability of farms are analyzed. First the personal commitment of farmers, revealed through reasons for converting or not to organic farming and investment in learning sustainable farming practices, is outlined. Then features indicative of social capital assets, such as cooperation among farmers, the work of organic farming associations and the relation between farmers and the Ministry of Agriculture, are described.

5.1 Conversion to organic farming:

i) First contact with organic farming:

In relation to conventional farmers, farmer C1 said he considered to shift to integrated farming, but organic farming was too labour and knowledge intensive for him. Farmer C2 was unable to explain what organic farming is: "*they use more certain kinds of products, right? But no, we farm in a natural way.*" She thought organic farming was less "*natural*" or ecologically sustainable than her way of farming. She believed to farm "*in a natural way*" with "*no contagious products*" and therefore possibly she felt no need to change farming practices to increase ecological sustainability.

The way how the 6 organic farmers first contacted with organic farming is different for each. They refer to experiences on the family home garden and discussions with student colleagues (O1 and O2) as well as information campaigns carried out by organic associations, reports on the media and neighbouring organic farmers (O3, O4 and O5). It is worth noting that the 2 organic farmers who started farming organically before

1996 had their first contact with organic farming early in life, whereas the other organic farmers only realized the existence of organic farming later on. The farmers who started to farm before 1996 started their agricultural work directly with organic farming, whereas the farmers starting after 1996 had been conventional farmers before.

ii) Motivation:

Figure 13 illustrates the 3 main reasons for conversion and the relative importance of each in the interviewed sample.

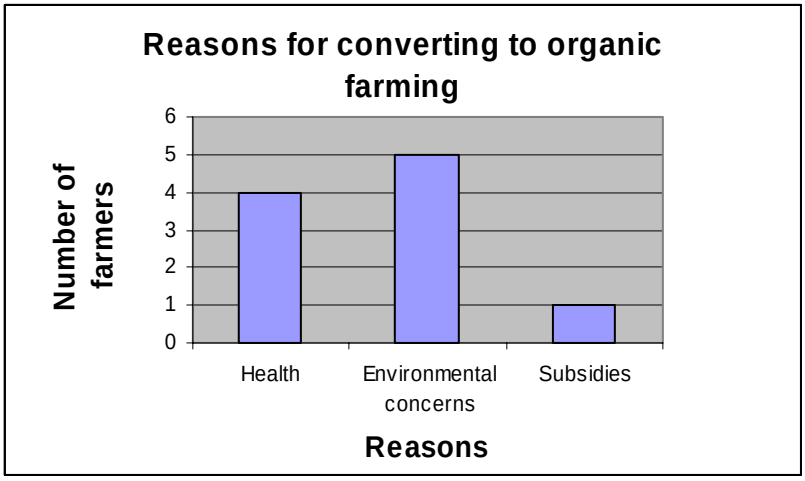


Figure 13 –Number of farmers who cited health, environmental concerns and subsidies as affecting their decision to convert to organic farming.

Organic farmers starting their activity before 1996 stress their environmental awareness and their wish to contribute to the "*preservation of life*" (O2) as their main motivation to farm organically.

O1, O4, O5 and O6 are motivated to farm organically for health reasons. Farmer O3 refers that his environmental sensibility, the accessibility of financial incentives and some pressure exerted by his daughters led him to convert to organic farming.

Farmer O4 became aware of the hazards of conventional farming when all the life in his lake died out because it rained short after he applied a pesticide and so it was washed into the lake. He reveals that he had thought before about converting to organic farming and he already had an organic home garden before this incident, but only thereafter he converted the whole farm. On his farm there is a conventional pigsty and he continues to retail conventional produce as well as his own. These are minor sources of income, which the farmer preferred not to reveal during the interview. But a participatory research work carried out on his farm by Machado (2005) was used for triangulation of the information obtained in the interview.

Farmer O6 started to work on an organic farm in Switzerland and continued this work when he returned to Portugal. There he introduced 4 other farmers into organic production, including O5.

Expert 2 described two contrasting reasons for people to join organic farming and its implications for the organic movement (Box 1).

Box 1 – Two contrasting reasons for people to start organic farming and implications for the organic movement (Source: Expert 2).

Two types of organic farmers and their role in the organic movement:

1) Farmers who convert to obtain Organic area payments: the financial support for organic farming is the highest subsidy available for farming; so many extensive farming systems that are easily converted to organic production methods are converted. This leads "*to the introduction of a certain number of hectares into organic farming statistics, even if what happened is not real conversion but rather maintenance of an extensive system or at best extensification*". This applies for 80% of organic farming, mainly in olive groves in the interior and south and for cereals in the Alentejo region. This gives a distorted picture of the development of the Portuguese organic farming sector.

2) To live according to ideals: many organic farmers and especially the first generation of the organic movement in Portugal chose to make a living from organic farming because they believe this allows for the most environmentally and socially responsible lifestyle. Despite their undoubted wish to maximize sustainability on their farms Expert 2 explains the drawbacks of having mainly "*idealists*" in the initial phase of organic farming in Portugal: "*People from the historic initial movement, frequently had no real connection to farming. This was of course a big inconvenience. They frequently did not have the minimum impact on their communities because they distanced themselves. I used to say that the people of the initial phase did not have the objective to develop organic farming in a broader perspective. Frequently they had only an interest in developing their own organic farm. But this is a very limited view that I was always against. I worked for some time with farmers and thought that if there is a farming model worth to be defended and developed we have the "moral obligation" to spread the message to people who do not have the slightest idea about the existence of alternative ways of farming. This is a perspective that most people from the initial movement did not share*."

For the farmers starting their activity before 1996 there was no legally binding conversion. O1 is a German immigrant who settled on her actual farm which had been abandoned in 1981, starting directly with organic farming. O2 took over the farm of his parents, converting it to organic production, in 1994.

Farmer O6 converted and expanded his farm when he returned from Switzerland in 1998. The other 3 organic farmers converted after 2000. Farmer O3 still has his sheep under conversion and farmer O4 and farmer O5 have one field under conversion.

Expert 2 said it is fundamental that farms that convert to organic farming have a well adapted plan for conversion. Expert 3 stressed the paperwork associated with certification of organic farming: farmers have to learn and get used to keep a documentary report about their work. Additionally both experts consider "*Mental conversion*" (Expert 3) as very important. Farmers have to learn to think about preventive action and how to make the best use of the whole farm system rather than to rely on "*easy solutions*" when a problem appears (Expert 2). These views confirm that learning is very important for the transition to a more sustainable approach to farming.

5.2 Learning opportunities:

i) Sources of information:

The farmers felt that it is difficult to find relevant information for their particular problems. Farmer O6 said "*if there is a problem I have to solve it by myself*", using past experience and trying to experiment and adapt it to the present situation.

Conventional farmers relied mainly on extensionists from producer cooperatives or the agrochemical industry for advice on farming practices. Organic farmers referred 6 different types of sources of information that they use to find out about farming practices in case of experiencing difficulties on their farm. Figure 14 shows the number of farmers using each of the different sources of information referred to: officials from organic farming associations, on-farm experimentation, advice by other farmers, the internet, books and the media and extensionists.

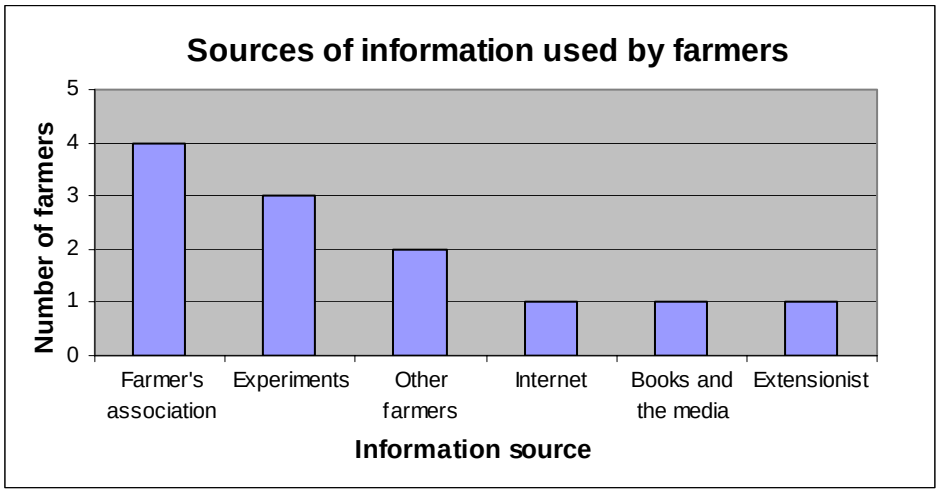


Figure 14 – Number of organic farmers using each type of information source.

Organic farmers need to be members of an organic farming associations if they are to receive organic area payments, therefore associations were the source of information mostly used by farmers. Only 2 farmers out of 8 (O1 and O4) say that they frequently search for information about farming practices and try to keep themselves actualized. Farmer O3 and O6 draw on their past experience in farming. Farmer O6 said not to use books or other sources of information to find information about farming practices.

Cooperation among organic farmers exists, but in central Portugal organic farms are much dispersed making a regular contact difficult. However, also neighbouring farmers do not always cooperate. Farmers O2 and O4, living in nearby villages dismiss opportunities for cooperation. In several instances organic farmers were found to speak in a depreciative manner of each others work. In other cases farmers do cooperate, such as for farmer O5 who receives much technical advice from farmer O6, who has more experience with organic farming than she has.

ii) Extension services:

Farmer O6 said that extensionists from agrochemical enterprises are widespread and already have a good knowledge about inputs allowed in organic farming. They also visit him from time to time and try to sell their products.

Expert 1 reflected upon the lack of technical advice for farmers from the Ministry of Agriculture. The lack of competent advice leads farmers to adopt unsustainable practices because they are advised by extensionists from the agrochemical industry and they sometimes do not know exactly what the requirements to receive the subsidies are. Farmers may saw cereals on steep slopes to maximize the area eligible for subsidies,

because they are not told that they can leave stripes unploughed to avoid erosion and receive the area payment anyway.

Expert 4 described the way how farmers are informed about the organic farming subsidies and other subsidies they can apply for. "*Every year before the application deadline we make a public presentation to explain farmers which subsidies exist and what they have to do to apply. We explain every little detail.*" However, the PowerPoint presentation used for this purpose only informed about the Traditional policultural systems payment under the Agri-environmental Measures and not about Organic farming subsidies.

iii) Technical training:

Organic farmers have to attend a course on organic farming, administered by the Ministry of Agriculture or recognized organic farming associations, to be eligible for the Organic area payment.

100 members of staff of the ministry of agriculture have joined a course on organic farming, lasting 80-90 hours. However, frequently the acquired knowledge is not used or refreshed for a long time and so the training for conventional farming, that is more deeply engrained, is not challenged (Expert 1). Expert 1 estimates that in Portugal there exist 20 well trained technical advisers for organic farming (from the ministry and associations) while Expert 3 speaks of 6.

