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Future sustainability of organic vegetable production in the UK: perception of the growers

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Thesis

Submitted to the School of Geography

in partial fulfilment for the degree of

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Director of Studies:

Dr. Sanzidur Rahman

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FUTURE SUSTAINABILITY OF ORGANIC VEGETABLE PRODUCTION IN THE UK: PERCEPTION OF THE GROWERS

Abstract

A study was carried out to investigate future sustainability of organic vegetable production in the UK based on perception of the vegetable growers. The objectives were to determine the economic and social sustainability of organic vegetables production and to examine whether there are any relationships between economic and social indicators. Data and opinions were collected by interviewing and through a postal questionnaire. Only 14% growers (26 out of 175) had replied by post. About 61% of the respondents had been farming in the conventional way before switching to organic and 39% growers started organic farming straightway. Those who started organic farming directly has significantly lower farm size ($p<0.01$). About 70% growers grew cereals in the conventional way but about 70% grew vegetables in the organic farming system. The respondent growers who switched from conventional to organic farming stated that they had given up conventional farming due to both economic and social related reasons but placed higher emphasis on economic reasons. However, social and environmental factors drove the growers much more than economic factors in switching to organic farming. Most of the growers were found to be satisfied with the productivity level of their organic vegetable production, profitability of their total farm business and the condition of market for their organic vegetables which was either increasing or staying the same. The respondent growers were asked to rank their opinions (1-very low and 5-very high) regarding threats to sustainability of organic vegetable production in the UK. A highly significant correlation ($p<0.01$) was found between economic and socio-environmental related threats. The interviewed growers will not give up organic farming and were not worried about a fall in price premium because of the assurance and larger size of the market for organic vegetables. The study reveals that organic vegetable production in the UK has the potential to be sustainable. This conclusion drawn here is solely based on growers own perceptions who in turn are limited in numbers. Therefore, to improve reliability and validity of the study of this nature, the sample need to be expanded to include more growers and other stakeholders such as by interviewing economists, government policy makers and non-governmental experts and incorporating their views along with growers' perceptions.

Author's Declaration

This study was in self-finance. The School of Geography financed sending the questionnaire via post. This study was undertaken by interviewing organic growers and sending postal questionnaire to them. Many research papers were consulted to write-up the thesis and these were referenced properly. The author attended a conference of organic growers at Dutchy College, Cornwal in May 2009 with the help of his co-supervisor. The total word counted in this thesis is 19,472.

Signed: Pankaj Kumar Banik

Pankaj Kumar Banik
(The author)
8/10/10

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Chapter I

Introduction

1.1 Organic farming

Organic agriculture is a system approach to agricultural production which is working towards an environmentally, socially and economically sustainable production (Shepherd *et al* 2003). It is claimed to be an ecological production management system which promotes and enhances biodiversity, biological cycles and soil biological activity (National Organic Standards Board, USA in Diver *et al* 1999). Organic farming involves holistic production management systems (for crops and livestock) emphasising the use of management practices in preference to the use of off-farm inputs. This is accomplished by using, where possible, cultural, biological and mechanical methods in preference to synthetic materials. (Codex Alimentarius Commission, European Commission 1999; www.defra.gov.uk). Organic farming thus restores, maintains and enhances ecological harmony (Diver *et al* 1999). The International Federation of Organic Agriculture Movements (IFOAM) defines organic agriculture as "a whole system approach based upon a set of processes resulting in a sustainable ecosystem, safe food, good nutrition, animal welfare and social justice. Organic production is, therefore, more than a system of production which includes or excludes certain inputs". Various organic technologies have been utilized for about 6000 years to make agriculture sustainable while conserving soil, water, energy, and biological resources. Among the benefits of organic technologies are higher soil organic matter and nitrogen, lower fossil energy inputs, yields similar to those of conventional systems, and conservation of soil moisture and water resources, especially advantageous under drought conditions (Pimentel *et al* 2005).

1.2 Organic movement

Organic farming is the outcome of theory and practice since the early years of the 20th century. It involved a variety of alternative methods of agricultural production mainly in northern Europe. There have been three important movements (Heckman, 2006): *Biodynamic agriculture*, which appeared in Germany under the inspiration of Rudolf Steiner; *Organic farming*, which originated in England on the basis of the theories developed by Albert Howard in his Agricultural Testament in 1940 and *Biological agriculture*, which was developed in Switzerland by Hans-Peter Rusch and Hans Müller. Despite some differences of emphasis, the common feature of all these movements is to stress the essential link between farming and nature to promote respect for natural equilibria. These distance themselves from the interventionist approach to farming, that maximise yields through the use of various kinds of synthetic products (Conford, 2001). Despite the vitality of these movements, organic farming remained undeveloped in Europe for many years. Throughout the 1950s, the main aim of farming was to achieve a major improvement in productivity so as to satisfy immediate needs for food and raise the European Community's rate of self-sufficiency. In the circumstances, organic farming was obviously unlikely to be viewed very favourably.

By the end of the 1960s and especially in the 1970s, organic farming came to the forefront in response to the emerging awareness of environmental conservation issues. New associations grew up, involving producers, consumers and others interested in ecology and a lifestyle more in tune with the nature. These organisations drew up their own specifications with rules governing production methods. Those were food safety concerns due to pesticide residues, BSE and other issues and social concerns over working conditions in agriculture (Lampkin, 2003). Social concerns included the loss of

jobs and rural population decline. Moreover, there were welfare concerns and environmental concerns over the loss of wildlife species and habitats, pollution and the use of non-renewable resources. Those issues had come to be reflected in the broad concept of sustainable agriculture (Pretty and Hine, 2001). These issues emphasized the use of systems and practices that maintain and enhance food supplies, safety and quality; financial viability of farm businesses; resource use sustainability; ecological impacts and social and cultural wellbeing of the rural communities.

In 1980s organic farming really took off (Conford 2001, Lampkin 2003). The new production method continued to develop along with consumer interest in its products not only in most European countries but also in the United States, Canada, Australia and Japan. There was a major increase in the number of producers and new initiatives got under way for processing and marketing organic products. The problems of overproduction in the industrialized countries, underproduction in developing countries and the environmental impacts of agriculture have concentrated minds and brought about a dramatic reassessment of the achievements of the post 1945 era. The effect can be seen not only in the range of policies which gives greater weight to environmental considerations, but also in the growth of organic movements and the market for organically produced food.

This situation conducive to the development of organic farming was very large due to the consumers' strong concern to be supplied with wholesome, environment-friendly products. At the same time, the public authorities were gradually recognising organic farming, including it among their research topics and adopting specific legislation (e.g. in Austria, France and Denmark). Some States also granted national or regional subsidies to

organic farmers. Since the early 1990s, organic farming has expanded rapidly in the United Kingdom, other parts of Europe and around the world. The expansion has been fuelled by strong interest from consumers and policy makers, reflecting the perceived potential of organic farming to contribute to environmental, animal welfare, social and nutritional goals (Lampkin, 2003). More recently, increasing attention has also been paid to the rural development potential of organic farming in the face of declining incomes from many conventional farming systems.

Despite all these efforts, organic farming was still hampered by lack of clarity. Consumers were not always sure about what was really covered by organic farming and the restrictions it implied. The reasons for the confusion lay in the existence of a number of different "schools" or "philosophies", the lack of harmonised terminology, the non-standard presentation of products and the tendency to blur the distinctions between concepts such as organic, natural, wholesome and so on. The situation was not helped by cases of fraudulent use of labelling referring to organic methods. In this circumstances, adopting formal rules was the best way to give organic farming credibility in the quality products niche market. The European Community adopted a legal framework *Regulation EEC No 2092/91* in the early 1990s. The movement towards official recognition of organic farming was spread to several other countries and followed by international initiatives. In 1998, the International Federation of Organic Agriculture Movements (IFOAM) adopted basic standards for organic farming and processing. The Federation brought together organisations from all over the world which were involved in organic production. In June 1999, the Codex Alimentarius Commission adopted Guidelines for the production, processing, labelling and marketing of organically produced foods (http://ec.europa.eu/). In 1999, the FAO also embarked on an organic farming work

programme, mainly concerned with promoting organic farming in the developing countries.

In recent years, the market for organic food has developed strongly and is now often seen as a main feature of organic farming (Organic Marker Report, 2007). However, the market initially developed as a means to support the broader goals of organic farming, rather than an end in itself, at a time when official support was non-existent. This allowed organic producers to be compensated financially for restricting their production practices, effectively internalizing costs that could be considered as externalities of conventional agriculture (Pretty *et al* 2000). In recent years, environmental awareness has driven demand and conversion to organic farming. Some governments, including the European Union, have begun to support organic farming through agricultural subsidy reform. Organic production and marketing have grown at a fast pace. Growers choose organic methods for a variety of reasons. One of the attractions of organic produce is that it sometimes brings a 10-30% premium in the marketplace.

1.3 EU and the UK policies

Vegetables are produced in UK through both organic and non-organic sectors. About 3.1% of vegetables produced are of organic (www.statistics.gov.uk). In both sectors, farmers supply to sellers and to consumers through box scheme. Market is an important factor here. Vegetable production is dependant on Demand. Demand cycle considers issues such as economic, home grown, wholesomeness, healthy eating and Green Agenda. Green Agenda is followed by environmental awareness and *feel good* factors. Healthy eating issue is concerned with medicine and well being issues that are linked with the government warning.

Sustainability is affected by production base indicators: soil, climate, economies, family issues and philosophy. Family issues involve labour, continuity, age profiles and education. Economics indicators comprise of demand and government subsidy. Demand is affected by price which depends on subsidy/premiums. Yield differentiates the volume which ultimately affects the demand. Government subsidies can be discussed in light of Common Agricultural Policy and Single Farm Payment.

The Common Agricultural Policy (CAP) was implemented in 1962 by the original six members in the European Union (EU). Its purpose was to subsidize production of basic crops in the interests of self-sufficiency and food security (Schmitz *et al* 2008, Stead 2007). As new member states were added to the EU, the agricultural policies of these nations were affected by the CAP which altered the supply and demand conditions for commodities within both the entrant country and each pre-existing EU member (Schmitz *et al* 2008).

Historically most agricultural support had been paid either directly through headage and area payments or indirectly through prices. Headage and area payments became the main method of support following the CAP reforms in the early 1990s when most of the current subsidy schemes were introduced (Scottish Executive, 2003). In recent years such support measures have been criticised for overburdening farmers with bureaucracy, for encouraging overproduction of low quality commodities and for encouraging non-sustainable farming systems in some areas – all whilst failing to secure reasonable farm incomes (Scottish Executive, 2003). CAP has for many years been the subject of internal disputes, criticism from international trade partners and mockery from the wider public (Erjavec *et al* 2008). It has been regarded as one of the main generators of distortions in

international markets for food and fibre. Within the EU it is often regarded as a policy that creates additional costs for the consumer, puts pressure on the physical environment and causes a burden to the taxpayers that is not proportionate to its economic significance (Erjavec *et al* 2008).

Since the original establishment of the CAP, the EU has been enlarged many times and the CAP has been partially reformed several times (Schmitz *et al* 2008). *The 1992 Reform* brought a sharp reduction in market support and support for farming incomes through direct payments (Erjavec *et al* 2008). The reform of the Common Agricultural Policy (CAP) agreed on 26 June 2003 marked a significant shift in the nature of agricultural support across the European Union (EU). The Agreement included three main elements, two that are extension of previous reforms and one that is a new concept. The new concept was decoupling, the other main elements were modulation and changes to market measures, including cuts in price support (Scottish Executive, 2003).

Existing headage and area payments had been known as direct payments and were linked or coupled to production. That is, farmers received payments on the basis of what they claimed – such as number of cattle and sheep and hectares of cereals. Decoupling meant that farmers continued to receive most of this money, in the form of a Single Farm Payment (Scottish Executive, 2003). The level of the payment was not affected by the number of cattle and sheep kept or the area of crop grown. Most of the existing subsidy schemes were abolished at the same time as the Single Payment Scheme had been introduced. Decoupling brought considerable benefits to farmers and crofters. The level of bureaucracy was greatly reduced and farmers and crofters regained the freedom to

manage their holdings as best suits individual circumstances as well as the freedom to produce for the market.

Reform in 2003 diminished the linkage between direct payments and agricultural production (decoupling) and increased the role of rural development policy (Erjavec *et al* 2008). There were numerous dimensions to the CAP that were of interest from a welfare economics perspective, including the movement towards the decoupled payments (Colhoun, 2007). The Single Payment Scheme (SPS) is the principal agricultural subsidy scheme in the European Union. Under the scheme farmers have greater freedom to farm to the demands of the market as subsidies are no longer linked to production, and environmentally friendly farming practices (known as cross compliance) are better acknowledged and rewarded (www.defra.gov.uk). SFP provided less production incentives and is less trade distorting than the prior system of compensatory payments (Rude, 2008).