Expert 3 said "*There are neither adequate nor inadequate infrastructures for farmers to learn about organic farming: they do not exist practically*". According to him even if

there are people willing to transfer knowledge on sustainable farming practices to farmers, there are not enough sources of information about sustainable practices adapted to Portuguese conditions, because there is no good centre for experimentation and research in organic farming in Portugal. However Expert 3 thinks that the amount of research in sustainable agriculture is increasing promisingly, even if the efforts of various institutions might still be disjointed.

5.3 Associations:

i) The role of existing organic farming associations:

Most organic farming associations help farmers to apply for subsidies and give technical advice. Additionally they promote organic farming in different ways.

Organic farmers' associations frequently help farmers to apply for the Organic area payment. However farmers might have to go to the office of the association, as is the case for farmer O3 and O6 whose associations offices are almost 300 Km away. Farmer O4 complained that despite of the big facilitation of being able to apply for the subsidies via his association, rather than in the offices of the Ministry of Agriculture, still some useless bureaucracies are required, such as the yearly delivery of a copy of the certificate that he once joined an organic farming course, despite of the files about his farm being kept by the association.

This year farmer O5 had an important pest attack on the lettuce fields and she phoned to the Engineer responsible for technical advice of her organic farming association. The engineer advised her to make a mixture herself out of many ingredients "*it seemed rather to be a soup*" and "*was unpractical to be made in the quantities I needed*". This account illustrates the fact that farmers may be sceptical about trying unusual things and also that technical advisers might be far from the field and not considering the practical aspects important for an effective intervention. Farmer O3 says that when he asks the association for technical advice the officer knows less than he about the problem and the specific conditions of his farm.

Expert 1 explained that some of the existing organic farming associations are a collection of farmers wanting to reap the high area payments they can get for their large extensively managed or abandoned landholdings, with reduced technical capacity and no serious interest in promoting sustainable agriculture.

The membership fee of organic farming associations increased drastically since technical advice is provided. Farmer O3 pays 275 € per year because he searched for the cheapest association.

ii) Importance of associations to promote sustainable agriculture:

The existence of associations and cooperatives was described as being very important for the development of organic farming and for the improvement of the structure of the agricultural market chain in general. But the amount of associations and the scope of their activities were classified as rather insufficient. The explanations for this situation were social and economic.

Farmer C1 said "*farmers should cooperate and form associations. But this is difficult in this region because farmers do not have the same mentality an there is mistrust between them*." Expert 3 explains that "*the low level of schooling of most farmers makes it difficult to organize; people do mistrust associations because they don't know what is going on there. The problems begin when the association grows big: people start to distance themselves and to disagree with the management. Then problems arise and farmers start to work against each other*." Informal associations for seed exchanges and sharing of machinery are nevertheless being developed and seem to be more effective (Expert 3).

Associations and cooperatives are markedly important to structure the marketing chain of agricultural products. Producer and consumer cooperatives would be important to guarantee possibilities for sale and better prices for farmers and to assure consumers of the quality and ecological soundness of products.

Expert 1 said that the amount of agricultural products being wasted in Portugal because of the lack of producer cooperatives is enormous. As small-scale agriculture predominates each farmer cannot produce quantities big enough to sell for a retailer or even worth for going to a market. However if producers would associate and sell their products together they could be profitable.

Expert 3 reflects that farmers are not motivated for farming because the income in agriculture is so low. They rather wish to escape agriculture than to improve it. Farmers also do not have time to get involved in much voluntary work for an association; therefore financial help from the ministry is required for effective associative work. There is a program for the creation of farming and forestry associations with financial support throughout 5 years (MADRP, 2005). But according to Expert 1 existing associations are not well enough supported. He feels that if farmers and associations start to claim for their rights they are "*boycotted*" by the Ministry of Agriculture (do not receive eligible financial support). Expert 1 asked an organic farming association to help him to go to Court against the financial guarantee section of the Ministry of Agriculture (IFADAP) and they denied help because the ministry was in debt to them for 3000 € and they did not want to lose this money.

Expert 1 charges the Ministry of Agriculture to be responsible for the lack of farmers' associations and cooperatives. He regrets that the role of associations is not recognized by the Portuguese government: "*In Spain the government supports associations. There are associations for everything: orange tree owners and milk consumers…The local government sees associations as partners, because associations do important work at very low costs. If the governments would have to do the job it would be much more expensive*".

European Union financial support programmes for farming associations and projects have to be co-financed by the Portuguese government, which passes on the duty of co-financing to the associations which do not have money to use these supports. Therefore the only possibilities associations have to use financial support measures is by accounting their own financial contribution to the project as being higher than it is in reality, through charging services done by the association at higher prices than usual and, on the other hand, by declaring overly high costs of carrying out the projects to receive more money, thereby being able to reduce their own financial contribution (Expert 1).

5.4 The interface farmers/Ministry of Agriculture:

i) Farmers' and experts' outlook on the Ministry of Agriculture:

Farmers revealed to be largely biased against the Ministry of Agriculture, in particular against the staff of local offices of the Ministry of Agriculture. Most of the complaints are based on negative experiences with applications and payments of farming subsidies. In box 2 some of the comments about the Ministry of Agriculture are reported for illustration of farmers' accounts.

Box 2 – Farmers' comments on the Ministry of Agriculture.

Farmers' comments on the Ministry of Agriculture

"*The elder staff of the ministry should be retired or sent for sheep grazing to the hills. This would be the best, so they could get much missed first hand experience on farming! Now they are there in the offices only waiting for retirement, and now the age of retirement raised and so we have to wait even longer for changes… If someone needs anything from the local office he has to wait for hours to get attention from the responsible member of staff. They are there, paid to serve the farmers, but they sit there and behave like they are kings. And we have to come and wait and then ask kindly "could you please…" They open late and start with a coffee break. And at 4 pm they are already closing.*"

Farmer O6

"*With everything I had to deal with them I had bad experiences.*"

Farmer O4

The Ministry of Agriculture was blamed not to do enough to promote national and organic produce. The Ministry of Agriculture should cooperate with the ministries of health and education to promote organic farming.

Expert 3 explained that there is too less cooperation among ministries and rules set up by the ministry of the environment can difficult the promotion of organic farming by the

Ministry of Agriculture. This is the case of licensing olive oil mills: the Ministry of environment wants to close mills down because of the effluents that are commonly disposed in nearby rivers. However, for the Ministry of Agriculture it is important that many olive mills remain working and that some are certified for organic olive oil production. The effluents could be used as a fertilizer for organic farming.

ii) Farmers' and experts' outlook on agricultural policies:

The farmers, when asked about agricultural policies, showed either a general discontentment without elucidating its background or they explained that the macroeconomic environment is causing many problems that should be tackled somehow by the government. Some farmers reported concrete policies that they felt were causing them difficulties or unfair working conditions.

The conventional farmers interviewed and farmer O1 said they prefer to keep themselves away from policy matters. Anyway they thought that the general policy environment was not good for farming but they were unable to explain concrete impacts of policies on their farm.

The farmers referred the dumping of agricultural products, mainly products imported from Spain, as undermining the prices of Portuguese agricultural products, and thereby harming the profitability of their farms, through making conventional products artificially cheap.

Some farmers gave an account of their problems with specific policies and experts further described the implications of some policy measures. Below policies that directly

impact on farm management and that have been criticized by the interviewees are set out. Other policies that impact on marketing possibilities will be described in the section on economic viability.

Policies affecting farm management criticized by farmers and experts:

- *Single area payment scheme:* The introduction of the single area payment for livestock, in 2005 is based on the historic number of animals kept; this is, for the reference years 2000-2002. Farmers who increased their herds or destocked are receiving disproportional amounts of subsidies. Farmer O3 started sheep farming in 2001 and increased his herd ever since, now the introduction of the single area payment scheme reduced the amount of subsidy he receives by half. In contrast farmers who had large herds and even ceased farming livestock after 2002 are now receiving much financial support payments through the single area payment scheme.

- *Decoupling of farming subsidies from production:* Before the introduction of the Single area payment scheme several steps to decouple financial support from production have been implemented. These support measures were heavily criticized by farmers O4 and O6. They say that this policies "*promote not-farming rather than farming*" because farmers do not need to produce or market anything to be eligible for subsidies. So many farmers abandon their fields and call it "*set aside*" or "*permanent pasture*" or they only sow their fields but do not harvest them, nevertheless they can receive large amounts of subsidy. These payments

also favour large farms over smaller ones. Rich owners of *herdades* in the Alentejo region reap the highest proportion of the budget available for farming. Farmer O4 does not understand the policy background of single area payments and suggests "*this policy is only possible because people related to the ministry have big farms and want to get subsidies without doing anything*".

- *Failure to apply polluter-pays principle to farming:* Expert 3 underlined the fact that organic farming is not competitive because environmental costs of conventional farming are not internalized, so conventional agricultural products are artificially cheap rendering organic products less attractive for the average consumer.

The experts were happy about the publication of the Portuguese National Action-plan for the Development of Organic Farming (MADRP, 2004), but they wondered when and how it would start to be implemented. This plan was delivered to the government of Durão Barroso in 2004 and should enter into force at date of publication. However, due to the policy crisis Portugal went trough since the leave of Durão Barroso, not much work has been advanced in the area of organic farming since then. The main institution responsible for the implementation of the Action-plan has still to be created.

6. Economic viability of organic farms:

In this section factors affecting economic viability of the case-study farms are described. First the role of financial support measures and certification of organic production are outlined. Then costs of agricultural labour and processing and marketing practices are analyzed according to implications for the profitability of the farm.

6.1 Organic area payments and other financial support for farming:

i) Subsidies used for farming:

Out of 8 farmers only one (C1) did not use farming subsidies. This farmer does not own most of the land he farms and is renting the land without a contract because the land belongs to elderly people who argue that it is less costly to abandon the land than to spend money in legalizing the ownership and paying taxes. In Portugal the ownership of landholdings is frequently unclear, as large areas are abandoned and farms have been split up as they are passed from one generation to the next and the new ownership is not registered in order to avoid paying registration fees. Therefore it can be said that large areas of the Portuguese territory are owned by the death (Vieira, 2003).

Figure 15 shows the number of farmers using each of different farming subsidy schemes. Organic farmers (O2, O3, O4, O5 and O6) receive the Organic area payment scheme from the Agri-environmental measures. Farmer O5 received subsidies for conventional horticulture and applied this year for the first time for the Organic area payment scheme. Farmer O1 is not certified as organic farmer and therefore does not

receive this subsidy; she applies for the Traditional policultural systems scheme, also from the Agri-environmental measures, and for Compensatory payment. Farmer C2 receives subsidies for conventional production of tobacco and cereals.

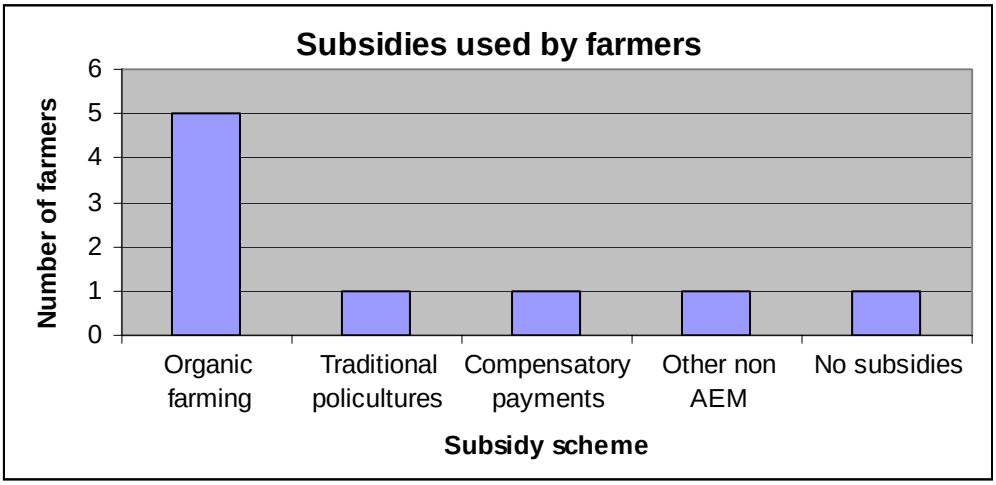


Figure 15 – Number of farmers using each type of subsidy (AEM – Agri-environmental measures).

ii) The Organic area payment scheme:

For receiving the organic area payment farmers have to:

- Have a minimum area and density for each crop type;
- Register as organic farmers at IDRHa (Institute for Rural Development and Hydrology);
- Be certified as organic farmers, according to EC Reg. 2092/91 by a registered certification enterprise;
- Have a contract for technical assistance with an organic farming association;

- Submit a working plan for the entire area under organic production, validated by the organic farming association;
- Sign the contract to comply with conditions set out by the Organic area payment scheme for 5 years (IFADAP and INGA, 2005).

Expert 4 argues that the fact that Organic area payments and Agri-environmental measures in general require a 5 year contract discourages elderly farmers to join the schemes, because they are afraid of not being able to comply with the conditions set out by the contract for 5 years and then to be obliged to pay the subsidy back.

The farmers described the farm management requirements to receive the Organic area payment as equivalent to organic farming as outlined in EC Reg. 2092/91 and considered it to be adequate. However most farmers complained about the paperwork and incompetence of the staff from the Ministry of Agriculture, which "*distracts farmers from farm work*" (O6). Box 3 gives examples of problems farmers had with receiving subsidies they were eligible for.

Box 3 – Farmers accounts of problems in receiving agricultural subsidies.

Farmers accounts of problems in receiving agricultural subsidies

Farmer O2 has not yet (July 2005) received the subsidies for the year 2003 and says these delays are common, because small details of farmers' applications are not clear and have to be changed over and over again. He describes why he does not apply for conventional cereal subsidies anymore: "*I had 10 ha of* Culturas arvenses *subsidy. But once the control from the Ministry of Agriculture came and said that I would not receive the payment because I was not using the right farming practices, because there were too many weeds. I said that under organic production I am not allowed to use herbicides. I wrote to IDRHa and asked if I should have used herbicides and they decided that only the official who did the control could decide if I used the right farming practices or not. I did not receive the subsidy.*"

Expert 1 took 5 cases to Court, because similar situations happened on the farm he was responsible for. In his case IFADAP (Institute for Financial Support for the Development of Agriculture and Fisheries) requested the amounts received through the subsidies to be paid back, because officers responsible for control did not agree with the use of organic farming practices.

The experts reflected about the limitations of defining organic farming as outlined in EC Reg. 2092/91. Expert 1 focuses on the lack of reference to practices to avoid soil erosion and says that the requirement to "*use good agricultural practices*" is too vague as to be implemented and controlled. In the case of organic cereal farming no intercropping is foreseen and farmers who insist in doing it disguise it as "*weeds*" in case of control (Raposo, pers. comm.).

iii) Economic importance of the Organic area payment scheme:

All 5 farmers receiving the Organic area payment scheme said they would continue to farm organically even if the would subsidy would cease. For farmer O3 the subsidies are important for economic viability of his farm, as he uses the money received to pay a

full-time farm worker. This farmer receives subsidies for organic livestock and cereal production as well as for horticulture.

Farmer O5 has not yet received the Organic area payment because she applied this year for the first time for this subsidy. The profitability of her farm has been achieved independently of this scheme. Farmers O2, O4 and O6 welcome the additional income to pay the rent and to acquire new machinery, but they reveal that subsidies do not make the difference for economic viability of their farm.

Most farmers found the relation between subsidies for horticulture and other crop types insufficient to promote organic horticulture. Despite the subsidy for organic horticulture is 600 € per hectare, more than for most other crop types, they explain that the work amount related to horticulture is disproportionately higher than for all other crop types. While for cereals and tree plantations the workload is so reduced that in some cases the subsidies make farming profitable without harvesting and selling the produce, in the case of small-scale horticulture the subsidy is not enough to pay for the expenses of certification and the compulsory membership to an organic farming association. For small-scale horticulture it might not be worth to apply for organic farming subsidies because the costs implied for receiving them are higher than the subsidy itself.

Expert 3 explains that many organic farmers certified by his enterprise do not apply for Organic area payments, as the workload and the expenses related to them renders them unattractive to many farmers. Also some organic farmers want to be independent of any control and externally imposed rules on how to farm.

In general it can be said that organic farming subsidies did not attract farmers to organic horticulture and economic viability of organic horticulture is largely independent of Organic area payments. The subsidy for organic horticulture does not represent and adequate incentive for small-scale farmers to switch to organic production.

For other farming sectors, it is the Organic area payment that allows for the maintenance of extensive, sustainable farming systems, which would not be economically viable without these payments. In these cases Organic area payments have the same effect as the Compensatory payment scheme (Expert 3).

iv) Other financial support measures:

Farmers (O5 and O6) used financial support measures for the installation of greenhouses and farmer O4 received financial support for purchasing machinery. Farmer C1 had to purchase the greenhouses using a bank loan because he could not apply for financial support as he is not the owner of the landholdings he farms.

6.2 Certification of organic production:

i) The certification process:

Out of the 6 organic farmers interviewed only O1 was not certified for organic farming. In this case, organic farming is mainly practiced to produce free healthy food for home consumption and only the overproduction is sold. For this farmer organic farming represents less than 50% of her income.

Farmer O2 and Expert 3 reflect about the additional documentary report that farmers are required to do in order to be certified. According to them many farmers do not like the idea of being controlled and resist providing all the documentary evidence required by certification enterprises. One of the explanations given is that farmers fear that they will have to pay more taxes if all their sales can be controlled.

Certification is coupled to technical advice; a visit to the farm holding has to be made at least once a year. One of the certification enterprises, covering about 100 organic farmers has an average of 1,4 visits per farm per year (Expert 3).

Farmer O2 says that the stringency of the control varies according to the certification enterprise and that he hopes very much that consumers will learn to distinguish between the quality of each enterprise.

ii) Economic importance of certification:

The certified organic farmers say that certification is very important to guarantee a premium price and to guarantee consumers a distinct quality and mode of production. Without certification organic farmers would have to sell their produce at conventional prices or they could sell only locally to consumers who trust them. Certification opens up a market niche that is important for organic farming to be economically viable.

The farmers thought of certification as being expensive, especially for small-scale producers. The costs of certification are about 150 € per ha open air and up to 250 € for greenhouses. If farmers associate for production and marketing the costs can be reduced (Mantas, pers. comm.).

Expert 3 believes that "*certification is only viable for big producers because the certification costs amount approximately 50% of the production costs* (excluding labour) *for small producers and so it is out of reach*". Therefore the costs of certification might exclude small-farmers to market their organic overproduction. For this reason it seems that certification of organic farming by private enterprises favours large farms, where certification costs represent a minor proportion of production costs.

To avoid that organic farming becomes a parallel large-scale, intensified farming model it is important to develop alternative forms of certification. Expert 3 explains how a complementary form of certification could work: "*in participatory certification the costumers themselves verify if the farming practices used on a particular farm are in accordance with their expectations and no third party* (the certification enterprise) *is needed.*" This direct contact between farmers and consumers has been developed at the

grassroots, but it would be important to be officially recognized and supported to be spread more easily rather than suffocated by local authorities.

6.3 Availability and costs of farm labour:

6 out of 8 farms employed full-time farm workers, 4 of them had more than 2 employees. Five case-study farms used family labour and 3 used seasonal farm workers for specific tasks with high workload.

The farmers interviewed mentioned the lack of agricultural labour and the high costs of employing farm workers. Farmer C2 describes the situation in the following way: "*there is not much labour anymore. And without labour it is impossible to farm. People searched better lives, they started to study and now have another culture. Some time ago young people came to ask for work in the holidays, but now no one wants to work on farming. Only the people who are still much attached to this continue farming. People who study always end up finding some work, even if it is on a desk. Everyone follows his destiny. This is bad for agriculture. The land is not sawn and is abandoned*".

Farmer O3 has difficulties in finding a farm worker, despite of providing on-farm accommodation, because the farm is isolated and he can only pay one worker through the subsidies he receives.

Farmer O1 regretted to be dependent on wage labourers and their machines to do certain works on her farm. As farm workers come to her farm when they have time she cannot always farm according to the phases of the moon and the weather.

Labour costs affect choices of farming practices in different ways. Farmer C1 prefers to use herbicides than to employ more farm workers because herbicides are cheaper. However C2 preferred to do manual and mechanical weeding as herbicides are too expensive for her. As farmer C2 uses a weeding engine by animal traction she might have less expenses in weeding than farmer C1 who employs farm workers to do the job.

Organic farming is more labour intensive than conventional farming and so the lack of farm workers and the labour costs can lead to two different options for farming: intensification, to allow for the employment of more workers, or extensification, reducing the labour to the necessary minimum. Intensification occurs in the case of O5, O6 (both using greenhouses) and O4 (monocultures), this is, in the farms where farming is the only or main source of income. Extensification occurs in the cases O1 and O2. In the case of O3 the farm is a relatively extensive system of cereal fields and sheep pastures and some areas of open air horticulture. In these cases organic farming provides less than 50% of income and is even considered to be a "*hobby*" (farmer O3).

6.4 Adding value:

i) Choice of on-farm processing:

The conventional farmers did not consider starting on-farm processing; they consider processing to be out of their reach because of lack of skills and infrastructures. They see themselves as part of the food producing and marketing chain and as having enough work with the production process. They see no point in on-farm processing. Farmers O3, O4 and O6 largely share the view of conventional farmers; they feel that they have not enough time and dynamism to do any additional work.

Out of the 6 organic farmers 3 process produce on farm (O1, O2 and O5), mainly to conserve seasonal overproduction but also to increase profit (O1). Farmer O5 produces tomato pulp when she cannot sell all her production. However she does not sell the pulp because the artisan production methods used are too costly to render it profitable.

Farmers O1 and O2 process products for sale, however, both farmers are not licensed for producing organic processed food. Farmer O1 does not know about the legal regulation of marketing on-farm processed food. She says "*maybe not everything is legal. There I am hanging in the air. I just hope that if a control comes and finds anything wrong they will not fine me…*"

Farmer O2 mainly produces marmalade. To sell it as organic marmalade he would need to have a licensed room for processing. Therefore he prefers to sell his produce under the label "*artisan*"; in this case he can sell it everywhere, even to supermarket chains, without needing a licence for processing.

ii) Farmers' and experts' outlook on legal and economic aspects of food processing:

Farmers O1 and O2 are aware of the economic advantages of processing agricultural products on farm. However the legal requirements to obtain a licence inhibit them from engaging more in adding value to their produce.