The Single Payment Scheme replaced most existing crop and livestock payments from 1st of January, 2005. The new scheme broke the link between production and support. Instead, farmers were asked to demonstrate that they were keeping their land in good agricultural and environmental condition and complying with a number of specified legal requirements relating to the environment, public and plant health and animal health and welfare (www.rpa.gov.uk, Colhoun 2007, www.ec.europa.eu). Meeting these requirements was described in the regulations as 'cross-compliance'. Access to the payment depended on the number of 'entitlements' that a farmer held. In 2005, farmers who were carrying out an agricultural activity could apply to the scheme to be allocated entitlements for their eligible agricultural area. Carrying out an agricultural activity

meant, as a minimum, keeping land in good agricultural and environmental condition (www.ec.europa.eu)

The differential impacts of SFP had considerably larger adverse effects on Less Favoured Areas (LFA) farms than non-LFA farms (Gelan, 2008). It emphasized the need to consider spatially differential impacts in further adjustments to policy reforms taking into account local circumstances. British agriculture was hugely under-funded in relation to EU competitors to around the tune of £3.5 billion a year; the single market gave free access to EU competitors; and these competitors were able to undermine UK farmers because they were better supported, both with CAP funds drawn down by their governments, and by national support systems (North, 2002).

As the environmental and wider social benefits of sustainable farming systems are gaining increasing recognition among policy makers and the general public, governments across Europe have increasingly been promoting the switch to organic agriculture. All Member States have taken advantage of the Agri-Environmental Regulation (EC 2078/92) to provide financial support to producers willing to adopt organic farming methods and, with the exception of the UK and France, for the maintenance of organic production (Latacz-Lohmann and Renwick, 2002). In the UK, support has been offered since 1994 – first under the Organic Aid Scheme (OAS) and later under the Organic Farming Scheme (OFS). The OAS provided the lowest rates offered by any of the Member States, and between 1994 and 1999 only 400 farmers entered the Scheme in England. With numbers of organic producers remaining low amidst rising consumer demand for organic food in the mid-1990s, MAFF responded with the launch of the

Organic Conversion Information System (OCIS) in 1996 and, in April 1998, announced substantially increased payment rates under the OFS, which replaced the OAS in 1999.

1.4 State of organic agriculture in the UK

Research shows that global sales of organic food and drink increased by £2.6 billion to £19.3 billion in 2006 (Organic Marker Report, 2007). The UK organic market is now the third largest in Europe after Germany and Italy. This market grew rapidly in the 1990s and had experienced growth rates in excess of 30% per annum since 1998 (Firth *et al* 2003). In 2006, retail sales of organic products in the UK represented a 22% increase since 2005. The retail market for organic products has grown by an average of 27% a year over the last decade (Lobley *et al* 2005). In January 2007, there was a total of 613,470 ha of organically managed land in the UK – representing little change since January 2006. Organically managed land now accounts for approximately 3.5% of the UK's total agricultural land area. The area of in-conversion land in the UK increased by 40% in 2006. However, fully organic land area declined by 7% over the same period. In January 2007, there were 4,639 organic producers in the UK, representing an annual increase of 7%. Organic holdings represent approximately 1.6% of all farms in the UK.

In 2006, net farm income (NFI) for the organic cropping farms increased by 43% while there was a 33% increase for the conventional farms, resulting in a widening gap between the two. NFI for the organic arable/field vegetable farms increased nearly 3.4 fold in 2006. Compared with similar conventional farms, organic farms performed as well or better on average, and substantially better for the cropping and mixed farm types. A report by ADAS in 2004 observed that organic farmers are more content with their lot than their non-organic counterparts – are happy to stay in farming compared to non-

organic. This most probably reflects the fact that organic farmers have taken a 'lifestyle choice' to farm organically and are happy with that choice. Approximately 3% of cropped area in UK is covered by vegetables. Organically managed land accounts for approximately 3.5% of the UK's total agricultural land area of which 3.1% is covered by vegetables (www.statistics.gov.uk). An average of 73% of the organic vegetables sold by the multiple retailers was sourced in the UK during 2006-07 (Soil Association, 2007). Retail sales of organic products through box schemes increased by an estimated 53% in 2006.

Organic production levels in the UK are somewhat lagging behind those of other European countries. This could be due to a number of contributing factors including information failure, social obstacles, lack of processing and marketing infrastructure, industrial barriers, lack of profitability, risk and reasons for reconversion (Latacz-Lohmann and Renwick, 2002)

1.4.1 Organic vegetable scenario in the UK

The UK has the second largest market for organic vegetables in Europe. This market grew rapidly in the 1990s and has experienced growth rates in excess of 30% per annum since 1998. UK growers responded to the growing market and to higher conversion grants introduced in 1999. The organic vegetable market represents 3% of the total market for vegetables. Nearly 70% of the vegetables are sold through multiple retailers, with 15% sold through wholesalers, 11% sold directly by the growers and only 5% sold to processing outlets (Firth *et al* 2003).

For organic vegetables that are grown commercially in the UK, levels of self-sufficiency or market share is 57% of all vegetables. Within the main marketing season, it is estimated that the UK is self sufficient in two thirds of organic produce demand with the remainder being met from imports. There is potential to increase UK market share by 10-15% (Firth and Schmutz, 2003). If so, market share of organic production will be similar to that achieved in conventional production (70%). This is also the target set by the British Government's Organic Action Plan (www.defra.gov.uk).

There are many positive drivers (**Tables 1.1 and 1.2**) for the future growth of the market. These are consumers' preference for UK produce, opportunities to supply catering and institutional food outlets, policy initiatives such as the Curry Report and the government's Organic Action Plan. These include: initiatives to reconnect consumers with farmers that build on organic direct marketing strengths; one is to boost co-operation and communication within the food chain and the other to boost UK market share to levels in the conventional sector (Firth *et al* 2003).

The average UK self-sufficiency level for all the vegetables is 57% by volume. One of the objectives of the government's Organic Action Plan for England is to encourage English producers to supply a greater proportion of the primary produce consumed domestically. The action plan intends to help British producers to supply the organic market at least at similar levels to the conventional market.

Table 1.1: Summary of the key drivers and constraints in the growth of demand for organic vegetables in the UK (adapted from Firth *et al* 2003)

Drivers	Constraints
• Promotions and marketing by major retailers • Improved quality and availability • Consumer awareness, behaviour and trust • Consumer concern for health, environment and animal welfare • Food scares and Genetic Modification • Increasing household incomes	• Availability and poor quality of supplies • Labelling • Processing capacity • High levels of imports • Price conscious consumer behaviour • Concentrated consumer base, mainly in the south east • Fragmentation of organic standards

For many organic vegetables, domestic production is below the conventional level of self-sufficiency. This indicates that there is potential to increase UK production to substitute imports. There is potential to increase production in the main season. This can be achieved by better attention to quality of production and storage, better continuity of production and price. The Food and Farming Report of the Policy Commission on the Future of Food and Farming in the UK is favourable to the development of organic farming, with its recommendation for a strategic plan for organic farming (Crown 2002 in Firth and Schmutz 2003). The governments Organic Action Plan has begun to take some of these issues forward; notably in seeking to develop the domestic supply to match levels, which are achieved in the conventional sector. Increased UK production is likely to come from existing farmers' expanding production, especially at the beginning and end of the season.

Table 1.2 SWOT analysis of the UK organic vegetable market (adapted from Firth *et al* 2003)

STRENGTHS	WEAKNESSES
• Market growing by 10-15% per annum • Rising disposable incomes • Scientific evidence of the health benefits of eating vegetables • Consumer concern about health, chemical residues and the environment • Trust in organics • More mature market • Direct routes to consumers expected to increase • Food miles issue prominence • 50% of babies are given organic baby food • Growers with skills and commitment • Government commitment • Strength of lobby groups such as the Soil Association and Sustain • Supermarkets desire to sell organic food	• Small market size, relatively static vegetable market, and slowing of organic growth • Small supermarket shelf space for organics • Low organic processing capacity • Complex, price-driven, disjointed and opaque supply chain • Lack of market data • Small number of organic pre-packers • Domestic continuity of supply and availability • High prices • Unclear labelling • Few opportunities for new suppliers to supply supermarkets • Competition from foreign suppliers • Lack of national food culture • Lack of marketing skills amongst some growers
OPPORTUNITIES	**THREATS**
• Convert 'dabblers' and encourage 'committed' consumers to spend more • Expand into chilled and prepared sector • Explore and increase institutional demand • Substitute imports • Develop regional marketing • Rapid expansion in eating outside the home • Novel crops • Innovation • Co-operation amongst farmers • Increase public awareness • Tell story of organics/farm in market place with product • Food scares • Ageing population • The 'Curry report' and the Organic Action plan • 'Five-a-day' initiative	• Global and European economic, environmental and political circumstances • Changing consumer demand • Intermediate standard products and GMOs • Domination of the market by multiples, especially low price operators. • Disconnection of consumers with agriculture • Policy alterations not considering effect on market • Fragmentation of organic standards and certification • Over supply • Excessive imports • Continued reduction of suppliers (packers) within food chain • Continued reduction in prices for growers • Lack of organic seed

1.5 Sustainability of organic farming

Despite some obvious successes in terms of consumer demand and supply growth, many policy makers, academics and farmer leaders are still uncertain about the potential contribution of organic farming to the future development of mainstream agriculture, and to sustainability issues in particular. The objective of sustainability lies at the heart of

organic farming and is one of the major factors determining acceptability of specific production practices. The term 'sustainable' is used in its widest sense, to encompass not just conservation of non-renewable resources (soil, energy, minerals) but also issues of environmental, economic and social sustainability. The term 'organic' is best thought of as referring to the concept of the farm as an organism, in which all the component parts - the soil minerals, organic matter, micro-organisms, insects, plants, animals and humans - interact to create a coherent and stable whole (ADAS, 2004).

1.5.1 Sustainability – definition and measurement

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987). Sustainability relates to the continuity of economic, social, institutional and environmental aspects of human society, as well as the non-human environment (Maine 2003 in Fuller 2007). The term sustainable agriculture means an integrated system of plant and animal production practices having a site-specific application that will, over the long term: satisfy human food and fibre needs; enhance environmental quality and the natural resource base upon which the agricultural economy depends; make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls; sustain the economic viability of farm operations and enhance the quality of life for farmers and society as a whole. Several studies took a quite straightforward approach to determining whether particular crop production systems are productive: they looked at systems that have been in operation for a long period on long-term experimental research stations, determine what has happened to their productivity over the period, and ask what the record suggests about their sustainability into the future. The important question is not whether agricultural

productivity is changing. It is whether agricultural productivity gains are occurring at the cost of degradation in the underlying resource base which will eventually result in falling productivity.

Agricultural sustainability is concerned with production of agriculture over time. Sustainability must be defined with respect to systems, rather than inputs or crops, because crop varieties and inputs produce nothing in isolation. Sustainability is the result of the relationship between technologies, inputs and management, used on a particular resource base within a given socio-economic context. Careful recognition of three aspects of systems space, time and dimension help make the discussion concrete.

Sustainable agriculture is concerned with the ability of agricultural systems to remain productive in the long run. Sustainability is the result of the relationship between technologies, inputs and management, used on a particular resource base within a given socio-economic context. The most frequently employed measure of agricultural productivity is *yield*. But this is an inadequate measure of sustainability as it ignores time, secondary products (straw), input use and externalities (Herdt and Steiner, 1995). *Total factor productivity (TFP)*, an index of total output relative to an index of total inputs, is a better measure of productivity than yield. TFP recognizes the use of all inputs, reflects the relationship between outputs and managed inputs. But TFP does not take account of inputs and outputs that are external (Mitchell, 1996; Herdt and Steiner, 1995). *Total social factor productivity (TFSP)* is more inclusive than TFP. TFSP accounts not only for managed inputs but for externalities as well [that is, outputs obtained on site (grain, erosion) and external to site (water pollution, pesticide residues etc.)]. Therefore, for measuring sustainability it is necessary to measure the flow of inputs and outputs across

the boundaries of the system over time, to include all the inputs and outputs, to aggregate each set so as to produce a single measure of input and output. Even given a good measure of all inputs and all outputs, it is also necessary to know what is happening to the underlying quality of the resource base since the quality of resource base affects future physical/biological production. Different studies (Lampkin 1999, Herdt and Steiner 1995) summarized the set of questions (**Figure 1.1**) that may be asked to determine whether a particular system is physically/ biologically sustainable using both the TSFP and ecosystem health criteria. A non-decreasing trend in yield and in TSFP is necessary to call a system sustainable. In addition, the ecosystem health indicators should remain at acceptable values. With the measurement problems solved, both ecosystem health and output/input aspects can be evaluated for a system. If valid and consistent, any 'healthy' ecosystem should have a non-decreasing trend in the TSFP, and vice-versa. As sustainability is about the future, both measurement approaches require prognostication of what the observations mean for future productivity. The TSFP ratio assumes that past trends are a good indicator of future trends. Ecosystem health trends are a good indication of future performance.

1.5.2 Literature on Bio-physical indicators

Literature shows research works in determining sustainability of organic farming system. Numerous researchers considered bio-physical parameters on a long term experiment basis. Considered indices were yield and total factor productivity. Badgley *et al* (2007) observed, the principal objections to the proposition that organic agriculture can contribute significantly to the global food supply are low yields and insufficient quantities of organically acceptable fertilizers. They evaluated the universalities of both claims by comparing yields of organic versus conventional for a global datasets of 293 examples.

The authors also evaluated the amount of nitrogen potentially available from fixation by leguminous cover crops used as fertilizer. Their model suggested that leguminous cover crops could fix enough nitrogen to replace the amount of synthetic fertilizer. Ikemura *et al* (2008) undertook a study in Mexico over 9 years to evaluate the effect of organic farming upon soil physical and chemical properties in 3 organic farms and contrasted these to those of a conventional farm. Shepherd *et al* (2003) reviewed the likely benefits to the wider environment from organic practices. They have summarized their assessment in **Table 1.3**.

Table 1.3 Summary of the environmental impact of organic farming compared with conventional farming (adapted from Shepherd *et al* 2003)

	Indicator	Assessment of impact		Comments
		Per unit area	Per unit yield	
Ecosystem	Biodiversity	☺	☺	Organic principles encourage a wide variety of habitats.
Soil Quality	Organic matter content	☺/😐	☺/😐	Potential benefits from organic farming, depends on organic matter inputs on individual organic and conventional farms.
	Biology	☺/☺	☺/☺	Literature tends to support a benefit, but not always.
	Structure	☺/☺	☺/☺	Literature tends to support a benefit, but not always.
	Erosion susceptibility	☺/☺	☺/☺	Few direct measurements, but organic practices should decrease risk.
Water Quality	Nitrate leaching	☺	☺/☺	Potentially large losses from ploughed leys, but smaller losses, on average, from other points in the rotation.
	Phosphorus loss	☺	☺	Insufficient information.
	Pesticides	☺	☺	Few pesticides used in organic production.
	Human pathogens	☺	☺	Insufficient information – work ongoing.
Air Quality	Ammonia	☺	☺	No direct studies. Assessed from what is known about processes.
	Nitrous oxide	☺	☺	Insufficient information.
	Methane	☺	☹	Most data relate to dairy systems. Lower emissions on an area basis due to lower livestock densities.
	Carbon dioxide	☺	☺	Main energy input relates to fertiliser manufacture
Resource use	Energy efficiency	☺	☺	Depends where boundaries are drawn when comparing systems, but main energy input into conventional is fertiliser production.
	Nutrient balance	☺	☺/☺	Smaller surpluses; OK if not over-depleting soil fertility.
	Controlled wastes	☺	☺	Emphasis on recycling. Less packaging and no agrochemical waste.

Key:
☺ Organic is better than conventional
😐 No difference between organic and conventional
☹ Organic is worse than conventional

Milgroom *et al* (2007) developed a methodology (named as RUSLE) to monitor soil erosion in organic olive orchards in Spain. By assessing erosion risk, they found RUSLE had potential to manage soil erosion trend in other crops and regions. This finding supports the model in **Figure 1.1**. Results of a 60-year simulation based on data from the

sustainable agricultural demonstration site at the USDA (Lu *et al* 2003) showed that organic systems had low erosion risks. Studies in the UK (Shepherd *et al* 2003, Stolze *et al* 2000 in Annon, 2003) and Australia (Conacher and Conacher, 1998) found reduction in erosion and runoff in organic production system. Benge *et al* (2007) measured soil quality in organic orchards in New Zealand. Soil appeared to be of better quality with lower bulk density, greater porosity and aggregation, more earthworms, a larger microbial population and activity, higher pH and CEC, more potentially mineralisable-N and biomass carbon, and higher levels of some macro-nutrients such as calcium and magnesium. However, Olsen P values were lower. Similar results were found in other studies as well. For example, higher pH was found by Ikemura *et al* (2008), Fliessbach (2007), Theodoro *et al* (2003) and Conacher and Conacher (1998); more potentially mineralisable-N was found by Ikemura *et al* (2008); higher level of macro-nutrients was found by Theodoro *et al* (2003).

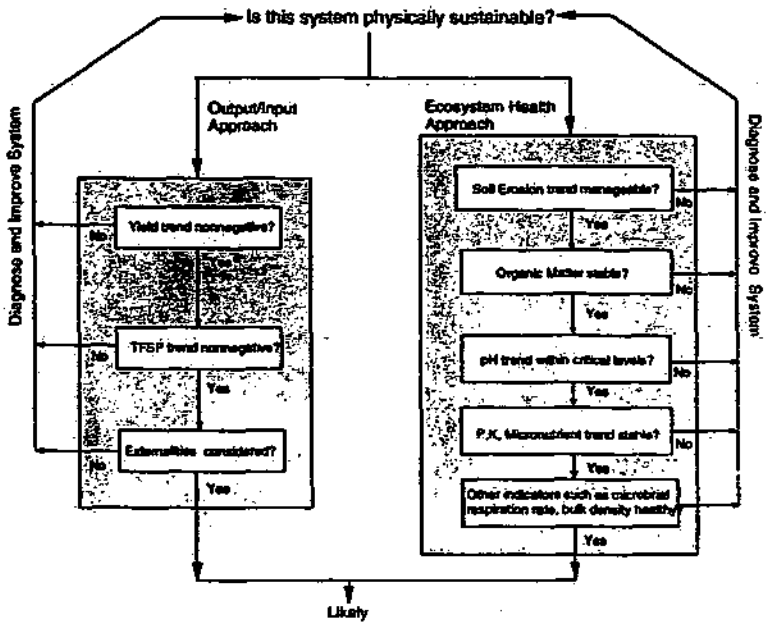

Figure 1.1: The sustainability flowchart (adapted from Herdt and Stainer, 1995)

It is clear that many research works have been undertaken based on bio-physical parameters. Further work on these parameters will probably bring almost the same results. Therefore, biophysical parameters were not considered in this study.

1.5.3 Literature on Socio-Economic indicators

Several authors carried out different surveys by sending questionnaire via post to thousands of organic growers. ADAS (2004) found in their survey that organic farmers had taken a 'lifestyle choice' to farm organically and had been happy with that choice. Organic farming creates and safeguards employment which is clearly an important aspect of rural development and improves individual welfare. Lobley *et al* (2005) found in their survey that the people who operated organic farms were typically younger, highly educated, entered into agriculture as an entirely new 'career', had never farmed before and did not come from a farming family. But they had no intention of leaving organic farming in the foreseeable future. Farms operating short supply chains with direct and/or local sales created a distinctive rural development impact.

Pacini *et al* (2003) considered gross margin as an indicator in case of Italy. They also integrated some bio-physical indicators with financial indicators to evaluate the economic and environmental trade-offs between different farming systems. Some of the significant key influences on attitudes towards organic farming were cited by Wheeler (2007): knowledge; experience; education; informational; occupational effects; and attitudes on the individual aspects of organic agriculture. Professionals with increased organic knowledge and experiences were more likely to think favourably about organic agriculture.

Lampkin (1999) assessed the performance of organic farming with respect to 1) financial viability of farm businesses and 2) social and cultural identity of rural communities. He observed that organic farming may be significantly more profitable than conventional, despite lower yields and the costs of conversion. The author argued that conventional systems, particularly intensive ones, may perform better with respect to food security and financial viability objectives, but that organic systems perform better with respect to the social, resource use and environmental objectives.

Latacz-Lohmann and Renwick (2002) examined the reasons why farmers are not willing to convert to organic farming. The research also attempts to identify the characteristics of people who take up organic farming and why they do so. HDRA (2003) provided detailed market information on the demand and supply of individual UK vegetable crops throughout the UK growing season. Within the main marketing season, for most staple crops, it is estimated that the UK is self sufficient for two-thirds of organic produce with the remainder being imported.

From the literatures, no work shows the determination of the sustainability of organic farming system based on both economic and social indicators. This area needs attention. Therefore, it has been attempted to study the future sustainability of organic farming (vegetable production) in the UK by taking into account the economic and social indicators.

1.6 Aim and Objectives of the Study

The overall aim of the study is to assess the future sustainability of organic vegetable production in the UK focusing on socio-economic aspects. The assessment is based exclusively on the perceptions of vegetable growers (conventional and organic). The specific objectives are:

a) to assess the future economic sustainability of organic vegetable production in the UK as perceived by the growers,

b) to assess the future social sustainability of organic vegetable production in the UK as perceived by the growers,

c) to identify the interrelationships between social and economic sustainability of future organic vegetable production in the UK.

1.6.1 Research Questions

In order to address these objectives, the following research questions are raised:

1. how stable is the market for organic vegetable production?
2. what are the economic factors that are driving organic vegetable production?
3. what are the social factors that are driving organic vegetable production?

Chapter II

Literature Review

As stated in the previous chapter, the indicators to determine sustainability of a farming system can be grouped into biophysical and socio-economical. Literature shows that many scientists worked by taking into account the biophysical indicators in the UK and in other countries. A few examples are cited below. Further works with biophysical indicators will bring the same results. So, this type of indicators was not investigated in this study.

The Agricultural Research Group on Sustainability (ARGOS) in New Zealand routinely measured soil quality in organic orchards (Benge *et al* 2007). Soil appeared to be of better quality with lower bulk density; greater porosity and aggregation; more earthworms; a larger microbial population and activity; higher pH and CEC; more potentially mineralisable-N and biomass carbon and higher levels of some macro-nutrients such as calcium and magnesium. However, Olsen P values were lower.

Fliessbach (2007) determined the indicators for soil quality changes in a long-term comparison trial. Replicated field trials comprised of organic and integrated (conventional) farming systems that are typical for Swiss agriculture. Soil pH tended to increase in the organic systems, whereas the integrated systems had the lowest pH values.

Ikemura *et al* (2008) undertook a study to evaluate the effect of organic farming on soil physical and chemical properties in three organic farms and to contrast these to those of a conventional farm. Four farms located in the southern New Mexico were selected. Three

of the farms were under organic farming system for three, six and nine years, and the fourth was under a conventional farming system. Soil properties measured included: soil bulk density, particle size classification, saturated hydraulic conductivity, soil moisture characteristics, effective porosity, available water capacity, volume of transmission and storage pores, pH, electrical conductivity, total carbon concentration, ammonium-N, and nitrate-N. EC and nitrate-N were positively correlated ($r = 0.82$). Soil pH and EC increased with increasing amount of time under organic farming. Inorganic-N was higher in organic than conventional farm indicating a greater yield potential of organic farms.

Parralopez *et al* (2007) evaluated the medium to long-term environmental performances of organic, integrated and conventional olive-growing systems in the south of Spain. Performances were compared with respect to soil erosion, soil fertility, rational use of irrigation water, water contamination, atmospheric pollution and biodiversity, based on experts' knowledge. The authors tested the common implicit assumption of environmental superiority of the two alternative farming systems over the conventional system. The Analytic Hierarchy Process (AHP) was implemented. Results confirmed the holistic environmental superiority of organic and integrated alternatives over the conventional olive system. The results represented a scientific base to justify and endorse institutional support regarding the promotion and implementation of organic and integrated olive-growing systems in the region, which are likely to result in greater social welfare.

Pimentel *et al* (2005) stated that various organic technologies had been utilized for about 6000 years to make agriculture sustainable while conserving soil, water, energy, and biological resources. Among the benefits of organic technologies are higher soil organic matter and nitrogen, lower fossil energy inputs, yields similar to those of conventional

systems, and conservation of soil moisture and water resources (especially advantageous under drought conditions). Conventional agriculture can be made more sustainable and ecologically sound by adopting some traditional organic farming technologies.