Farmer O1 says that she would like to have a licensed bakery in order to be able to sell organic bread to retailers. But as organic farming is not her main job, the investment to set up a fully licensed bakery is not profitable. Farmer O2 explains that he wanted to have a fully licensed place to produce organic marmalade, but he found out that the infrastructure required for a small enterprise is the same as for a large enterprise. The necessary investment turns the licensing of a small-scale enterprise unprofitable. He describes "*I would need to have a room only for this purpose, made of special materials, with separate bathrooms for men and women, signalization of the fire exit and fire extinguishers…All this to produce 500 jars of marmalade a year…*" Farmer O2 suggests that "*quality production is impeded because of bureaucratic details.*"

Expert 2 clarifies that on-farm processing generally has to follow exigencies at the level of big enterprises to receive the licence. Sometimes the conditions of production are the cause of the specificity of the product, but the law prescribes that processing has to be made under standard conditions. But "*if an artisan cheese transformation starts to be done in industrial ways, something is lost*" he says. "*In niche markets, such as organic, different rules than in industrial production should apply. There is a difference between a multinational chain that produces millions of foodstuffs daily from a farm enterprise selling some organic meals made of local produce. It is not imaginable that the*

conditions have to be the same. The legal conditions necessary to obtain the licence to process products frequently drive people out of business, because of requirements which frequently are senseless. But naturally, there has to be a minimum set of rules. But I think there is a working philosophy behind this rules for licensing that has to be rethought. For decades legislation was designed to be an incentive for the maximization of profits through specialization of production."

Expert 1 confirms that the requirements and standards for processing are the same for conventional and organic produce. These standards are essential to guarantee consumers that the processing was well done, under good hygienic conditions. According to him the investment problem could be overcome if there were producer and consumer cooperatives. If producers would work together they could process their produce in common licensed places and all would profit. Cooperatives of consumers, on the other hand, can set up their own rules for processing and so farmers could be exempted from requirements agreed upon to be superfluous.

Expert 3 describes that in Portugal there are too many laws and too less enforcement. If someone wishes to get a licence to start any activity he has to fulfil too many requirements and standards, but later when he has the licence he is almost never controlled. This expert says "*it would be important to have a more permissive legislation, which allows for the entry in the market, and a stricter control system to guarantee minimum standards*."

6.5 Marketing organic products:

i) Marketing practices used:

The farmers interviewed used 6 different types of marketing outlets to sell their products, they are: direct marketing at farm and on farmers' markets, organic farming cooperatives, supermarket chains and other retailers such as specialist shops, and local institutions and enterprises (such as kindergartens and restaurants). In Figure 16 the number of farmers using each type of marketing practice is shown.

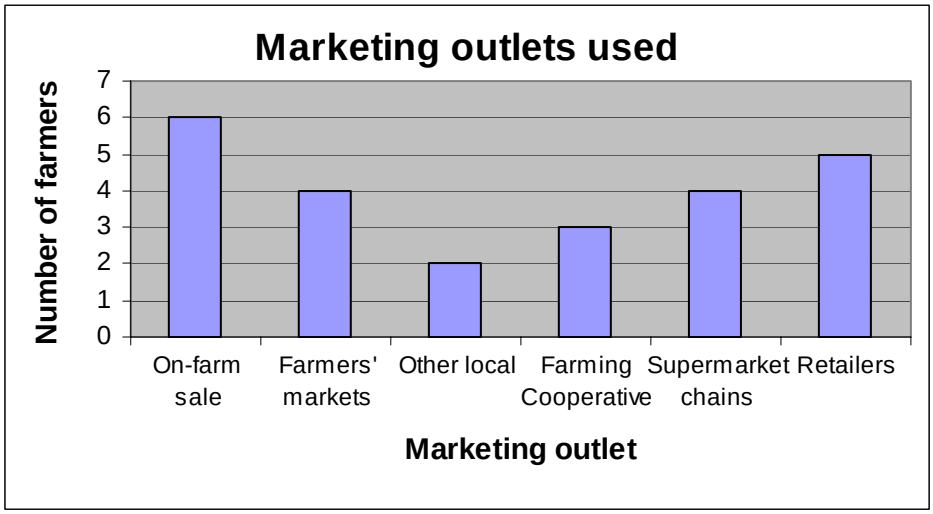


Figure 16 – Number of farmers using each type of marketing outlet.

The conventional farmers sell to a supermarket chain (C1) and to a farmers' cooperative, a tobacco processing and retail enterprise and a local institution (C2).

Direct marketing is done by all organic farmers, but it represents a variable share of the produce marketed. Farmer O1 only markets directly: to consumers at her farm or at farmers' markets, whereas direct marketing is of minor importance for farmers O5 and O6, who do not sell at farmers' markets. Organic farmers O1, O2, O3, and O4 sell at

farmers' markets in Lisbon, Coimbra and/or Lousã. Three farmers (O2, O4 and O6) also sell to organic farming cooperatives such as Biocoop in Lisbon and Naturcoop in Porto.

All farmers prefer local marketing, some for economic reasons to reduce transport costs, others for environmental and social concerns such as the wish to reduce food miles and to enhance the local economy.

Direct marketing at the farm is advantageous because costumers come directly to the farm and no special effort from the farmer is needed. Additionally the fact that the costumers can see the farm and talk to farmers builds trust and a steady marketing relation between producer and consumer. Farmer O1 also refers the joy of costumers in picking their own produce and the raise of consumer awareness resulting from visits to farms.

Selling on farmers' markets has the advantages of hiring new costumers and allowing selling seasonal overproduction locally. The problem with direct marketing is lack of consumer awareness, leading to reduced sales on farmers' markets resulting in the waste of produce that cannot be sold.

Selling for local institutions and enterprises is seen as the best form of marketing by farmers who use several different marketing practices. The farmers can deliver large quantities of seasonal products weekly to kindergartens and old age homes (O5), and they themselves decide what is going into the weekly pack. In addition transportation is not a problem because the distances are reduced. Farmer O5 also finds it important to make quality food available to children and elderly people who need healthy food the most.

The perceived disadvantages of direct marketing are that farmers have to take much time out of farming to do tasks they might not be skilled at doing. Expert 1 says that specialization in different tasks is important in the food producing and marketing chain "*because farmers have to be 100% farmers to farm well. Now they have to be bureaucrats, managers, financial accountants, drivers, and sales persons... And it's difficult to be good in all these tasks; if they are good at farming they might be bad sales persons*."

Out of the organic farmers only farmer O1 does not sell to retailers. The bulk of sales from farmers O4 and O6 are to supermarket chain retail centres in Lisbon and Porto. Farmers O2 and O5 also sell to supermarket chains. Farmer O5 sells her produce directly to the local branch of a supermarket chain, rather than to its centralized retail centre. Farmers O5 and C2 also sell their produce to local institutions, namely kindergartens and old age homes.

Supermarkets and retailers are seen as advantageous for selling big quantities of produce on a regular basis. Farmers O4 and O6 have contracts with supermarket chains to sell their produce. The amount and type of produce is negotiated on a weekly basis but usually these farmers, and also farmer C1, can sell all their produce to supermarket chains. The farmers themselves are responsible for delivering the produce to the supermarket retail centres. This creates the additional costs of owning a vehicle with appropriate refrigeration facilities and hiring a driver or taking time away from farming to deliver the products.

Retailing organic produce for big supermarket chains was a hotly discussed issue. Box 4 contains the comments of interviewees taking a strong position in favour or against selling organic through supermarket chains.

Box 4 – Different opinions regarding retail of organic products by supermarket chains.

The role of supermarket chains in marketing organic products

"*I think the good organic farmer does not like to sell to supermarket chains, because supermarkets want big quantities, make high requirements to farmers and take part in an economic system that is not in accordance with what we think marketing should be like*."

Farmer O2

"*Many supermarket chains have a policy of buying national produce first and import only in case there is no national produce available. They have a better policy than the ministry…*"

Farmer O6

"*Organic farmers do not receive a higher price for selling to supermarket chains, those increase the prices dramatically because organic is a fashion. So they create an image of organic as being a very expensive niche market for the rich elite. This does not promote organic*."

Expert 1

"*Hypermarket chains did a big work in dispromoting organic food. Organic food remains a long time in the shelves and is sold at very high prices even after loosing quality and looking really odd. Consumers who know organic only from supermarkets start to think organic produce is worse than conventional*."

Expert 3

ii) The structure of the organic market:

The market for organic products is weakly organized, and marketing opportunities are mainly localized in the big urban centres (Lisbon and Porto). This reduces the profitability of small-scale farming in remote areas because of the transportation costs. Bigger and intensively managed farming systems have advantages because more sales make the transportation costs less relevant for profitability.

In fact the lack of organization of the organic market drives organic retail enterprises and cooperatives to import organic produce that could well be produced in Portugal, as well as produce that exists in Portugal but does not reach the formal market chain. Experts suggest that it is the lack of organic retailers and farmer and consumer cooperatives that difficult products to reach consumers.

According to Expert 2 the market for some organic products is better developed than for others. Wine and olive oil production is being profitable and Portugal is exporting this products. However, despite of the large areas under organic cereal production, it is very difficult to find national organic cereals. Most areas receiving subsidies for organic cereal production are not harvested or produce is sold to the conventional market chain (Raposo and Rocha, pers. comm.).

The organic farmers had two opposite views on the demand of organic products. Farmers O2 and O6 can sell all their produce and cannot produce enough to supply the demand, whereas farmers O3 and O4 have difficulties in selling their produce because of "*lack of demand*". Farmers O2 and O4 live in the littoral of the central region, closer to urban centres, whereas farmers O3 and O6 live in the interior region, so the geographic location, (proximity of urban centres) does not explain this outlook adequately. The dynamism of the farmer and his management skills seem to be the key to understand this situation.

Farmers and experts agreed that there is much work to be done to raise the awareness of consumers in order to increase demand for organic products and, as a result, develop more sustainable farming practices.

iii) Other factors affecting profitability:

In addition to the structure of the market for organic produce, other macroeconomic factors affect the profitability of organic farms. It has been outlined above that the concentration of the organic market in urban centres makes the marketing of small amounts of produce from the interior regions difficult because of decreasing profits resulting from high transportation costs.

The concentration of the organic market in urban centres makes direct marketing difficult and therefore farmers have to accept lower prices negotiated with retailers. Retail enterprises raise the price of organic produce to levels that can affect the amount of sales; this might reduce the number of costumers and harm profitability of organic farms in the long run.

Thus the structure of the existing organic market reduces the share of the food price that flows back to farmers. Additionally, some organic farmers (O3, O4, O5) sell part of their produce at the prices of conventional produce because they cannot sell organic produce locally (O3 and O5) or because they cannot sell enough produce to the organic market chain (O4).