Theodoro *et al* (2003) compared the alterations of some chemical, physical, and microbiological characteristics of a Typic Hapludox in Brazil in organic, in conversion and conventional coffee production. Data were collected throughout one year on two farms under the influence of similar climate and relief conditions. In general, in conversion and conventional plantations increased the soil fertility. Larger chemical characteristic alterations were observed in the agroecosystem of organic coffee production in relation to the conventional. There were increments in the values of soil pH and Ca, Mg, K, P, Zn, B, CTC, base saturation, and decrease of exchangeable Al.

The research works cited below considered socio-economic indicators:

ADAS (2004) carried out a survey on organic farming in the UK through postal questionnaire. A total of 13,000 survey-packs had been dispatched of which 2,000 were returned. They found that 39% of organic farmers took a *lifestyle choice* to farm organically and were happy with that choice. Relatively high interest in organic farming from those not organic was of interest. This group was biased on the basis of farm size (smaller farms) and farm type (Cattle & Sheep and Mixed farms). Only five per cent of existing organic farmers intended reverting to non-organic. This was significantly less than the numbers converting or interested in conversion. This indicated an overall expansion of the sector. About 40% organic farmers cited the need to diversify. It reflected that a high proportion had low profits and was consistent with higher reliance on

non-farm income. A high proportion of organic only farms would consider ceasing agricultural production and maintaining the land in good environmental condition. Organic only farmers had a more fatalistic attitude towards CAP reform. The organic responses were very divided. Fifty eight per cent of organic only farms saw the reforms as negative. Overall the authors found the organic perspective as more positive than the non-organic.

Badgley *et al* (2007) stated that the principal objections to the proposition that organic agriculture can contribute significantly to the global food supply are low yields and insufficient quantities of organically acceptable fertilizers. They evaluated the universality of both claims. They compared yields of organic versus conventional for a global dataset of 293 examples. With the average yield ratios, they modelled the global food supply that could be grown organically on the current agricultural land base. Model estimates indicate that organic methods could produce enough food on a global per capita basis without increasing the agricultural land base. They also evaluated the amount of nitrogen potentially available from fixation by leguminous cover crops used as fertilizer. They found that leguminous cover crops could fix enough nitrogen to replace the amount of synthetic fertilizer in use. Their results indicated that organic agriculture has the potential to contribute quite substantially to the global food supply.

Gelan (2008) quantified the impacts of common agricultural policy reform on farming in Less Favoured Areas (LFAs) in Scotland. LFAs are characterised by low agricultural productivity because of unfavorable natural conditions. The differential impacts of the single farm payment on LFA farming were examined. Results indicated that the policy reform had considerably larger adverse effects on LFA farms than non-LFA farms. They

emphasized the need to consider spatially differential impacts in further adjustments to policy reforms taking into account local circumstances.

Lampkin (1999) assessed the performance of organic farming with respect to 1) financial viability of farm businesses and 2) social and cultural identity of rural communities. First objective is seen as a key sustainability objective. Farmers cannot continue indefinitely where financial returns are low or negative. Financial performance of organic systems is typified by lower yields and lower costs for external inputs. The author developed models of the costs of conversion to organic farming. He illustrated the impacts of the changing policy support framework and the widening price differential in the UK. The author observed that organic farming may be significantly more profitable than conventional, despite lower yields and the costs of conversion. Organic farms can achieve similar labour incomes and returns to family labour as average conventional farms. Numbers employed on organic farms tend to be 10-20% higher as a result of higher value, labour intensive enterprises and value adding into processing and marketing activities. The contributions which organic farming makes to small farm survival are job security and job satisfaction. Organic farms score highly in improved consumer perceptions of organic farmers and the emphasis on fair trade principles. Finally, the author argued that conventional systems, particularly intensive ones, may perform better with respect to food security and financial viability. But that organic systems perform better with respect to the social, resource use and environmental objectives.

Lobley *et al* (2005) studied the impact of organic farming on the rural economy of England. Organic farming is creating and safeguarding employment which is clearly an important aspect of rural development. It can be assumed to improve individual welfare.

The people who operate organic farms were typically younger, highly educated, entered into agriculture as an entirely new 'career', had never farmed before and did not come from a farming family. But they had no intention of leaving organic farming in the foreseeable future. Farms operating short supply chains with direct and/or local sales created a distinctive rural development impact. Directness/ shortness of the supply chain was the most important factor. Organic farmers operating direct sales were even more acute than the organic farming population generally. All farms with direct sales recorded a higher value of sales and this was even more marked for organic farms. These farms support a larger number of jobs as well as providing a more diverse range of employment opportunities. Direct sales are frequently associated with improved connections and collaboration between farmers. Relationships are based on a shared understanding rather than a formal contract. Consumers can feel that they are supporting and building a form of food production that is superior from an environmental and health perspective. As a result, they can enter a new set of relationships with those who produce their food. In turn the producers can negotiate that relationship face-to-face with their customers. Organic status again acts as a bridge that helps customers and producers share a feeling of solidarity, before entering into a relationship of relative interdependence. Fellow feeling and mutual dependence strengthen the feelings of community. Although the selling of food directly to the customer is not a complete answer to community development, it can make an important contribution. Organic farms that sell directly to the end consumer have a distinctive socio-economic footprint and make a significant contribution to rural development. Configuring farm businesses differently can foster rural development. The authors have demonstrated that in order to deliver rural development benefits organic conversion alone is not enough. The beneficial impacts identified in the research were associated with organic farms which operated a very different business model. The

authors recommended that a *business reconfiguration package* is developed to help farmers reconfigure their businesses to supply customers directly. A number of implications for future research activity arose from this report. Integration of environmental impacts with socio-economic impacts is needed.

Rude (2008) examined whether or not the Single Farm Payment (SFP) induces extra production. The study finds that the SFP provided less production incentives and is less trade distorting than the prior system of compensatory payments.

Tranter *et al* (2007) explored the financial implications of converting to organic farming in Great Britain through a case study of farmers considering conversion in 2002. Most study farmers were motivated to convert for financial, not ideological or life-style reasons. Organic vegetables were studied in depth. A fall in Family Farm Income during the conversion period would not be an obstacle to farmers changing to organic methods. There is also the possibility that reversion to conventional agricultural production might occur, perhaps at a faster rate than the original conversion process that was taking place around the turn of the century.

Wheeler (2007). Organic agriculture is a farming system that is considered by some to have beneficial impacts on the future sustainability of agriculture. Some research studied the attitudes of consumers and farmers. No studies considered what influences the attitudes of agricultural professionals (extension officers, scientists, academics and researchers). Agricultural professionals play in influencing farmer adoption of agricultural innovations and conducting research. Their views on farming systems may be critical for overall adoption. This study reported the results of a telephone survey

conducted in 2004, with 185 agricultural professionals surveyed for their views towards organic farming. A particular aim was to study how increased knowledge and experiences influenced attitudes towards organic agriculture. Using an ordered probit regression framework, some of the significant key influences on attitudes towards organic farming were: knowledge; experience; education; informational; occupational effects; and attitudes on the individual aspects of organic agriculture. The study found support for the hypothesis that professionals with increased organic knowledge and experiences are more likely to think favourably about organic agriculture.

Mitchell *et al* (1996) examined trends in productivity and sustainability in a continuous cotton production in Alabama over a 95-year-long-term experiment. TFP, productivity and TSFP were calculated. Output per unit of input is higher in 1991 than in 1896, even when externalities are valued. An average annual rate of TSFP growth of 1.8%/yr was attained. Valuing soil erosion and pesticide externalities had only a modest effect on measured productivity.

No work has so far been done to determine the future sustainability of organic vegetable production in the UK considering economic and social indicators together and finding the interrelationships between these two types of indicators. Therefore, an attempt has been taken in this study to focus on these two issues.

Chapter III

Method of study

There are four methodological dimensions in social science research process: 1) Research design, 2) Data collection and elicitation, 3) Task of recording, managing and analysing data and 4) Knowledge interest. A research design is a structure of a research plan to solve a particular problem. There are 5ive basic research design techniques : Observation, Desk Research, Continuous, Surveys and Experimental (Zikmund, 2000). An Observation is the basis of laboratory experiments and field studies. A Desk Research relies on secondary data such as searching databases.

There are three basic types of research: Continuous, Survey and Experimental Research. Continuous research is the monitoring on a regular basis. In an Experimental Research, the researcher measures the results. It is more quantitative than qualitative in nature. In light of research objectives, social science researches undergo *descriptive* and *explanatory* research methods. The first method answers the question 'what is going on?' and the second one answers 'why and how is it going on?' (David, 2001).

Kent (2001) suggested that if there were very low responses (< 30) from the respondents in a survey then quantitative analysis would not be ideal. Qualitative methods should be applied in such a case. The type of information needed for a research (qualitative and quantitative) depends on : 1) the purpose of the study, 2) measurement of variables and 3) how will the information be analyzed. Data collection methods, recording and analyzing processes are different in both of the approaches **(Table 3.1)**.

Table 3.1 The difference between qualitative and quantitative research (cited from Islam, 2005)

	Qualitative research	Quantitative research
Aim	Exploration of participants' meaning. Understanding, generation of theory from data	Search for casual explanations. Testing hypothesis, prediction, control
Approach	Broad focus Process oriented Context-bound, mostly natural setting Getting close to the data	Narrow focus Product-oriented Context-free, often in artificial setting
Sample	Participants, informants Sampling units such as place, time and concepts Flexible sampling which develops during research	Respondents, subjects Sample frame fixed before research starts
Data collection	In-depth non-standardised interviews Participant observation/ fieldwork Documents, photographs, videos	Questionnaire, standardised interviews Tightly structured observations Documents Randomized controlled trials
Analysis	Thematic, latent content analysis such as grounded theory, ethnographic analysis	Statistical analysis
Outcome	A story, an ethnography, a theory	Measurable results
Relationships	Direct involvement of researcher Research relationship close	Limited involvement of researcher Research relationships distant
Validity	Trustworthiness, authenticity	Internal/external validity, reliability

Social research data can be structured or unstructured. Structured data are coded but unstructured data are not. In a social science research, data can be presented in formal or informal ways of communication and the medium can be texts, images or sound materials. A research concept is highly subjective. Its meaning and understanding may vary according to perceptions. So, it may or may not be measurable. It is important in both qualitative and quantitative research methods that an appropriate technique is to choose to operationalize the concept of the research.

The descriptions and logical expressions dominate the qualitative data analysis. The quantitative analysis mainly deals with data. Both quantitative and qualitative methods have strengths and weaknesses. A research methodology depends on the research conditions, research questions, available resources and data type. The advantages and disadvantages of quantitative techniques are listed below (cited from Islam, 2005):

Advantages:

1. Large data and sample can be analysed and standardised very quickly
2. Variety of ways of administration
3. Anonymous-respondents may express views more confidently
4. Quick analysis can give rapid feedback
5. Results are easily and immediately accessible (such as tables and graphs)

Disadvantages:

1. Lack of flexibility (if the respondent wishes to express other than the given option)
2. Sample size needs to be high as a small sample size may become disastrous
3. It is necessary to know the key issues or problems beforehand
4. It may yield shallow or completely misleading information or results

Qualitative research methodology is suitable for the following types of research:

- Research that delves in-depth into complexities and processes
- Research on a little known phenomenon or innovative systems
- Research that seeks to explore where and why policy and local knowledge and practice are at odds

- Research on informal and unstructured linkages and processes in organisations
- Research on real, as opposed to stated, organised goals
- Research that cannot be done experimentally for practical or ethical reasons
- Research where relevant variables have yet to be identified

Disadvantages:

- Qualitative research takes much longer, requires greater clarity of goals during design stages and cannot be analyzed by running computer program
- Ignores representative sampling with findings based on a single or a few cases

3.1 Construction and pre-testing of the questionnaire

Collection of necessary data was a major part of this study. So, developing a suitable questionnaire was a very important job. It was decided that some pilot interviews would be conducted to design the framework of the questionnaire. Initially, an organic farmer at Buckfastleigh, Devon was interviewed face to face. She has a mixed organic farm (chicken and vegetables). Questions were asked about her conventional production system before switching to organic farming, reason for switching, production systems and related problems in her organic farming, yield, cost of production, marketing policy, profit, satisfaction level in economic and ethical point of view and her thinking towards the sustainability of organic vegetable production in her farm and in the UK. She was motivated in switching to organic farming by the price premium and the assured market. Her market is so large that she will not be looser financially if there is no price premium. Lots of other information was available from this pilot interview (**Appendix A**). After this interview, a set of indicators were fixed and a draft framework of the questionnaire was designed.