Several farmers and the experts stressed the negative impact that cheap agricultural imports have on the Portuguese agricultural sector. Specially imports from Spain where said to undermine the prices of Portuguese products. Spanish farming is more modernized than Portuguese agriculture, and intensive large scale farming prevails. Therefore crops can be produced more cheaply than in the still dominant small-scale, traditional farming systems of Portugal. In addition, in Spain producer cooperatives are

very common and so farmers can sell their produce easily, while in Portugal few such cooperatives exist and therefore produce from small farms barely reaches the formal market. Also the Spanish government still upholds export subsidies, thereby promoting the dumping of farm products in Portugal.

The farmers do not consider standardization of agricultural products as a major problem for them. The experts explain that according to the law it is not permitted to sell vegetables and fruits under a certain size. These legally established minimum standards are seen as a "*contradiction*", because their aim is to guarantee a minimum quality standard but they end up by defining minimum size as equivalent to minimum quality. Although organic products can be very small or have cosmetic damage they may exceed by large the quality of conventional big sized produce (Expert 2). Expert 3 points out that frequently "*good sanitary condition*" appears to be confused with sterilization and therefore hazardous chemicals are used abusively in the food chain. In this way the *raison d'étre* of quality standards is perverted.

Summarizing it can be said that the not very well organized organic market and its current concentration in the big urban centres challenges the economic viability of remote or small-scale organic horticulture in the central region. However in cases of intensively managed farms with a dynamic farmer who sets up his own market chain, organic horticulture can be profitable in this region (e.g. farmer O6).

7. Discussion: Implications for the development of sustainable agriculture:

In this section the results from the case-studies will be analyzed with regard to the larger picture: the implications of the findings for the development of organic framing and the development of a more sustainable model for Portuguese small-scale agriculture.

7.1 Ecological sustainability:

The Indicator for Sustainable Agricultural Practice (ISAP) allowed for a clear-cut distinction between conventional and organic farms. This indicator is not very sensitive to discriminate between the sustainability of different organic farming practices (Rigby *et al*, 2001). This shortcoming was not relevant as it was not possible to establish a direct link between agricultural policies and sustainability of individual farming practices. Instead of agricultural policies determining the choice of individual farming practices through economic incentives and legal dispositions, the choice of farming practices was mainly affected by Human and Social capital assets. Nevertheless, agricultural policies affected the broad options of farm management.

A fundamental tension exists between the economic principle of specialization, that informs agricultural policies, and the ecological principle of diversification embedded in the functioning of ecosystems (Gale, 2000). In the case-study farms it was observed that intensification was connected to diversification rather than specialization. This could be explained by the limited national market for organic products that leads farmers to

diversify production in order not to oversupply the market of a single crop type, as this would force them to decrease prices.

According to Buck *et al* (1997) the fast spread of organic farming since the 80's is associated to an increase in industrialization of organic farms and the shift from a farm-to-table marketing strategy to the introduction of organic into the conventional market chain in form of a niche market. This process, that can cause less sustainable organic farms to drive more sustainable farms out of business, is discussed in the literature as the *Conventionalization argument* (Hall & Magyorody, 2001).

Regarding the organic case-study farms it is evident that in the farms where organic production represents the sole or main source of income (O4, O5 and O6) intensification takes place. These farmers use monocultures (O4) and greenhouses (O5 and O6) to maximize output, and have all their land under production. Farmers O4 and O6 sell the bulk of their production in the conventional market chain, this is, to supermarkets. In contrast the farms O2 and O3 were largely extensive farming systems. In these cases farming was a minor source of income. These findings suggest that economic viability of mixed organic farms is achieved through intensification.

Due to the limited development of organic horti- and fruticulture, price competition between more and less sustainable organic farms was not apparent. Also an appropriation of organic farming by agribusiness through input substitution and control of the market chain (Guthman, 2004) was not found to be relevant. Therefore conventionalization does not seem to constrain marketing opportunities of organic produce in the current situation.

7.2 Human and Social capital:

The conversion of conventional farms to organic production methods was hampered by the lack of awareness of environmental impacts of conventional agriculture and by risk aversion. Conventional farmers considered their farming practices to be sound (C2) or they were afraid not to be profitable as organic farmers for lack of knowledge and increased production costs (C2).

Motivations to convert to organic farming were diverse and three cultural types could be distinguished (Seyfang, 2004). Farmer O1 holds egalitarian values, viewing organic farming as a tool for creating sustainable localized economies. Farmer O2 can be grouped to the hierarchical typology; subscribing to organic farming because of concerns with healthy food and the environment connected to social status. Farmers O4 and O6 reflect individualist values, aiming at thriving in the current market system and providing a healthier choice for individual consumers. Farmers O3 and O5 could not be grouped to any of these three cultural types. These farmers did neither back up their options with theoretical arguments nor did they seek organic farming for the stake of profit. These farmers revealed to have rather pragmatic views on sustaining themselves in a sound way, and their understanding of soundness derived from common sense knowledge.

The existence of these very different ideologies within the organic movement might be one of the causes of reduced cooperation among farmers. The fact that organic farmers are sparse in the central region additionally complicates cooperation and obstructs the establishment of organic farming associations. Cooperation among farmers is important

for learning, sustainable management of common resources and to improve marketing opportunities (Pretty, 1995).

The option for certain farming practices was frequently associated to the lack of awareness of alternative options. This did not necessarily undermine ecological sustainability of the farming practices chosen, however, over the long term, it can difficult adaptation of farming practices to different circumstances or new evidence. The case-studies showed that farmers have little initiative to learn about new farming practices and that information about sustainable solutions for specific agricultural problems is difficult to access.

The problems that the expansion of more sustainable forms of agriculture faces due to deficient knowledge and awareness demands for investment in education, training, research, extension and information services (Cristóvão *et al*, 2001b). The development of farmers' learning and organizational skills is of foremost importance for enabling them to make the best use of their local knowledge in order to enhance agricultural sustainability through knowledge based action (Röling, 2003).

The relation between costs and environmental benefits of most Agri-environmental schemes has not been efficiently monitored (Kleijn & Sutherland, 2003) and especially changes in farmers' attitudes have been largely neglected in evaluating the success of Agri-environmental schemes (Wilson & Hart, 2001).

The farmers revealed a general discontentment with the Ministry of Agriculture. This dissatisfaction was predominantly related to the working of the local offices of the Ministry of Agriculture. In fact the low productivity of public workers from the

Ministry of Agriculture has been denounced by the media and the calculation that there is one public worker of the ministry for every four farmers has not been defied (FP, 2005). According to the accounts of farmers, the Ministry of Agriculture resembles what Carter calls a "*neo-patrimonial organization*", where officials holding legal-rational positions of some power "*exercise as far as they can a form not of public service but of private property*" (Carter, 1999, p. 170)

The farmers had not been elucidated about the reason why certain policies and conditions for receiving subsidies changed over the last years. This increased discontent among farmers and even resulted in the feeling of being a victim of conspiracy. The decoupling of state support for agriculture from production, with insufficient modulation, was the most heavily criticized policy, perceived as being unjust and promoting an unproductive farming sector.

7.3 Economic viability:

The organic farmers interviewed in this study reveal to be largely independent of organic farming subsidies, and only one farmer out of 8 was motivated by subsidies to convert his farm. The farmers explain that for mixed farms and horticulture the area payments are not high enough to make the financial incentive attractive. Even if the payments for horticulture are highest, horticulture requires much more work than any other sector and conversion is more difficult.

The compulsory certification of the organic mode of production and membership in an organic association for technical advice are the main expenses farmers face to receive Organic area payments. This extra costs and the related paperwork necessary to receive the Organic area payment make it less profitable for small farms to apply. Because of this reduced effectiveness of the Organic area payment scheme to drive conversion to organic horticulture, it is unlikely that supply will outstrip demand because of agricultural subsidies (Jansen, 2000). Therefore a crisis of the organic sector resulting from oversupply is unlikely to happen for organic horticulture in Portugal under the current Organic area payment scheme.

Certification guarantees premium-prices, but it also constraints the access to the organic market (Nieberg & Offerman, 2003). Certification of the organic mode of production by a registered private enterprise is important for indirect marketing; however it should not undermine the possibilities for direct marketing of organic produce through the appropriation of the definition of organic. To sell locally it is important that consumers can identify the mode of production that has been used. However, the legal prohibition of using the term *organic* for non-certified products (EC Reg. 2092/91) hinders the

understanding of newcomers about the value of produce that actually has been produced according to this mode of production but that is not certified for reduced profitability. This issue is relevant in so far as small-farms might see no advantage in shifting to sustainable production as they are hindered of selling their overproduction for premium prices because of not being profitable enough to afford certification.

Organic farms generally employ more farm workers than conventional farms, because diversification of production and labour intensive practices result in year round farm work (Morison *et al*, 2005). The high labour costs and reduced availability of farm workers hit organic farming more than conventional agriculture (Hanson, 2003). Organic farming on one hand is an opportunity to create employment; on the other hand its development can be restricted by labour requirements (Jansen, 2000).

The higher labour requirements of organic production can render it less competitive than conventional agriculture (Jansen, 2000). In addition the liberalization of agricultural trade causes low-wage countries to have competitive advantage in producing and trading organic products (Jansen, 2000). This could lead to a surge of organic products from Third World countries, preventing the development of the EU organic sector.

In the current situation on-farm processing requires very high investments, because the rules for licensing are designed for industrial plants and are not adaptable for small-scale production. An adaptation of licensing rules for small-scale processing would be important to allow farmers to sell added value products, thereby increasing the profitability of their farms. The achievement of minimum quality standards focuses

mainly on appearance and sterility that are more easily enforceable than other indicators of product quality that would give advantages to organic produce (Pretty, 2002).

The market for organic produce is not very developed in Portugal. In addition to reduced demand, due to lack of consumer awareness and the economic crisis the country is facing, the market is deficiently organized, in a way that hinders supply to reach consumers. Actually it appears that demand is outstripping supply, as organic products are imported.

The lack of marketing opportunities in the interior region of central Portugal obstructs profitability of small-scale agriculture in this area because of the high transportation costs to urban centres where marketing outlets and more demand exist. Therefore large-scale and intensified farming systems of the interior have advantages over small-scale farms in achieving economic viability because economies of scale can be made.

Cooperation among farmers would be vital to improve marketing opportunities. If farmers cooperate they can produce bigger quantities, enabling market access and making investment in infrastructure for processing organic produce more profitable.

7.4 Policies for the development of organic farming:

The ability to reach certain policy goals, such as the implementation of Agri-environmental measures, depends on the involvement of farmers in the program and their willingness to adopt changes on their farms (Darnhofer *et al*, 2005). The implementation of Agri-environmental measures in Portugal has not been satisfactory, as only 21% of the financial support available in the years 1994-98 have been attributed (Valadas de Lima, 2000). This can be explained by the fact that most potential beneficiaries involved in traditional farming were not eligible for financial support under the Agri-environmental measures, because complementary sources of income exist, the farmers are over working age, have low educational attainments and too small landholdings (Roca, 2000).

The formal regulation of organic farming creates a double edged situation: on one hand it opens up a niche market with premium prices, on the other hand the meaning of organic farming is appropriated through its legally restricted use for a certified mode of production (EC Reg. 2092/91). However, the impossibility of defining sustainable standard practices, adapted to the diverse ecological farming conditions throughout Europe, restricts the definition of organic as to the exemption of the use of certain agrochemical inputs. The adoption of locally adapted sustainable farming practices with a view of integrating ecological concerns into the whole productive process cannot be enforced easily. However this limited definition may lead to conventionalization of organic farming, through the adoption of more production and profit oriented practices, thereby undermining the aims of organic farming.