Later, an organic vegetable grower in Truro, Cornwall; one consultant advising the organic growers in Cornwall and one businessman of conventional vegetables in Truro, were interviewed face to face. Different aspects of the production, market and sustainability were asked to them. These interviews helped in reshaping the questionnaire. The revised questionnaire was pre-tested by interviewing another consultant advising organic growers and a farmer couple in Cornwall. The couple grow cereals, grass and vegetables. They have been farming organically fully in ethical point of view. Their farm is not making much money but they are not getting financially looser. They are confident that they would never give up their organic farming. After all the above interviews, the economic and social indicators were set up to determine the future sustainability of organic vegetable production in the UK. The questionnaire was then finalized **(Appendix B)**.

3.2 Sampling Strategy

Initially, Soil Association was approached with a request to provide with the name and address of the organic vegetable growers in the UK. After series of requests, they provided the contact details of all organic vegetables growers (175 in number) in Devon and Cornwall counties. The set of the questionnaire and a forwarding letter was mailed to all of 175 growers. Only 25 growers replied back over six weeks. A reminder email was sent to all 175 growers. But only one grower replied. A request was made to the Soil Association again to provide the contact details of the organic growers in the other parts of the UK. This time, they denied complying with the author's request by stating that they had stopped giving the growers' details to any individual but Defra. Soil Association is not even showing these information in their website now which they used to show before.

Then, an email was sent to randomly selected growers from the list of 175 growers seeking their permission to interview them. But they did not reply to the email.

The percentage of getting reply was 14% (26 out of 175). ADAS (2004) had received reply from 15% organic growers in their postal questionnaire whereas Lobley *et al* (2005) got reply from 43% of respondents. Data were tabulated in Excel. Both quantitative and qualitative analyses were manipulated by using SPSS statistical package.

3.3 Limitations of the study

Identification of the growers was a difficult task because of the privacy policy of the Soil Association and also due to lack of interest from the growers. If this restriction prevails, anyone wanting to know the contact details of the organic growers have to approach Defra which is not straightforward. So, it will be very hard to undertake a research work (of this study type) on organic farming in the future. As the sample size was very low, detailed statistical analysis (such as Chi Square Test) could not be performed. So, it is necessary to be careful to generalize the findings of this study.

Chapter IV

Results and Discussions

4.1 Basic characteristics of the respondent growers

In this study, about 61% of the respondent growers have been farming for more than 20 years (**Table 4.1**). Therefore, it can be presumed that they answered to the questions in the questionnaire and provided their suggestions in light of long term experiences. Devon appears as the core organic county in that it has a high absolute number of holdings and the largest absolute number of long established registrations (Lobley *et al* 2005). The dominance of the South West as the home of English organic farming is abundantly clear. Devon has the highest number of organic farms of any county in England as well as some of the oldest.

Table 4.1 Frequency of years the growers have been farming

Years of farming	Frequency
Less than 5 years	4.3
5-10 years	17.4
10-15 years	13.0
15-20 years	4.3
More than 20 years	60.9

It was found that about 61% of the growers had been farming in the conventional way before switching to organic and about 39% growers started organic farming straightway. So, most of the respondents in this survey are acquainted with both conventional and organic farming systems. There were 153,177 ha of organically managed land in the Southwest in January 2008, an increase of 24% since January 2007 (Soil Association, 2009). The amount of in-conversion land increased by 55%, while the amount of fully organic land rose by 24%. There were 1,453 in-conversion and organic producers in January 2008, a growth of 13% since January 2007.

In conventional farming systems, it was found that more than 70% of growers had produced cereals and grass; above 20% and nearly 30% grown field vegetables and root crops, respectively; approximately 25% growers cultivated oil crops, pulses and had livestock. Potato and swede were the most cultivated vegetables followed by cauliflower, cabbage, broccoli and vegetable crops. Overall 57% of the total vegetables are grown in the UK. Within the group 62% of potatoes are UK grown (Firth *et al* 2005).

4.2 Reasons for giving up conventional farming

The reasons for giving up conventional farming were grouped into *economic related* and *social and environmental related* reasons. Among economic related reasons, *low product price* was ranked highest followed by *low productivity* and *high operating cost* (**Table 4.2**). These three reasons were also mentioned by most of the growers as indicated by high frequency of response. Significant correlation was found between *low productivity* and *low product price; high operating cost* and *negative net profit* (**Table 4.3**). With total economic related reasons; low productivity, high operating cost, negative net profit and low product price had highly significant correlation.

Among social and environmental related reasons, *moral/philosophical* was ranked highest followed by *concerns over chemical use* and *animal welfare* (**Table 4.2**). These three reasons were also mentioned by most of the growers as indicated by high frequency of response. Among social and environmental related reasons, significant correlation was observed between *taking as a new challenge (lifestyle choice)* and *decline in wildlife* (**Table 4.4**). Highly significant correlation was observed between *soil damage* and *sustainability*. With total ranks in this category, correlation of *taking as a new challenge (lifestyle choice)* was highly significant. *Animal welfare* and *decline in wildlife* were significantly correlated with the total rank.

No significant correlation was observed between *economic related* and *socio-environmental related* ranks (**Appendix C**). But significant correlation was found between *overall low productivity* and *taking a new challenge*.

Table 4.2 Frequency and ranks of the reasons for giving up conventional farming

	Reasons	Frequency	Average value of Rank
Economic related	Overall productivity was low, *Opw*	38.5	1.3
	High operating cost (excluding labour), *Hoc*	46.2	1.2
	Labour cost was high, *Lc*	7.7	0.1
	Net profit was negative, *Npw*	23.1	0.7
	Product prices were low, *Ppw*	53.8	1.5
Social and environmental related	Moral/philosophical, keen on organic principal, *Mor*	30.8	1.4
	Ill health, concerns over chemical use, *Con*	23.1	1.2
	Taking a new challenge, *New*	15.4	0.5
	Desire to do organic, lifestyle choice, *Nt*	7.7	0.1
	Soil damage, *Soil*	15.4	0.5
	Animal welfare, BSE in dairy cattle, to produce healthier chemical free livestock *Anim*	23.1	1
	Decline in wildlife, *Dec*	7.7	0.3
	Sustainability, *Sus*	7.7	0.1
	Extra EU money, *EU*	7.7	0.4

Table 4.3 Correlation among the reasons (economic related) for giving up conventional farming

	OpwR	HocR	LcR	NpwR	PpwR	EconReason
OpwR	1.0					
HocR	0.05	1.0				
LcR	0.3	0.3	1.0			
NpwR	0.5	0.6*	0.5	1.0		
PpwR	0.6*	0.5	0.2	0.5	1.0	
EconReason	0.7**	0.7**	0.4	0.8**	0.8**	1.0

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

Table 4.4 Correlation among the reasons (social and environmental related) for giving up conventional farming

	MorR	ConR	NewR	NtR	SoilR	AnimR	DecR	SusR	EUR	SocEnvReason
MorR	1.0									
ConR	-0.01	1.0								
NewR	0.5	0.3	1.0							
NtR	-0.2	-0.2	-0.1	1.0						
SoilR	-0.3	0.3	-0.2	-0.1	1.0					
AnimR	-0.04	0.1	0.2	-0.2	0.3	1.0				
DecR	0.4	-0.2	0.7*	-0.1	-0.1	0.5	1.0			
SusR	-0.2	0.5	-0.1	-0.1	0.8**	0.5	-0.1	1.0		
EUR	-0.2	-0.2	-0.1	-0.1	-0.1	-0.2	-0.1	-0.1	1.0	
SocEnvReason	0.5	0.5	0.7**	-0.3	0.3	0.6*	0.6*	0.5	-0.02	1.0

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

4.3 Characteristics of growers who switched to organic farming

Some respondent growers have been farming organically for more than 20 years; some of them have been farming organically for 15 years and many of them have been farming organically for more than 10 years. Only a few farmers increased their farm size noticeably. ADAS (2004) found in their study that a greater proportion (16%) of organic growers had claimed to have increased the area of land owned and/or farmed by them; with 90% of organic-only producers stating no-change to the size of their farm business.

Half of the respondents in this study have their own land, one-fourth have 100% rented land and rest of the growers have partially rented land. Average organic farm size of those who switched to organic farming is 103.08 ha and those who started directly is 13.80 ha. T-test result shows that those who started organic farming directly has significantly lower farm size ($p<0.01$).

Tranter *et al* (2007) stated that growth in organic production is much more based on conversion of large existing farming businesses rather than the new entrants to farming typically operating smaller units. They found the farms, participating in their study, were medium to large in area and well-established family holdings whose family members were seriously exploring all opportunities to boost their farm incomes. ADAS (2004) found that the relatively high interest in organic farming from those not organic was of interest. There was a bias in this group on the basis of farm size (smaller farms more likely) and farm type (Cattle & Sheep and Mixed farms).

Lobley *et al* (2005) found that organic farmers were more likely to be new entrants; were also more likely to have previously worked outside of farming. Tranter *et al* (2007) found that farmers adopting organic methods had a high involvement of younger farmers, possessed high levels of education, most were male, came from a rural background, had an agricultural educational attainment to technical college or equivalent level and two-thirds of having undertaken general or agricultural higher education. However, it was notable that very few farmers had received specific training in organic farming methods. Tranter *et al* (2007) found also gender influence in converting. Female farmers were more likely to convert than their male counterparts. Female farmers reported they would convert for organic values' (improved environment, health, and/or personal satisfaction). Male farmers were more likely to perceive that they would make more profit by converting to organic farming. Males' decision to convert was dependent on market performance rather than on perceived quality of life values.

It was found in the current study that 70% of growers grew field vegetables, 70% grew grass, 30% grew cereals and 26% grew root crops organically. Half of the respondents have protected cropping in tunnels or glasshouses. The area of organic vegetables among

the respondents ranged from 0.25 hectare to 80 hectares. Most grown organic vegetables was potato followed by cabbage, broccoli, leek, carrot, squash, salad, swede, red beet, courgettes, chicory, cabbage, pak choi and parsnips. Firth et al (2003) showed graphically the size of the vegetables within overall organic market (**Figure 4.1**). Vegetables are a rich source of many essential micronutrients and health-related phytochemicals. Vegetable production provides jobs and supports agribusiness, thereby creating economic opportunities (Juroszek *et al* 2008).

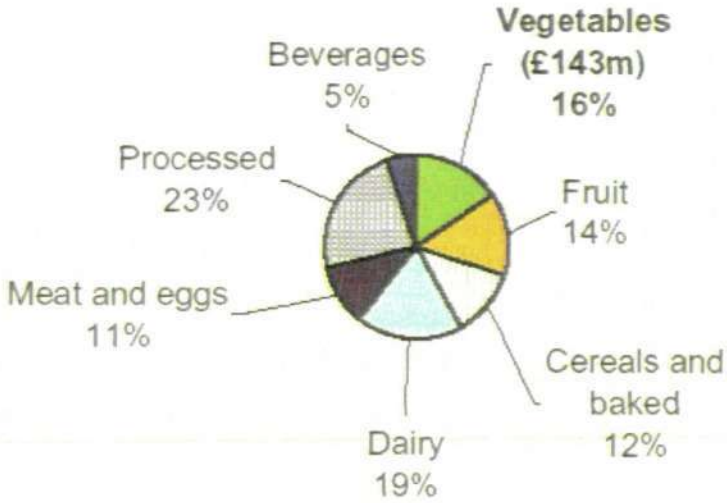

Figure 4.1: The size of vegetables within overall organic market
(adapted from Firth *et al* 2003)

4.4 Reason for switching to organic farming

The reasons behind switching to organic farming were grouped into *economic related* and *social and environmental related*. **Table 4.5** shows that social and environmental factors drove the growers much more than economic factors in switching. The strongest driving factor was the growers' belief that they were to do good to the environments such as reducing pollution and increasing bird population (**Table 4.6**). The other stronger driving factors were ethical and growers' feeling that they were to contribute positively to public health. Few growers took organic farming as a new challenge and thought it would be

safe for their own health. In economic point of view, growers were not happy with low conventional product price and hence organic price premium motivated them to switch to organic farming system. They could not foresee any future expansion of their existing farm. Consumers' belief about the higher nutritional value in organic products also influenced the farmers. Some other important motivating reasons were stability of organic market, variable demand of conventional products and consumers' perception about organic products as better than local grown products.

Table 4.5 Average value of factors motivating growers to switch to organic farming

Economic related factors	Social & Environmental related factors
1.7	2.5

Table 4.6 Frequency distribution of the factors motivating growers to switch to organic farming

	Motivating factors	**Frequency**
Economic related factors	You were motivated by the price premium for organic products	34.8
	You were not happy with lower prices of conventional products	34.8
	The market for organics was more stable	17.4
	Demand for your conventional products was too variable	17.4
	You could not foresee the scope of future expansion of your conventional farming	21.7
	Imported conventional products were a threat to your business	4.3
	Consumers perception about organic products as better than local grown products was a factor influencing you	13
	Consumers belief about the high nutritional value of organic products was a factor to motivate you	21.7
	Inclusion of organic food in school meals influenced you	0
	Real fear concerning food production risk in the conventional route	4.3
	Suits your method of farming & farm size	4.3
Social and environmental related factors	You started organic farming because it is ethically sound	69.6
	You had a feeling that you are doing good to the environment (e.g., reduced pollution, increase in bird population)	91.3
	You had a feeling that you are contributing positively to public health	52.2
	Desired to do organic principle as a new challenge	8.7
	Better for your own health because of less chemical use	8.7
	Better animal welfare standards	4.3
	Better soil conservation	4.3
	Better sense of working with nature	4.3
	Extra EU money	4.3

The above findings of this study differ with that of Tranter *et al* (2007). They found that farmers were motivated to convert mostly by economic factors, with 32% of producers mentioning this, especially 'better prices for produce' and 'greater income'. Personal satisfaction (23%) and improving the farming system (22%) were also important factors in the decision to convert. Their study farmers scored high agreement with statements suggesting that organic farming benefits 'the environment', 'marketing', 'animal welfare' and 'quality of organic products'. Most of the farmers gave low agreement to 'Organic products look better than conventional products', 'I will make more profit by converting to organic farming', and 'There are enough processors of organic food'. Farmers with high off-farm income, predominantly the small-scale meat producers, appeared to be more optimistic than other farmers that the market for organic food was growing.

ADAS (2004) found that organic farmers were more content with their lot than their non-organic counterparts – 39% are happy to stay in farming as compared to 26% non-organic. This most probably reflected the fact that these farmers have taken a 'lifestyle choice' to farm organically and are happy with that choice.

At the beginning of 2001, British agriculture faced its toughest period ever with farm incomes at their lowest levels since the general depression in 1930s. All product sectors were substantially affected. This economic condition forced many producers to re-consider the finances of their farming systems. Some cut costs significantly, some opted to diversify into non-farm businesses or to leave agriculture completely, whilst a significant number were considering organic methods (Tranter *et al* 2007). During 1998-2001, 10% of all farmers in England contacted the Organic Conversion Information Service (OCIS). The large premiums over 'conventionally' produced products and the subsidies received whilst converting were 'pulling' farmers towards the organic option at

the same time as the downturn in profits in conventional farming was 'pushing' farmers in new directions (Tranter *et al*, 2007).

Firth *et al* (2003) observed that the lack of clarity of the market was causing uncertainty amongst growers who were considering conversion or expanding their production. At certain times of the year and for certain vegetables the balance between demand and supply was more evenly balanced and in some cases oversupply was occurring. Nobody had a clear picture of the market and this was causing uncertainty amongst growers who wished to increase their production and for those who were considering conversion.

The conversion to organic farming is related to the farm level profitability of organic systems compared to conventional systems (Lohmann and Renwick, 2002). In turn this is dependent on the size and the type of enterprise(s) and/or enterprise mix, cost levels and the level of price premiums.

UK growers responded to the growing market and to higher conversion grants introduced in 1999 by nearly doubling the area of organic vegetables (HDRA, 2003). There were many positive drivers for the future growth of the market, including consumers' preference for UK produce and opportunities to supply catering and institutional food outlets. Policy initiatives such as the Curry Report 2002 and the government's Organic Action Plan were also all favourable to the development of the organic vegetable market. These included: initiatives to reconnect consumers with farmers which build on organic direct marketing strengths; ones to boost co-operation and communication within the food chain and others to boost UK market share to levels in the conventional sector.

The rapid growth in the organic vegetable market has been in parallel with the growth of the whole organic food market in the UK. This has been due to a number of factors,

which have resulted in greater consumer awareness of food safety, health and environmental issues and concerns about the use of genetically modified organisms (GMOs) in conventional production. These have all caused more consumers to buy organic vegetables (Firth and Schmucz, 2003).

The growth in demand and supply of organic produce has been argued to offer environmental benefits, health benefits and also benefits to the rural economy through stimulating employment and providing a basis for rural development (Lobley *et al* 2005).

4.5 Satisfaction over productivity level of organic vegetables

When growers were asked if they were satisfied with the level of productivity at the time of filling up the questionnaire, 70% growers replied that their productivity level was satisfactory; 17% of the growers were very satisfied and 13% were not satisfied. One third of the respondents had 75% to 100% portion of their income and half of the growers had more than 50% portion of their income from organic vegetables. Total farm business of 74% growers was making a profit and that of 26% was not.

ADAS (2004) found in their survey that 5% of organic growers claimed to have increased profits; 9% of producers reported that they were managing to maintain their profit levels ahead; a greater proportion (13%) of organic only growers reported maintained profit levels compared to 6% of partially organic growers; 51% among organic producers reported that profits were down but they expected to weather the crisis. Among the latter, this ranged from 43% of organic only producers to 57% of partially organic producers. Among organic growers, 4% cited that their business was not profitable and might not survive. They also found that the main farm business accounted for 55% of farm income

over the previous year among organic producers. Diversification activities accounted for almost 15% of farm family income and off-farm income for almost 30%.

Horticulture producers in the Southwest experienced difficult weather conditions for two consecutive years 2007 and 2008 (Soil Association, 2009). Riverford Organics reports limited sales growth since spring 2007 but with considerable inputs required to maintain sales. Largescale organic vegetable production is technically feasible but that marketing and labour management challenges need to be overcome to make it financially viable at the farm level (HDRA 2004 in Tranter et al 2007). Tranter et al (2007) found that in organic farming *farm family income* (FFI) increased 110% on average; cereal/horticultural producers would see the biggest increase; conventional cropping farms' *occupiers net income* (ONI) was €192 per ha whilst the organic sample averaged €280 ha per, a 45% improvement. ADAS (2004) found that high proportion of organic only farms would consider ceasing agricultural production and maintaining the land in good environmental condition. It reflects the following traits among organic farmers: greater incidence of low profitability among organic only farms, higher reliance on non-farm income for organic farmers, preference for a system which involves less intensive stock/inputs.

4.6 Market for the organic vegetables

About the market outlet in this study, 57% of the respondent growers use box scheme, 30% of growers sell to farmers' market, 17% of growers sell directly at the farm gate and to organic shops and 13% of the growers sell via cooperatives and through wholesale (**Table 4.7**). Other less used outlets were multiple retailer, processor and online. Nine percent growers used organically produced vegetables for home use. Box scheme was

found quite fluctuating as 17% of growers reported that their market had been decreasing (**Figure 4.1**), 30% reported as staying same and 9% reported as increasing. Overall, all growers reported that their market of organic vegetables was staying same / increasing.

Nearly 70% of the vegetables are sold through multiple retailers, with 15% sold through wholesalers, 11% sold directly by the growers and only 5% sold to processing outlets (Firth *et al* 2003). Organic farmers are more likely to work together and with customers. This is consistent with high proportion marketing directly to consumers (ADAS, 2004). There is much informal evidence within the farming industry of organic farmers working together to share best practice and market information.

Table 4.7 Likely state of the market for organic vegetable produce

Markets	% of growers in this market	% of the likely state in the immediate future		
		Decrease	Stay same	Increase
Box scheme	56.5	17.4	30.4	8.7
Multiple retailer	8.7			8.7
Cooperatives	13		4.3	8.7
Farmers market	30.4	8.7	17.4	4.3
Processor	4.3		4.3	
Wholesale/distributors	13	4.3	8.7	
Direct online sales	4.3			4.3
Direct sales (at farm gate, to organic shops)	17.4		13	4.3
Home use	8.7	4.3	4.3	

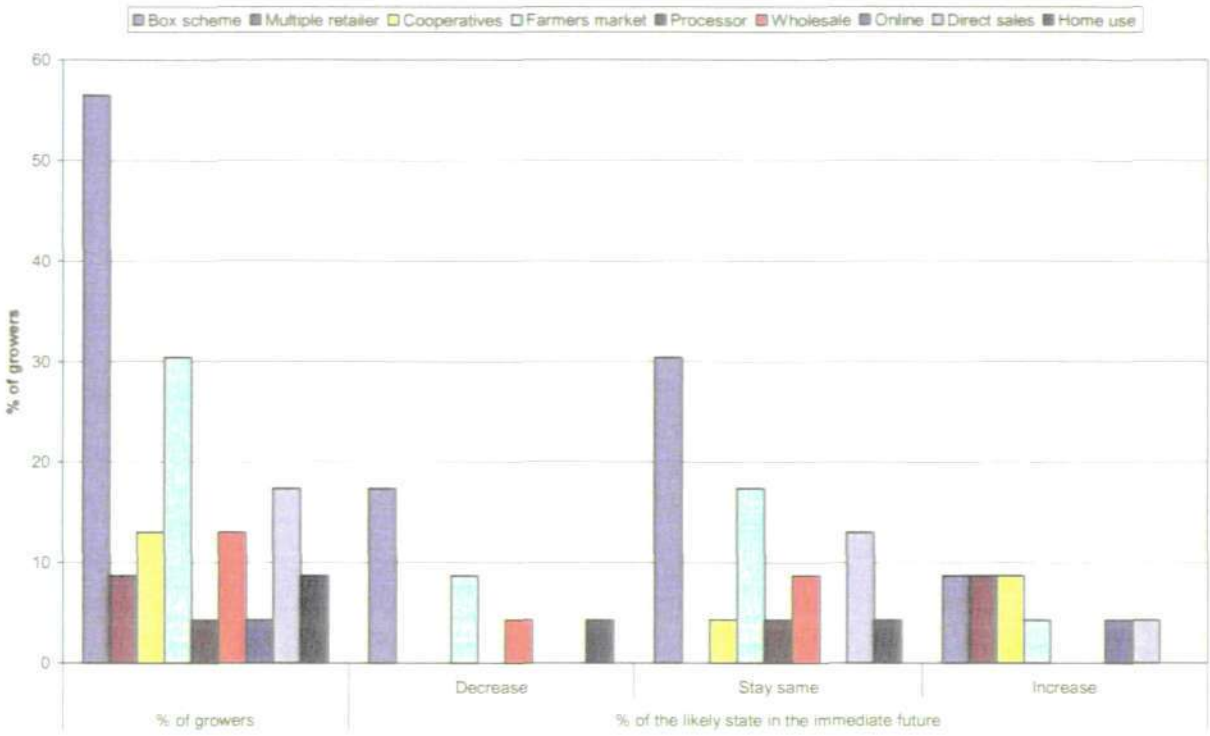

Figure 4.2 Likely future state of different markets for organic vegetables

4.7 Future threats to the sustainability of organic vegetable production

Farmers were asked to put their rank ('1 – very low' to '5 – very high') against threats towards future sustainability of their organic vegetable production. Threats were grouped into *economic related* and *social and environmental related*. Economic related threats were categorized into *price related*, *market related* and *CAP and farm policy related*. Social and environmental related threats were categorized into *social* and *environmental and health related*. The average value of the given ranks was calculated for each of the threats in all the categories (**Table 4.8**).

Considering the average value of the given rank in descending order, *price related* threats to the future sustainability of organic vegetable production can be outlined as withdrawal of price premium and falling of the product price. Among *market related* threats, growers

are concerned about the fluctuation in demand of buyers, assurance of market, uncertainty for future expansion potential and competition from foreign imports. Within *CAP and farm policy related* threats, growers are very concerned about CAP policy reform, existing national policies and current support provisions.

Among social threats farmers are worried much about consumers' perception that food value is same in the conventional and organic products followed by the misconception about local grown food as organic and uncertainty about supply for school meals. In the category of *environmental and health related* threats, growers cited insects and disease attacks, rising concern about carbon footprints, criticism about organic food miles and loss of soil fertility.

Table 4.8 Farmers' ranks to different future threats of sustainability of organic vegetable production

Economic related		
Threats		Average value of ranks
Price related	Withdrawal of price premium, *Wpp*	3.04
	Fall in product price that you receive, *Fpp*	2.8
Market related	Assured market, *Am*	2.6
	Fluctuating demand by buyers, *Fd*	3
	Uncertainty for future expansion potential, *Uff*	2
	Competition from foreign imports, *Cff*	2
	Competition from supermarkets on deliveries, *Cfs*	0
	Lack of outlets, *Out*	0.2
CAP and farm policy related	Concerned about CAP reform policies, *Cac*	2.2
	Concerned about existing national policies, *Cae*	2.2
	Satisfaction on current support provisions, *So*	2
Social and Environmental related		
Threats		Average value of ranks
Social factors	Misconception about local grown food as organic, *Ma*	2.6
	Food value are same between organic and conventional crops, *Fv*	3
	Uncertainty about supply for school meals, *Ua*	2
	Ignorance, *Ign*	0
	Lack of Education, *LaE*	0.2
Environmental and health related	Loss of soil fertility, *Ls*	1.6
	Insects & disease attacks, *Id*	2
	Criticism about organic food miles, *Cao*	1.8
	Rising concern about carbon footprints, *Rc*	2
	Weed control is difficult, *Wee*	0.2

Overall the Economic and Social threats are highly correlated **(Table 4.9)**. This result represents very well one of the research questions of this study. Within the Economic threats category – CAP, Market and Price threats are highly correlated. Within the Social threats – Social and Environmental threats are highly correlated. The results are identical for Pearson correlation.