It is important to assure that the promotion of sustainable agriculture does not focus on the use of certain farming practices alone, but rather that it creates conditions for the sustained development and adaptation of agricultural technologies to suit local environmental conditions (Pretty, 1998).

Organic farming, as defined by EC Reg. 9092/91 is based on an individualistic outlook to policy making that promotes organic framing within the productionist paradigm (Seyfang, 2004, Lang and Heasman, 2004). The individualistic outlook is patent by the focus on the mode of production and the promotion of differently produced goods, rather than different patterns of consumption (Seyfang, 2004). The fact that Organic area payments focus on the production process rather than on aspects of rural welfare characterize this subsidy as “productionist”, alongside with subsidies for conventional agriculture (Jansen, 2000).

The existence of a big diversity of values and the endorsement of differing ideologies by farmers and consumers concerned about environmental impact of farming should be taken into account in policies and campaigns for the promotion of sustainable agriculture (Seyfang, 2004). To favour the development of organic production for the conventional market chain alone, to attract costumers who value convenience and low price, would undermine the possibility of organic farming to strengthen local communities and protect rural livelihoods from the negative impacts of economic globalization (Seyfang, 2004). It is important that organic farming is supported by policies that do not throw away the child with the bathwater.

8. Conclusion:

The initial analysis of the factors affecting choice of farming practices reflected the importance of economic and social factors and the limited relevance of legal factors to determine individual farming practices. It became clear that the knowledge and initiative of farmers and the cooperation between farmers, institutions and consumers is of major significance to the development of sustainable agriculture in central Portugal.

Simultaneously to overcoming Human and Social capital constraints, it is crucial that economic viability of sustainable agriculture is improved. An improvement in the structure of the market chain and a raise in consumer awareness could improve the economic situation of organic farms within the current economic and policy environment.

From the analysis of the case-study farms it is possible to conclude that:

- Agricultural policies influence broad options of farm management rather than option of individual farming practices;
- Lack of environmental awareness and risk aversion inhibit conversion of conventional farms;
- Learning opportunities and extension services for farmers are insufficient to spread sustainable agriculture;
- Knowledge, former experience and economic considerations determined the choice of individual farming practices;
- Economic viability is achieved through intensification of organic farms;

- Profitability of joining the Organic area payment scheme is reduced in the case of horticulture;
- Certification costs and related paperwork reduce profitability of organic farming for small farms selling their overproduction;
- The reduced dimension of the market for each crop type might lead to diversification of farms;
- Cooperation among farmers and between farmers and institutions would enhance marketing possibilities;
- The market chain for organic products is underdeveloped and therefore no full advantage is taken from existing demand;
- The concentration of marketing outlets and demand in urban centres reduces the profitability of small-scale organic farms in the interior because of transportation costs;

The policy environment experienced at farm level is largely indifferent to sustainability issues: apparently ecological and economic sustainability are not hitting policy constraints, and can therefore possibly be increased significantly within the current policy environment. Table 2 outlines a number of actions that could be taken by various actors and institutions in Portugal in order to spread sustainable farming practices to small-scale agriculture.

Table 2 – Activities that could be carried out by different actors and institutions to spread sustainable agriculture.

Farmers	**Consumers**	**Associations**	**Ministry of Agriculture**	**Portuguese government**
Informal cooperation among farmers; Investing in learning; Establish producer cooperatives	Purchasing local food; Asking farmers to reduce use of agrochemicals; Establish consumer cooperatives;	Participatory learning and action initiatives;	Reorganize local offices to render them more efficient; Increase area payments for the least developed organic sectors; Review type and control of food quality standards; Financial and legislative support for the use of landraces and locally adapted farming practices	Improve financial support for agri-food associations; Support multifunctional agriculture and rural development policies at EU level negotiations; Adapt licensing rules for processing plants to small farm enterprises;
Organize direct marketing practices (farmers' markets, box schemes, CSA, etc.)				
		Technical advice to farmers		
Spread information on sustainable agriculture				

The actions outlined in Table 2 can be carried out to a large extent by citizens, within the current policy environment. Nevertheless, active support by the state to facilitate civil engagement for sustainable agriculture would be helpful. For this the implementation of the Portuguese Action-plan for the Development of Organic Farming would be tremendously important. However, public spending for promoting sustainable agriculture could be reduced if realistic economic signals were emitted by the market. For this to happen, price distorting policies would need to be abolished and environmental and social costs would have to be internalized into production costs.

Despite the evident negative environmental and social outcomes of the application of the modernization paradigm to agriculture, the position of the Portuguese government in

EU negotiations is still a pledge for “catch-up” development (e.g. Goodman, 2004), aimed at delaying the implementation of policy measures to support extensification and diversification of agricultural landscapes, trying to divert further funds for the modernization of Portuguese agriculture to make it more competitive. Instead, the existing extensive and small-scale farming systems could be seen as an advantage; rather than hindering modernization, they could assist the development of sustainable agriculture.

9. References:

Baptista, F.O. (1995). *Agriculture, Rural Society and the Land Question in Portugal*. Sociologia Ruralis 35 (3/4), 309-321.

Buck, D., Getz, C. and Guthman, J. (1997). *From Farm to Table: the Organic Vegetable Commodity Chain in Northern California.* Sociologia Ruralis 37 (1), 3-20.

Cardwell, M. (2004). *The European Model of Agriculture*. Oxford University Press, Oxford.

Carter, A. (1999). *A Radical Green Political Theory*. Routledge, London.

Conte de Barros, M. (1991). *Poluição e Agricultura. Primeiro Inventário da Situação em Portugal.* CNPPA, Oeiras.

Cristóvão, A., Timothy, K. and Strecht, A. (2001a). *Produção Agrícola Biológica (Orgânica) em Portugal: Evolução, Paradoxos e Desafios.* Agroecologia e Desenvolvimento Rural Sustentável 2 (4), 37-47.

Cristóvão, A. Koehnen, T. Strecht, A. and Videira, N. (2001b). *Developing Organic Farming in Portugal: Learning Issues*. Proceedings of the 15th European Seminar on Extension Education – Integrating Multiple Land use for a Sustainable Future. Wageningen: WUR/CIS, pp. 20-21. At URL: http://home.utad.pt/~des/acervo_des/

Darnhofer, I., Schneeberger, W. and Freyer, B. (2005). *Converting or not converting to organic farming in Austria: Farmer types and their rationale.* Agriculture and Human Values 22, 39-52.

DG-Agri (2003). *Agricultural Situation in Portugal*. European Commission Agriculture Directorate Working Document.

DG-Agri - EU Directorate General Agriculture (2005). At URL: http://europa.eu.int/comm/agriculture/envir/index_en.htm

EC Reg. 2092/91 (amended) Available at URL: http://www.organic-europe.net/europe_eu/default.asp#2092

Firmino, A. (2000). *Organic farming in Portugal 2000*. Research Institute for Organic Agriculture. At URL: http://www.organic-europe.net/country_reports/portugal/default.asp

Fowler, S. (undated). *Factors affecting the profitability of organic farms*. Welsh Unit of Rural Studies (WIRS). At URL: http://www.organic.aber.ac.uk/library/Profitability%20of%20organic%20farms.pdf

FP (2005). *Trabalhadores a mais no Ministério da Agricultura: verdade ou mentira?* Federação Nacional dos Sindicatos da Função Pública. At URL: http://www.fnsfp.pt/

Gale, F.P. (2000). *Economic Specialization versus Ecological Diversification: the Trade Policy Implications of taking the Ecosystems Approach seriously*. Ecological Economics 34, 285-292.

Goodman, D. (2004). *Rural Europe Redux? Reflections on Alternative Agro-Food Networks and Paradigm Change*. Sociologia Ruralis 44 (1), 3-16.

Guthman, J. (2004). *The Trouble with "Organic Lite" in California: a rejoinder to the "Conventionalization" Debate*. Sociologia Ruralis 44 (3), 301-316.

Hall, A. and Magyorody, V. (2001). *Organic Farmers in Ontario: an Examination of the Conventionalization Argument.* Sociologia Ruralis 41 (4), 399-422.

Hanson, J. (2003). *Farm-level impact of organic production systems*. In: OECD. *Organic Agriculture. Sustainability, Markets and Policies*. CABI Publishing, Wallingford.

IDRHa - Instituto de Desenvolvimento Rural e Hidráulica (2005). At URL: http://www.idrha.min-agricultura.pt/agricultura_biologica/dados_estatisticos.htm

IFADAP and INGA (2005). *Medidas Agro-ambientais. Manual de normas e instruções de preenchimento.* Ministério da Agricultura, Desenvolvimento Rural e Pescas, Lisboa.

IFOAM - International Federation of Organic Agriculture Movements (2005). At URL: http://www.ifoam.org/sub/faq.html

Jansen, K. (2000). *Labour, Livelihoods and the Quality of Life in Organic Agriculture in Europe.* Biological Agriculture and Horticulture 17 (3), 247-278.

Kleijn, D. And Sutherland, W.J. (2003). *How effective are European agri-environmental schemes in conserving and promoting biodiversity?* Journal of Applied Ecology 40, 947-969.

Lang, T. and Heasman, M. (2004). *Food wars: the global battle for minds, mouths, and markets.* Earthscan, London.

Long, N. and Long, A. (Eds.) (1992). *Battlefields of knowledge. The interlocking of theory and practice in social research and development*. Routledge, London and New York.

Machado, C. (2005). *Agricultura Biológica. Barreiras ao Seu Desenvolvimento.* Dissertation for obtaining the first degree in Biology, Department of Botany, University of Coimbra (unpublished thesis).

MADRP (2004). *Plano Nacional para o Desenvolvimento da Agricultura Biológica.* Ministério da Agricultura, Desenvolvimento Rural e Pescas, Lisboa.

MADRP - Ministério da Agricultura, Desenvolvimento Rural e Pescas (2005). At URL: http://www.min-agricultura.pt/

Mantas, A. Staff of certification enterprise SATIVA. Personal communication (e-mail received on the 02.08.05).

Mason, J. (1996). *Qualitative Researching*. Sage Publications, London, Thousand Oaks and New Delhi.

Morison, J., Hine, R. and Pretty, J. (2005). *Survey and Analysis of Labour on Organic Farms and Smallholdings in the UK and Republic of Ireland*. International Journal of Agricultural Sustainability (in press).

Nieberg, H. and Offerman, E. (2003). *The profitability of organic farming in Europe*. In OECD. *Organic Agriculture. Sustainability, Markets and Policies*. CABI Publishing, Wallingford.

O'Neil, M. (2002). *The winds of change blow again: the World Trade Organisation's impact on the European Common Agricultural Policy*. Liverpool Law Review 24, 181-208.

Pretty, J. (1995). *Regenerating Agriculture. Policies and Practice for Sustainability and Self-reliance.* Earthscan, London.

Pretty, J. (1998). *The Living Land. Agriculture, Food and Community Regeneration in Rural Europe*. Earthscan., London.