Table 4.9 Correlation among different future threats to the sustainability of organic vegetable production

	PriceThreat	MarketThreat	SocialThreat	EnvThreat	CAPThreat	SumEconThreat	SumSocThreat
PriceThreat	1.000						
MarketThreat	.732**	1.000					
SocialThreat	.622**	.589**	1.000				
EnvThreat	.702**	.753**	.543**	1.000			
CAPThreat	.648**	.613**	.423*	.614**	1.000		
SumEconThreat	.818**	.922**	.594**	.762**	.833**	1.000	
SumSocThreat	.675**	.718**	.842**	.878**	.545**	.726**	1.000

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

Conversion grants can encourage commercialization of organic farming, thus leading to the loss of the traditional values and principles held by organic farmers (Tranter *et al* 2007). Financial enhancements of the OFS, announced in the Organic Action Plan, and an increase in government funded research has to be interpreted as a very positive commitment to organic agriculture by the British Government. ADAS (2004) found that lack of capital and planning legislation emerged as giving greater cause for concern for both organic and non-organic producers. Environmental legislation represented a greater concern to non-organic compared to organic producers. Into planning legislation, the organic responses were very divided with 58% of organic only farms seeing the CAP reforms as negative.

Reform of the EU's Common Agricultural Policy has involved several rounds since 1992. These rounds have gradually changed the method of support from market-based intervention purchases to direct producer payments. The Single Farm Payment (SFP) was introduced most recently and is claimed to be decoupled from production decisions. Rude

(2008) examined whether or not the SFP induced extra production. He found that the SFP provided less production incentives and is less trade distorting than the prior system of compensatory payments.

Notwithstanding the need to source non-seasonal and exotic products from third countries, provided the organic option is economically viable, there was still scope to increase the share of U.K. organic production on retail shelves (Tranter *et al*, 2007).

4.8 Growers' suggestions and comments

When answering to question No. 20 in the questionnaire (**Appendix B**), the participant growers put different suggestions about what can make organic vegetable production sustainable in the UK. These suggestions were very interesting. Some growers wrote only keywords such as "reasonable price" in the *Price Related Suggestions* box, "direct sales" and "closed relationships" in the *Market Related Suggestions* box. Some growers wrote keywords and explained these in one or two sentences. Some other growers put their suggestions on to the details by writing many sentences. The suggestions in these three categories of answer were gone through carefully. Some suggestions were cited by more than one farmer. Some suggestions were unique to the reply of individual farmer. By keeping growers' statements into verbatim as quotations, the following interpretation can be outlined as below:

4.8.1 Price Related Suggestions

1) "Keeping prices reasonable and not overinflated with ensuring consistent quality."
2) "To make locally produced organic vegetable production viable and sustainable, producers need to have confidence that there is a market which is willing to pay a

'fair price' (i.e. above the cost of production) – not an easy thing to achieve as it requires a fundamental cultural and political shift."

3) "Production related prices; costs of water cleansing, pesticide removal and fossil fuel shortages need to be added to true costs of conventional production."
4) "Needs to be the same price as conventional food – gets rid of white middle class buying organic over other social groups."
5) "Price is a consideration when all other conditions are met. Organic production will be as good as or better in quality (both content and visual) to achieve any premium".
6) "Very good quality food production at a sensible price".

4.8.2 Market Related Suggestions

1) "A restraint on the power of the big retail outlets. The market is dominated by the supermarkets that buy on a huge scale and thus pay as unsustainable price level for small scale growers. So, to survive – small scale growers would have to specialize in one or two crops and gear up with very specialist expensive machinery. Philosophically (and risk wise) many farmers cannot choice to go down that route. Some growers do not see a future for small scale (approximately 50 boxes) production. Supermarkets and huge box schemes will freeze them out."
2) "Reducing supermarket influence on customers".
3) "Retailers should take less profit – they do not seem to understand the high risk taken by groups as sometimes things go wrong with great loss; good demand from young families but retailers mark up prices too high."
4) "More people are prepared to pay premium for organic vegetables; growing for local outlets and cooperation with other growers."

5) "Direct sales"

6) "Improving the local link to organic"

7) "Growing to meet known demand"

8) "More home delivery"

9) "Some growers supply to local shops. There are local shops that give the impression that they sell organic vegetables. But the word 'local' has become more dominant in consumers' mind. The growers who are selling through box scheme find that this method is administratively costly and the product price has to reflect that."

10) "There should not be distinction between 'local' and 'organic'."

4.8.3 Suggestions on Social Factors

1) "Close relationships with customers".

2) "Encouraging qualifications; teaching organic livelihood in the farming sector/ horticultural colleges."

3) "Education – public must want only seasonal food."

4) "People need to be educated "to see the ridiculousness of supermarket food with no vitamins having to be supplemented with artificial vitamins in pills. Local fresh food would give them all the vitamins they need.

5) "People need to be educated to see the big picture, the whole ecosystem that they are a part of."

6) "Emphasis on fresh local produce."

4.8.4 Environment and Health Related Suggestions

1. "More awareness of the benefits of organic farming."
2. "Increased awareness of habitat benefits for wildlife, improving perception of 'better food' for organic is a must."
3. "Clearer message about the health of fruits and vegetables, particularly organic with no pesticides used on the vitamin-rich skins of crops which can be safely eaten without peeling."
4. "The main focus of organic food should be its environmental benefits and publicity of the climate change impact of artificial use of chemicals in the conventional industry."
5. "Conventional farming is oil based and relies heavily on nitrates etc. plus chemicals and antibiotics. It destroys the soil to that extent when fertility becomes more and more depleted. The only way forward is through wide scale organic principles. Surely the question is not whether organic farming is sustainable but is conventional agricultural methods sustainable and the answer is a strong 'no'. The economic downturn will have a short term effect. Major in these in the future will be the efficiency differential between conventional and organic production. With there being no provable benefit, this will be harder to justify in future."
6. "More free press for organics: organic is GM free; organic does not rely on fossil fuels and hence is more sustainable."

7) "Better quality seeds and soil. More inherent into organic pest control methods."

8) "Ensuring consistent quality."

Few growers' health was affected by agricultural chemicals. So, they understood the benefits of organic farming. They suggested for the need of awareness of residues of

chemicals in conventional farming. Some growers emphasized for messages such as *Push Local, Push Environment, Push 'Better Focus'* explaining that reducing meat consumption and replacing it with organic vegetables etc. can reduce the weekly spend, improve health and lower the carbon footprint.

4.8.5 CAP, National Policy and Farm Support Related Suggestions

1) "When oil becomes more expensive, more sustainable food production systems will become cheaper than the current wasteful systems".
2) "Community supported agriculture is only true sustainable marketing option. Agreement at a strategic planning level for individual towns, cities and perhaps country level i.e. creating local, sustainable food plans leading to commitments to purchase."
3) "Local food network plus supply chain; wasteful food infrastructure needs replacing; cooperation with other farmers: shared resources plus markets. These need to be in place now ready for when oil and transport are too expensive."
4) "A system to ensure the integrity of the produce – organic certification is such a system, but this has to be combined with clear and comprehensive labelling of the provenance."
5) "Sustainable food production is both local and organic. Public need to value both of these more. People need to be encouraged to see the long-term (soil, sustainable) not just short-term greed."
6) "Strict control of artificial fertilizer and pesticides. Equal sized field for all would produce organic produce. Nutritionally, not so stringent regulations".

7) "Why does an organic laying hen need more ground area than conventional hen and why extra perch space?"
8) "Limiting the CAP support to a threshold level, thereby distributing huge public handouts to large farming industries."

Some growers observe that the OELS premium which pays their organic certification fees, makes remaining organic farming feasible. The loss of organic premium for sheep in 2008 was another nail in the coffin. They suggested for the better long term maintenance payment in favour of conversion, temptation to convert for the payment only as motivation and higher OELS payments.

Tranter *et al* (2007) was concerned that there is also the possibility that reversion to conventional agricultural production might occur, perhaps at a faster rate than the original conversion process that was taking place around the turn of the century. ADAS (2004) found in their survey that around a quarter (27%) of respondents producing organically saw their future in farming but expected to have to change their farming practices and a similar proportion (26%) expressed a need to diversify. Furthermore, at 40% Organic Only producers were more likely to cite a need to diversify than were Partially Organic producers (15%). Conversely, while 14% of Partially Organic producers expressed a desire to increase the size of their business. It is diversity that is important, a mixture of local and national sales, connecting businesses and consumers in a local economy together and also generating export income (Lobley *et al* 2005).

ADAS conducted a vast survey with organic and non-organic growers in the UK. Just under half of all organic producers responding to the survey indicated an intention to

maintain their current level of organic activity; equal numbers planned to increase as decrease their organic activities; a higher proportion of respondents indicated that they were in the process of converting to organic production compared to those indicating an intention to revert from organic to conventional production systems. Hence on the evidence of this survey, the overall proportion of organic producers was likely to show some increase. Lack of end market, inflexible organic regulations, poor potential premia/price margins and poor payment rates for conversion/maintenance of the land were the driving forces to scale down the level of organic activity. Reasons for decreasing the area of organic land or reverting to non-organic farming were dominated by poor market prospects and confidence rather than technical issues. All respondents who indicated an intention to increase their organic output were asked whether the main reason for this was the potential price premium or in the interests of environmental benefit. In the majority (55%) of cases the main reason was cited as "Environmental Benefit" while 35% cited "Potential Price Premium". By farm size, 66% of small producers cited environmental benefit as the main reason. This was in contrast to the majority of large producers that cited potential price premium (52%).

Farmers, policy-makers and other market actors must react swiftly to the changing conditions of the new environment. Government must continue to give clear policy support to the sector. Growers and marketers need a clear picture of the market and knowledge about the supply levels of crops at different times of the year and precisely where there are opportunities for innovation, processing and expanding production.

Lobley et al (2005) recommended a business reconfiguration package is developed to help farmers reconfigure their businesses to supply customers directly. This package

should recognise that it is a process rather than a simple switch and that on-going support will be required. The business reconfiguration package should be available to all farmers but in the organic sector it could be run in tandem with organic conversion.

Lampkin (1999) argued that conventional systems, particularly intensive ones, may perform better with respect to food security and financial viability. But that organic systems perform better with respect to the social, resource use and environmental objectives.

By interviewing the organic vegetable growers and from their reply through the questionnaire, it was found in this study that most of the growers switched to and carrying on organic farming in ethical point of view. Their market is so assured that they are not worried about the price premium and are not thinking to give up. They are quite sure that their production system will be is sustainable in economic, social and environmental point of view.

Chapter V

Conclusions

This study was carried out to assess the future sustainability of organic vegetable production in the UK by focusing on social and economic aspects and based on the perceptions of vegetable growers. Literature search included an understanding of the organic market scenarios in Europe and in the UK; the effect of government and EU policies to the organic growers; sustainability, its measurement and indicators and factors determining sustainability of organic farming system. Furthermore, few organic and conventional growers, experts and businessmen were interviewed. These interviews helped in developing a mail-based comprehensive questionnaire which was then posted to organic vegetable growers. Finally, based on the responses from interviews and postal replies, an attempt was taken to assess farmers' views on the sustainability of organic vegetable production in the UK focusing on economic and social indicators.

The findings from the study can be outlined as:

- The growers who gave up conventional farming were mostly driven by Economic factors. *Low product price* was ranked highest followed by *low productivity* and *high operating cost* .Significant correlation was found between *low productivity* and *low product price* and between *high operating cost* and *negative net profit*. No significant correlation was observed between Economic related and Socio-Environmental related ranks
- Social and Environmental factors drove the growers much more than Economic factors in switching to organic farming. The strongest driving factor was the growers' belief that they were to do good to the environments such as reducing pollution and increasing bird population

- About 70% growers were satisfied with the productivity level of their organic vegetables and 74% growers found that their overall farm business was making a profit
- All growers reported that their market of organic vegetables was either staying same or increasing.
- The growers ranked different threats to the sustainability of organic vegetables production in the UK. The highly ranked threats were withdrawal of price premium and falling of the product price; fluctuation in demand of buyers; CAP policy reform; consumers' perception that food value is same in the conventional and organic products; insects and disease attacks.
- Overall the Economic and Social threats are highly correlated. Within the Economic threats category – CAP, Market and Price related threats are highly correlated. Within the Social threats – Social and Environmental threats are highly correlated.

The findings of this study could have been more robust by expanding the scope of the study to include viewpoints of economists, government policy makers, non-government experts and other stakeholders, such as supermarket chains and consumers. Then this would have provided a platform to compare and contrast the views of the growers with other stakeholders, including related views on national economic downturn, government's plans or thinking regarding overall organic agricultural market in the UK and Europe. Considering this, further work can be carried out to get a clear picture if organic production will be sustained in the UK in the future.

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Appendix A

A Pilot Interview taken with Mrs Allison Samuel, an organic grower at Buckfastleigh, Devon

A powerpoint presentation based on this interview was displayed to the project supervisors. The powerpoint file has been converted to Word as below:

- Physical parameters are very important to measure sustainability in case of vegetable production
- Soil here is not ideal for vegetables
- Climate is not brilliant, the farm is very wet
- Stony soils, Growing vegetables in hilly slopes
  - causing soil erosion
  - difficulties in plantation & machinery operations

- One sustainability indicator – Market
- Another indicator - Price
- Though it's not ideal to grow vegetables in this soil, yet they have a market
- Riverford coperative is at their doorstep. It is expanding their box scheme

- Before 1990, conventional farming (beef & arable crop)
- First year – no money. They had to work off the farm
- In 1990 – conversion, they are working in the farm. Because they have a market
- They had only 39 ha of land which is not viable for arable crops in conventional method

- For <u>cereals</u>, the farm size should be minimum 200 ha for economic viability
- So, they did something different (<u>vegetables</u> and chicken) which made it viable in 39 ha of farm

- In conventional, we need higher acreage, big output per acre
- From this 39 ha, annual output is only £30,000 per year (including input, so no profit)

- Riverford approached all local farmers for vegetables production. Most farmers did not grow vegetables before. As the market was assured, they started vegetables

- They did not just grow vegetables and look for market. Market approached them, they produced vegetables.
- For chicken, Riverford wanted farmers to produce chicken. Now the market is full. There is a long Q of farmers who wants to produce chicken for Riverfood

- They are the members of South Devon Cooperative (SDC).
- Agreement – cooperative must sell their product to Riverford
- SDC has machinery, machinery manager, labour. Farmers share machineries and labour. Farmers put money, borrow money from SDC

- Riverford collect from farmers, pack it into boxes, deliver it through lorry in south-west.
- Riverford has Franchise, they deliver through van to peoples' door.
- 30,000 boxes each week
- From Devon to Yorkshire – Riverford, trying to reduce the No. of Miles

- Other area (exeter) farmers grow their own box scheme, 5/600 boxes /week
- Farmers individually can produce 5/5 type of vegetables. But 1 box needs 20 types of vegetables

- Riverford organize seeds, suggest planting, weeding, harvesting time
- If the production is high of one farmer, Riverford finds another market

- Conventional vegetable farming is not labourious. They put 2 herbicides. In organic, they have to spend £750/ 1000/ 1500 for hand weeding
- Much labour
- Weeding is expensive
- Some crops (cabbage) can be of mechanical weeding, weeding cost lower but production 60% of conventional

- Some crop is affected by aphids, production is 25% of conventional
- Harvesting cost is same
- Much more risky in organic farming. Can loose crop from pest, disease
- Considering pesticides, insecticides in conventional, labours is much more expensive in organic

- We pay much more than nmp, >£8 (for labour management, holiday, NI No., sick pay etc.)
- They sell the product at a lower rate than the other organic farmers, but yet they don't have to spend time over phone to find customers
- Net profit is 30%
- Riverfood gets another 30%, they have no risk loosing the crops

- If Riverfood were to sell it to stores, the farmers might have to sell at lower price with some strict criteria (quality, rejection)
- Price of labour, fuel is going up but selling (purchase) price is remaining same

- If she were to supply to Tesco, she would not want to carry on
- Riverfood doesn't supply to stores

- Weeding, weed population has increased, good for wild life
- Harvesting in wet condition, no tractor, soil erosion
- Pest, occasionally
- They do mechanical weeding. Some crop (carrot) needs weeding within a row because weeds grow faster than carrot. Even weeds creates problem in harvesting

- More tillage operation
- After harvesting, they put green manure
- Planting is like conventional
- More weeding during wet season
- Brush weeding between the rows
- No of times of cultural operations are more than conventional

- More tillage operation
- After harvesting, they put green manure
- Planting is like conventional
- More weeding during wet season
- Brush weeding between the rows
- No of times of cultural operations are more than conventional

- Price premium will not affect the Riverfood. Their suppliers are fixed, customers are fixed.
- A customer can't get various things in a £10 box from the stores, verities of crop, they can't get this variety from store at a cheaper rate

- If it continues, this system is sustainable. But customers can say, they don't want any more boxes or they want to get it from super market
- Price premium will not affect the market of cooperative system. Market is stable at this moment

- Late planting and growing on exposed field – prevention of carrot root fly rather than using net
- Growing on black plastic to prevent weeds. Costly

- If the super market has large variety of options, the customer may terminate from box scheme
- Riverford produce local produce. Customer prefers locally produced vegetables

Appendix B

The Questionnaire

1. How many years have you been farming? □<5 □5-10 □10-15 □15-20 □20+
2. What kind of farming did you start?

Conventional	□Yes (please go to 3) □No (please go to 6)	Organic	□Yes (please go to 6) □No

3. What were your conventional crops before you switched to organic? (tick all that apply)

□Cereals	□Roots Crops	□Field Vegetables	□Grass
□Oilseeds	□Pulses	□Other (please specify)	

4. List the conventional field vegetables you used to grow (tick all that apply)

□Cauliflower	□Cabbage	□Broccoli	□Potato	□Swede
□Leek	□Carrot	□Courgettes	□Red Beet	□Chicory
□Pak Choi	□Squash	□Salads	□Onions	□None

5. Are the reasons for giving up conventional farming listed below? If Yes, please rank between 1 to 5 (where 1 – very low, 5 – very high influence on your decision)

Overall productivity was low	□ No	□ Yes	□ 1	□ 2	□ 3	□ 4	□ 5
High operating cost (excluding labour)	□ No	□ Yes	□ 1	□ 2	□ 3	□ 4	□ 5
Labour cost was high	□ No	□ Yes	□ 1	□ 2	□ 3	□ 4	□ 5
Net profit was negative	□ No	□ Yes	□ 1	□ 2	□ 3	□ 4	□ 5
Product prices were low	□ No	□ Yes	□ 1	□ 2	□ 3	□ 4	□ 5
Others (please specify)							
	□ No	□ Yes	□ 1	□ 2	□ 3	□ 4	□ 5
	□ No	□ Yes	□ 1	□ 2	□ 3	□ 4	□ 5
	□ No	□ Yes	□ 1	□ 2	□ 3	□ 4	□ 5

6. When did you start organic farming? ……..
7. What was the farm size initially? …. hectare
8. What is the size of your total farm now? … hectare
9. What portion of the farm is rented? …. %
10. What are your main crops?

□Cereals	□Roots Crops	□Field Vegetables	□Grass
□Oilseeds	□Pulses	□Other (please specify)	

11. Do you have any protected cropping (tunnels or glasshouses)?

□ Yes	No. …. Area …... sq m or …... ha
□ No	

12. What is the size of your organic vegetable area? ..... hectare

13. What organic vegetables did you grow last year?

□ Cauliflower	□ Cabbage	□ Broccoli	□ Potato	□ Swede
□ Leek	□ Carrot	□ Courgettes	□ Red Beet	□ Chicory
□ Pak Choi	□ Squash	□ Salads	□ None	

14. What was your main motivation to start organic farming? Please specify

You were motivated by the price premium for organic products	□Yes	□No
You were not happy with lower prices of conventional products	□Yes	□No
The market for organics was more stable	□Yes	□No
Demand for your conventional products was too variable	□Yes	□No
You could not foresee the scope of future expansion of your conventional farming	□Yes	□No
Imported conventional products were a threat to your business	□Yes	□No
Consumers perception about organic products as better than local grown products was a factor influencing you	□Yes	□No
Consumers belief about the high nutritional value of organic products was a factor to motivate you	□Yes	□No
Inclusion of organic food in school meals influenced you	□Yes	□No
You started organic farming because it is ethically sound	□Yes	□No
You had a feeling that you are doing good to the environment (e.g., reduced pollution, increase in bird population)	□Yes	□No
You had a feeling that you are contributing positively to public health	□Yes	□No
Others (please specify)		

15. Over your organic vegetable area, are you satisfied with the present level of productivity?	□ Not satisfied	□ Ok	□ Very Satisfied

16. What portion of your income was from organic vegetables? .... %

17. Is your total farm business making a profit? □Yes □No

18. For each of the markets for your organic vegetables produce, please indicate the likely state of that market for the immediate future

	Decrease	Stay same	Increase	I am not in this market
Box scheme				
Multiple retailer				
Cooperatives				
Farmers market				
processor				
Other (please specify)				

19. Please rank the future threats to the sustainability of organic vegetable production

		Very low	Low	Stable	High	Very High
Price related	Withdrawal of price premium	☐	☐	☐	☐	☐
	Fall in product price that you receive	☐	☐	☐	☐	☐
	Others (please specify)					
Market related	Assured Market	☐	☐	☐	☐	☐
	Fluctuating demand by buyers	☐	☐	☐	☐	☐
	Uncertainty for future expansion potential	☐	☐	☐	☐	☐
	Competition from foreign imports	☐	☐	☐	☐	☐
	Others (please specify)					
Social factors	Misconception about local grown food as organic	☐	☐	☐	☐	☐
	Food value are same between organic and conventional crops	☐	☐	☐	☐	☐
	Uncertainty about supply for school meals	☐	☐	☐	☐	☐
	Others (please specify)					
Environmental and health related	Loss of soil fertility	☐	☐	☐	☐	☐
	Insects and disease attacks	☐	☐	☐	☐	☐
	Criticism about organic food miles	☐	☐	☐	☐	☐
	Rising concern about carbon footprints	☐	☐	☐	☐	☐
	Others (please specify)					
CAP and farm policy related	Concerned about CAP reform policies	☐	☐	☐	☐	☐
	Concerned about existing national policies	☐	☐	☐	☐	☐
	Satisfaction on current support provisions	☐	☐	☐	☐	☐
	Others (please specify)					

20. In your opinion what can make organic vegetable production sustainable

Price related suggestions	
Market related suggestions	
Suggestions on social factors	
Environment and health related suggestions	
CAP, national policy and farm support related suggestions	

Appendix C

Correlation between economic related and socio-environmental reasons
for giving up conventional farming

	OpwR	HocR	LcR	NpwR	PpwR	MorR	ConR	NewR	NtR	SoilR	AnimR	DecR	SusR	EUR	EconReason	SocEnvReason
OpwR	1.000															
HocR	.048	1.000														
LcR	.266	.252	1.000													
NpwR	.500	.559*	.522	1.000												
PpwR	.582*	.446	.163	.480	1.000											
MorR	.392	.018	-.189	.396	.369	1.000										
ConR	-.112	-.027	-.158	.198	-.258	-.030	1.000									
NewR	.557*	.155	-.123	.347	.362	.489	.272	1.000								
NtR	-.222	-.252	-.083	-.157	-.286	-.189	-.158	-.123	1.000							
SoilR	-.327	.029	-.123	-.230	.051	-.279	.310	-.181	-.123	1.000						
AnimR	-.006	-.475	-.157	-.295	-.183	-.055	.099	.232	-.157	.267	1.000					
DecR	.488	-.252	-.083	-.157	.327	.331	-.158	.677*	-.083	-.123	.471	1.000				
SusR	-.222	-.252	-.083	-.157	-.286	-.189	.527	-.123	-.083	.736**	.471	-.083	1.000			
EUR	-.222	.463	-.083	-.157	-.286	-.189	-.158	-.123	-.083	-.123	-.157	-.083	-.083	1.000		
EconReason	.720**	.691**	.397	.762**	.818**	.325	-.101	.499	-.318	-.117	-.299	.199	-.318	.000	1.000	
SocEnvReason	.052	-.121	-.399	.023	-.078	.488	.505	.590*	-.239	.208	.567*	.479	.399	.080	-.041	1.000

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)