Pretty, J. (2002). *Agri-Culture. Reconnecting People, Land and Nature.* Earthscan, London and Sterling VA.

Pretty, J. and Smith, D. (2003). *Social Capital in Biodiversity Conservation and Management.* Conservation Biology 18 (3), 631-638.

Raposo, J.P. Organic cereal farmer, personal communication.

Rigby, D., Woodhouse, P., Young, T. and Burton, M. (2001). *Constructing a farm level indicator of sustainable agricultural practice.* Ecological Economics 39, 463-478.

Ritchie, J., Spencer, L., and O'Connor, W. (2003). *Carrying out Qualitative Analysis*. In Ritchie, J. And Lewis, J (Eds.). *Qualitative Research Practice. A guide for Social Science Students and Researchers.* Sage Publications, London, Thousand Oaks and New Delhi.

Roca, M. (2000). *EU Policies and Development Stakeholders at local level: the case of the Lima Valley, Northern Portugal*. At URL: http://www.abdn.ac.uk/arkleton/conf.2000/papers/roca-m.doc

Rocha, A. Director of the organic cooperative *Biocoop*, personal communication.

Röling, N. (2003). *From Causes to reason: The Human Dimension of Agricultural Sustainability.* International Journal of Agricultural Sustainability, 1 (1), 73-88.

Guzmán-Casado, G., González de Molina, M., and Sevilla-Guzmán, E. (Eds.) (2000). Introducción a la Agroecología como Desarrollo Rural Sostenible. Ediciones Mundiprensa, Madrid.

Seyfang, G. (2004). *Local Organic Food: the Social Implication of Sustainable Consumption.* CSERGE Working Paper EDM 04-09. A URL: http://www.uea.ac.uk/env/cserge/pub/wp/edm/edm_2004_09.pdf

Valadas de Lima, A. (2000). *Agricultura e Ambiente. A Aplicação de Medidas Agro-Ambientais. Inquérito Exploratório na Região do Oeste*. Observa, Lisboa.

Vieira, P. A. (2003). *O estrago da nação*. Publicações Dom Quixote, Lisboa.

Wilson, G.A., Hart, K. (2001). *Farmer participation in Agri-environmental Schemes: towards Conservation-oriented Thinking*. Sociologia Ruralis 41 (2), 254-274.

Yin, R. K. (1993). *Applications of Case-Study Research*. Applied Social Research Methods Series, 34. Sage Publications, London and New Delhi.

Cover picture: a smallholding in the mountain region of central Portugal (Serra da Lousã), by Álvaro Trindade.

Note: All citations of farmers have been translated from Portuguese and shortened with the aim of briefly illustrating farmers' views. Any responsibility for interpretation is the authors own.

10. Appendices:

10.1 Appendix A:

Semi-structured interview for farmers

SEMI-STRUCTURED INTERVIEW:
CHOICE AND SUSTAINABILITY OF FARMING PRACTICES

FARM: _____
LOCATION:_____
NAME OF INTERVIEWEE:_____

1. DEMOGRAPHIC INFORMATION:

1.1) What is your age: Under 40 40-65 over 65

1.2) For how long have you been working on this farm?
_____

1.3) How many people work on the farm?
_____

2. CHARACTERIZATION OF FARM AND FARMERS COMMITMENT:

2.1) What is the area of the farm?
Organic_____
In conversion_____
Conventional_____

2.2) Is farming your only source of income?
Yes No
Is farming more/less than 50% of income?

2.3) What are the main products?
_____

2.4) Are you a member of any farmers association?
No
Yes What are the benefits for you?
_____

2.5) Where do you search for information on farming practices and ways to improve your farm?
_____

2.6) Do you visit and exchange information with other farmers?
Yes No

2.7) What are your reasons to convert/ not convert to organic farming?
Financial reasons
Fitted with previous farm management
Wish to contribute to environmental conservation
Encouraged by officials
Encouraged by other farmers
Other What? _____

ORGANIC FARMERS:

2.8) Where did you first hear about organic farming?
_____

2.9) When did you start the conversion?
_____

2.10) In case you are receiving subsidies, would you continue organic farming if subsidies expire?
Yes No

2.11) Did the shift to organic farming change your priorities for your farm? If yes, how?
_____

2.12) Have there been changes in the productivity of your farm since the conversion?
Yes What? _____
No

2.13) Have there been changes in wildlife on your farm?
Yes No

2.14) Are you engaged in spreading organic farming? (Giving information to other farmers, show your farm to interested people, being active in an NGO).

3. SUSTAINABILITY OF FARMING PRACTICES

	FERTILIA -TION	**PEST MANAGE-MENT**	**WEED CONTROL**	**IRRIGA-TION**	**CROPPING PATTERN**	**CROP VARIETIES**
Methods used						
Economic factors						
Legal factors						
Ecological conditions						
Ecological concerns						
Knowledge of the practice						
Availabilit y infrastruct-ures on farm						
Advised by other farmers or officials						
Other Reason						

4. MARKETING

ORGANIC FARMERS:
4.1) Are you certified as organic farmer?
No Yes What are the benefits and the costs of certification?
_____

4.2) What are the advantages and disadvantages of marketing your produce in this way?
_____

4.3) Do you process products on farm?
No Why? _____
Yes What? _____

4.3)1. What are the requirements to do so?
_____

4.3)2. Did you need to establish new infrastructures or make significant changes to existing infrastructure to be able to process your products?
_____

4.3)3. Do you need to specialize on the crops/animals you need to produce these products profitably?
_____

5. POLICY INCENTIVES AND IMPACT ON FARM:

5.1) Do you receive subsidies for farming?
No
Yes What scheme? _____

What are the requirements to receive these subsidies?
_____

5.2) Did you use any grant or co-financing measure to invest in your farm?
No Yes What? _____

5.3) What are the major challenges for your farm?

5.4) How do you think the agricultural policy impacts on your farm?

5.5) Would you like to add any other information?

10.2 Appendix B:

Summary of case studies

Farm C1

Information about farmer's life history:

This farmer is the eldest son of a big family. His father died when he was still minor and from then on he had to earn his own living and help to sustain the family. After 6 years of schooling he started to work in a ceramic production enterprise and when he was about 20 he started to farm on a piece of land that belonged to his parents. This farmer is 42 years old.

General description of the farm:

This farm is close to Alcobaça, on very sandy soils next to the sea. The landholdings of this farmer are surrounded by other conventional and similarly managed farms. The farmer uses several plots of land, comprising ca 10 ha, but he owns only one of them, the others are rented without contract to elderly people. 7 farm workers are permanently employed on this farm. He mainly produces potatoes, cabbages, tomatoes, peppers and lettuce.

Farming practices:

The farmer uses conventional farming practices. As the soils are very poor, regular fertilization is essential. In addition to synthetic fertilizers the farmer applies animal manures to add organic matter to the soil. Weeding is done using herbicides, excepting for lettuce where no traces of pesticides should be left on the leaves. He owns greenhouses that he bought with a bank loan. There he produces tomato, pepper, green bean and cucumber. He irrigates with an electric pump by micro and macro aspersion from a nearby water canal.

Marketing:

The farmer sells all his production to the retail centre of a supermarket chain. For this purpose he owns a truck with refrigeration to deliver the products weekly to the retail centre.

Farmer's outlook to farming:

This farmer knows that conventional farming can have negative consequences, but he believes not to have enough knowledge to shift to organic farming. Also additional labour needs impede him from seriously considering shifting to more sustainable farming practices. This farmer sees agrochemicals as medicine for his plants.

Farm C2

Information about farmer's life history:

This farmer is over 70 and has been a farmer for all her life. She manages the farm together with her husband. Their children studied and are not going to take the farm over.

General description of the farm:

This farm lies in the suburbs of the town of Lousã and comprises approximately 5 ha of land. The main products are tobacco, potatoes and corn. The farmer and her husband work on the farm and day-workers come frequently. Seasonally they employ more farm workers for the harvest of the tobacco leaves. Most of the work is done manually and various traditional techniques are in use.

Farming practices:

This farmer uses conventional farming practices, relying strongly on synthetic fertilizers. She uses high yielding varieties and fertilizers to increase profits. For weeding she uses manual weeding with a hoe (*sachar*) and a weeding engine pulled by her donkey.

Marketing:

This farmer sells to a local catholic charity, a farmers' cooperative in Coimbra and to retailers who come directly to the farm to buy her produce. The tobacco is sold to the tobacco processing enterprise that also gives technical advice for tobacco production.

Farmer's outlook to farming:

The farmer believes to farm in a natural way, despite using agrochemicals, described as "*special products*". Agrochemicals are seen as benevolent substances whose names and usage the farmer is proud to know.
This farmer must have heard about genetically modified organisms, because she explained that she was not using contagious seeds that came from America.
This farmer described that some birds were eating her green beans, and she likes the birds and so she just complains. But if the birds destroy too much she will put *"some grains of a certain product"* next to the beans.

Farm O1

Information about farmer's life history:

The farmer is a German immigrant who settled on this farm in 1981 starting organic farming for self-sufficiency. The parents of this farmer had a gardening enterprise and so she contacted with farming early in life. She started to study medicine but did not finish the degree. During her studies she was involved in the environmental movement. Now she is divorced and lives with 3 teenage children on the farm. Besides farming she sells handicrafts on markets.

General description of the farm:

The farm is approximately 1 ha in size, but the farmer also farms neighbouring land, totalizing about 2 ha of land under production.

Farming practices:

The farm is very diverse: small beds of single crops are delimited by trees and wine. Compost is made of farm waste and legume shrubs that form the undercover of the forest belonging to the farm.
The farmer said that it was very unpractical to farm according to the phases of the moon and preparing the biodynamic mixtures and therefore now she follows biodynamic farming in a less strict way than initially.

Marketing:

This farmer only sells the overproduction directly to consumers that come to her farm or on the organic markets of Coimbra and Lousã. She sells processed products such as bread and pesto.

Farmer's outlook to farming:

The farmer has a general concern for environmental problems and sees farming and self-sufficiency as the best way for healthy living with a low environmental impact. She started the organic market of Lousã in 2003 and is its main promoter.

Farm O2

Information about farmer's life history:

The farmer studied economics in Lisbon and did a post graduation as well. Now he is the director of a secondary school and financial officer of the national organic farming association. He inherited the farm from his parents and is farming organically since 1994.

General description of the farm:

The landholdings of this farmer comprise 40 ha and are spread around the village where the farmer lives, in the calcareous mountains next to Rio Maior. 2 full-time employees work on this farm and seasonal workers are hired. Sometimes Ukrainians and other East-European immigrants were hired to work on this farm. The main products are dry fruits, such as walnuts, figs, almonds and olives. He also has other fruit trees, for marmalade production, and horticulture. He sells aromatic and medicinal plants that grow wild on his farm.

Farming practices:

The tree plantations are extensively managed. The olives are cut regularly but the other trees do not receive any treatment. On the fields between the trees wild aromatic herbs grow, such as oregano, which he harvests for sale.
Vegetables are grown in rows; however the intercropping does not correspond to purposive consociations. For fertilization he uses bought animal manures and he composts all types of residues from his farm. Also cows of a neighbouring farmer use to graze on his fields. Only the horticulture area is irrigated, mainly by flooding and micro aspersion.

Marketing:

Farmer O2 sells to specialist shops, to a supermarket chain and on the organic market in Lisbon. His main products are expensive artisan marmalade specialties.

Farmer's outlook to farming:

The farmer says he farms organically for a general wish to contribute for the maintenance of life. The farmer drove us off-road with his jeep through his tree plantations, stopping next to the trees that he wanted to see, barely going more than 10 steps away from the car.

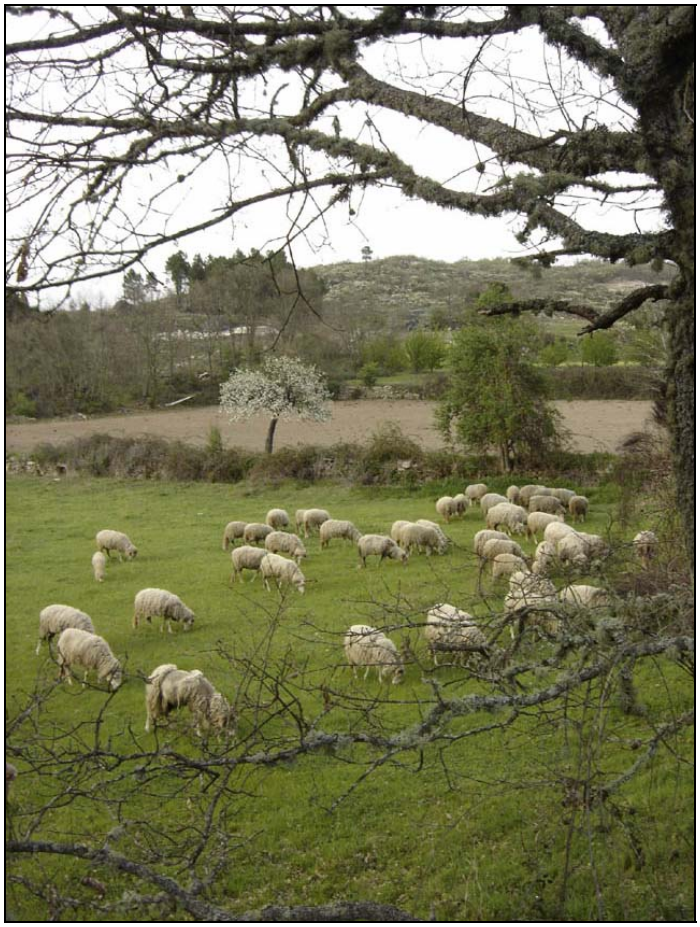
Farm O3

Information about farmer's life history:

The farmer is originally from the area of Idanha-a-Nova where his parents had a farm. Still as a teenager he was known in that area for being a good horse rider because he had been riding since a child. He moved to Sernancelhe through his marriage. There he was the director of the local bank office and started to farm conventionally until he converted to organic production in 2001. Now he is retired and keeps farming as a hobby, but as he has difficulties in finding employees he wishes to rent the farm to a young farmer who continues organic production.

General description of the farm:

The farm lies in the vast granitic region of central Portugal and comprises 27 ha of land lying next to a river. The land has several natural wells that provide plenty of water. The farmed areas lie close to the river and the maintenance house. Some areas are not managed for production. The farmer keeps a herd of a traditional sheep breed for which he grows millet and cereals and to whom he feeds the overproduction he cannot sell. He also produces vegetables and has apple landraces.



Traditional sheep breed "*Mondegueira*" grazing at farm O3 (Source: Machado, 2005).

Farming practices:

The farmer practices crop rotation and intercropping. Next to the river he has a cereal field of a variety he keeps since 20 years. The farmer said he does not need to practice pest control as he focused on preventive measures. Weeds were not seen as a major problem: they are ignored after the crop plants are big enough to strive and he uses irrigation channels for flooding vegetables that grow on a slightly elevated bed: young seedlings of weeds are impeded to reach the water easily.

Cereal field lying between the river and the wood at farm O3 (Source: Machado, 2005).

Marketing:

This farmer sells to specialist shops in Coimbra and on the farmer's market of that city, but he cannot sell all his production. As he can only sell small amounts it is frequently not profitable to take his products for sale to Coimbra, because the transportations costs are too high. He also sells to an organic retail enterprise that collects the products at farm gate, but this is only an occasional marketing outlet.

Farmer's outlook to farming:

The farmer has grown up on a farm and so he values the productive interaction with nature associated to farming: work on the open-air, careful observation of nature and production of healthy food.

Farm O4

Information about farmer's life history:

This farmer is under 40 years old and derives almost all his income from farming. Additionally to farming he retails conventionally produced vegetables and has a pigsty.

General description of the farm:

The farm is divided into several landholdings, the biggest of which surrounds the house where the farmer lives. The other pieces of land are rented to relatives. In total the farmer cultivates 10 ha of land. He started conversion in 2000.

Farming practices:

The farmer grows the crops in long rows. For fertilization he uses animal manures and bought fertilizers. He strongly relies on manual and thermal weeding.

General views of farm O4: use of the tractor (left) and manual weeding (right) (Source: Machado, 2005).

Marketing:

This farmer sells most of his production to supermarket retail centres. He also sells to specialist shops and on Sundays in a tourist village.

Farmer's outlook to farming:

This farmer is a young entrepreneur wishing to contribute to the conservation of the environment. On his farm he has different bins to collect garbage but he does not avoid packaging. This farmer said that he is interested in learning about sustainable farming practices and searches for books and pays attention to the media to learn more about the subject.

Farm O5

Information about farmer's life history:

The farmer is under 40. She has been immigrated to Switzerland and returned some 3 years ago, when her oldest daughter had to start schooling and she wanted her to go to a Portuguese school and to grow up in Portugal. Now she has 3 children, all under the age of 10. She works with her husband and one employee on the farm, from 6am till 12pm.

General description of the farm:

The farmer owns about 3 ha of land, a big part of the land is covered with greenhouses where lettuce, cabbages, spinach, tomatoes and other vegetables are grown. On the open she produces mainly potatoes, corn and beans. She started conversion in 2003.

Farming practices:

The farmer uses small monocultures and no intercropping. Asked if she did intercropping she explained she likes to grow differently coloured lettuces together because it is beautiful. The farmer uses animal manures for fertilization. For pest control copper sulphate is used, and organic pesticides in case of acute pest attack. Weeds are ignored whenever it does not represent a problem to the corps.

Marketing:

The farmer sells directly to local kindergartens and to the branch of a supermarket chain. She also sells directly to villagers that come to her farm and to farmer O6 for retail.

Farmer's outlook to farming:

This farmer is happy that since she farms organically her children can play in the fields and eat what they find and she does not have to fear they come in contact with hazardous chemicals. She also thinks it is important to produce healthy food for young and elderly people of the local institutions for whom she produces. She explains that many farmers are not aware about the hazards that pesticides represent. The rabbits her mother keeps on a nearby landholding regularly died in spring when the farmers around started to "clean" their fields, applying herbicides, and they could not explain this mortality for a long time.

Farm O6

Information about farmer's life history:

This farmer was an emigrant in Switzerland where he worked on a farm that was converted to organic production. When he returned to Portugal he had in mind to create his own organic farm in his village of origin where he had a landholding.

General description of the farm:

The farm is split into several landholdings, making up 15 ha. He started organic production in 1998, since then he expanded the area farmed by purchasing additional land and even clearing the pine forest that had been on a bought land to put it under production. He has several greenhouses, bought using a co-finance measure from the Ministry of Agriculture. There are 21 full-time employees on the farm and sporadically family labour. The main products are aromatic herbs and fresh vegetables.

Young cabbages in the greenhouse of farmer O6 (Source: Machado, 2005).

Farming practices:

The farmer uses every little free space of land to grow something for sale. The farm is very intensively managed and monocultures, however small, are common. Nevertheless the farmer stresses the importance of intercropping and consociations and explains that he uses these methods whenever possible.

Marketing:

This farmer sells at ca. 100 different marketing outlets and had an annual turnover of ca. 500.000 € in 2004. The farmer employs drivers and owns refrigerated trucks, with which he transports his produce to retail centres in Lisbon and Porto. He mainly sells to supermarket chains, but also to specialist shops and directly to costumers who come to his farm.

Farmer's outlook to farming:

This farmer has the feeling to be left alone, having no support from the Ministry of Agriculture and no neighbouring farmers or associations from which he could learn about sustainable farm management. But he also shows no interest in searching for new information. This farmer introduced 4 other farmers into organic production and gives them technical advice.

Vegetables awaiting packing, at farm O6 (Source: Machado, 2005).

10.3 Appendix C:

Farming practices in use on each farm

Appendix C – Farming practices used for soil fertilization, pest and weed control, irrigation, crop management and seed sourcing on each farm.

Farm	Soil Fertilization	Pest control	Weed control	Irrigation	Crop management	Seed sourcing
C1	cow manure and synthetic fertilizer	pesticides	herbicides and manual weeding	aspersion	monocultures, rotation	High yielding varieties
C2	synthetic fertilizer	pesticides	manual and mechanical weeding with donkey	flooding	monocultures	high yielding varieties
O1	compost (made of farm wastes and forest undercover), chicken manure	preventive forms of cultivation, in case of pest presence organic pesticides, but even these are avoided	manual weeding, solarization with black plastic, biodynamic experimentation against Rumex	micros aspersion	rotation and intercropping, small beds	imported non hybrid varieties, some landraces
O2	cows are kept on his land, cow and chicken manure, compost, green manure, organic compost from industrial pigsty	manual killing of bugs, copper sulphate and sulphate, soft soap, bought products from Italy mixed with irrigation water or pulverized over plants.	manual weeding in case of finding day workers, soil mobilization in summer, crop rotation	natural and artificial wells, fills deposits and then irrigates with gravity and micro aspersion	rotations and intercropping (not consociations)	own seeds and seedlings

Appendix C – Farming practices used for soil fertilization, pest and weed control, irrigation, crop management and seed sourcing in each farm (continuation).

Farm	Soil Fertilization	Pest control	Weed control	Irrigation	Crop management	Seed sourcing
O3	compost and animal manures	no need for other than preventive control	avoiding weed growth through irrigation method, intercropping, manual weeding and frequently leaving weeds	by gravity from artificial lake, flooding and aspersion	intercropping, cereal monocultures	most own
O4	compost, some fertilizers made of marine algae and other organic composts that he buys (P and K).	triennial rotation, "*chirurgic operations*" with Bt and other organic pesticides.	manual, thermal and mechanical weeding	micro and macro aspersion	some consociations, crop rotations	some traditional varieties, bought organic seeds
O5	compost and animal manures	copper sulphate and organic pesticides	manual weeding and "ignoring" weeds	automatic micro aspersion	small fields, crop rotation	buys seedlings, keeps seeds, or uses seedlings growing spontaneously next to last years beds
O6	animal manures (horses, pigs, chicken), buys guano	preventive action, makes his own products and mixtures that he knows from former experience with organic farming	manual weeding	micro and macro aspersion, flooding.	consociations, intercropping, small fields	own seeds or imported organic seed, no landraces.