Organic Food & Global Trade: Is the Market Delivering Agricultural Sustainability?

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"Organic is becoming what we hoped it would be an alternative to[1]"

The desire for a more sustainable agricultural production system has a long history, pre-dating many other areas where sustainability has become an issue in recent decades. Agricultural production is one of the few areas of life where individuals, families and firms are able to attempt to implement their vision of a sustainable production system. As a result many 'alternative' agricultural systems have developed. This paper focuses on the issue of agricultural sustainability and in particular the development of the organic sector. The relationship between organic production and the concept of sustainability is discussed, the role of regulation analysed and trends in the global organic market outlined. As a result some questions are posed regarding pressures on, and trends in, the organic sector and their implications for agricultural sustainability.

In this paper it is argued that a number of commonly held notions of organic farming that developed in the second half of the twentieth century are misplaced. While organic farms have historically been smaller, family run, mixed farms often producing for local consumers there is nothing intrinsic in most organic regulation that requires this. It is argued that as the sector grows and offers profitable options for the conventional farming and agribusiness sectors, the organic sector is subject to pressures that mean that the assumptions that many make about it are unravelling.

These issues are examined in a number of ways. The issue of off-farm effects and sustainability assessments is discussed, something which, it is argued, is increasingly important as organic food movements increase. This is further explored using the concept of 'food miles'. The globalisation of the organic food market is assessed further through a brief consideration of the social effects of sourcing organic goods from developing countries. Finally, the role of organic regulations is discussed with particular reference to the USA where such regulations have been fiercely contested.

As an introduction, however, the concept of sustainable agriculture is briefly reviewed, the development of organic farming outlined and the relationship between the two briefly discussed.

1. Sustainable Agriculture

The problems associated with conventional, industrial agriculture have long been acknowledged. Hodge summaries the problems concisely when he writes

> "Agriculture has come to draw the inputs which it uses from more distant sources, both spatially and sectorally, to derive an increasing proportion of its energy supplies from non-renewable sources, to depend upon a more narrow genetic base and to have an

[1] This is a quote from Roger Blobaum who has a long history in the organic sector, he sits on the board of the Organic Farming Research Foundation and represented the World Sustainable Agriculture Association at the 1992 Rio "Earth Summit".

> increasing impact on the environment. This is particularly reflected in its heavy reliance on chemical fertilisers and pesticides, its dependence upon subsidies and price support and its external costs such as threats to other species, environmental pollution, habitat destruction and risks to human health and welfare." (Hodge, 1993:3)

The development of the idea of sustainable agriculture has developed, in recent times, in this context. We will say little more about this development other than to note that the word sustainable is derived from the Latin, *sustinere*, meaning to keep in existence, implying permanence or long-term support (Scofield, 1986). In the context of agricultural production, Ikerd defines a sustainable agriculture as

> "capable of maintaining its productivity and usefulness to society over the long run. ... it must be environmentally-sound, resource-conserving, economically viable and socially supportive, commercially competitive, and environmentally sound" (1993:30).

Note that Ikerd's definition includes, as do many others, biophysical, economic and social aspects of agricultural sustainability. We note also that attempts at arriving at more precise, operational definitions of sustainable agriculture are extremely problematic, partly because there is such a range and number of parties involved in the debate. This is not surprising, as there would appear to be little point in advocating a non sustainable agriculture, and so all relevant groups are fighting it out in the sustainable camp (Francis, 1990).

In fact there have been few attempts to develop actual assessments of real farms and farming systems. There are some exceptions to this (as discussed in Section 5) where attempts have been made to develop indicators of sustainability (or similar) in relation to farming systems. In addition Stolze *et al.* (2000) have reviewed the evidence regarding organic farming's on-farm environmental effects. However, it generally seems to have been the case, as with so many other areas of sustainability, that perceptions of context-specificity and differences in interpretation and understanding have led to analytical paralysis, with endless definitions but few practical assessments.

2. Organic Farming

Organic farming pre-dates all other approaches to "environmentally-friendly" agriculture[2]. As Lampkin points out, contemporary organic farming is based on a number of different approaches which have blended over time to produce the current school of thought. A modern definition of organic farming is provided by Lampkin (1994):

> "to create integrated, humane, environmentally and economically sustainable production systems, which maximise reliance on farm-derived renewable resources and the management of ecological and biological processes and interactions, so as to provide acceptable levels of crop, livestock and human nutrition, protection from pests and disease, and an appropriate return to the human and other resources" (1994:5).

One of the most significant expositions of the aims and principles of organic farming is that presented in the International Federation of Organic Agriculture Movements basic standards for production and processing (IFOAM, 1998) which make clear that the scope of the principles extend beyond simple biophysical aspects to matters of 'justice' and 'responsibility'.

[2] There is a variety of approaches of schools that respond to some of problems with conventional agriculture including Integrated Pest Management (IPM), Integrated Crop Management, Low Input Agriculture, Low Input Sustainable Agriculture (LISA), Low External Input Sustainable Agriculture (LEISA), Agroecology, Biodynamic Farming. See Rigby and Caceres, 1997 for more on this.

3. The Scale of Organic Production

The Department for Environment Food and Rural Affairs (DEFRA) calculates that there are 540,191 hectares of organic and in-conversion land in the UK, equal to 3% of the agricultural area of the country, this is more than double the figure for April 1999 (Soil Association, 2000a). Australia and Argentina have the largest areas of organically managed land (7.6m ha and 2.8m ha respectively) but, proportionally, the largest/greatest areas are in European countries. The amount of organic farmland in Europe is now 3.6 million hectares, accounting for nearly three per cent of total agricultural land (IFOAM, 2002).

The global market for organic food is estimated to be worth £17 billion, derived from nearly 16 million hectares of organically managed land. The USA, which has 1.3m ha managed organically, is the largest organic market, accounting for almost one third of global sales (IFOAM, 2002). In most Asian countries there are no figures on organic area available, but it has been estimated that the total organic area in Asia is about 100 000ha (IFOAM, 2002). IFOAM reports that in Latin American countries the organic area represents about 0.5% of total area, but growth rates are very high (Argentina's area grew 550 fold in ten years). Figures for African nations are patchy, but organic production is increasing and is estimated at 0.35% of land at present (IFOAM, 2002).

4. Organic Food and Agricultural Sustainability

There is no real dispute that sustainable agriculture and organic farming are closely related terms. There is however disagreement on the exact nature of this relationship. For some, the two are synonymous, for others, equating them is misleading. Lampkin's definition of organic farming, quoted above, talks of sustainable production systems. Having provided his definition, he goes on to state: "...sustainability lies at the heart of organic farming and is one of the major factors determining the acceptability or otherwise of specific production practices" (1994: 5). Similarly, Henning *et al.* precede their definition of organic farming, quoted above, by claiming that "it could serve equally well as a definition of 'sustainable agriculture'" (1991: 877). Rodale even suggested that "sustainable was just a polite word for organic farming" (York, 1991:1254).

Hodge argues against those like Bowler (1992), who view organic farming as the only truly sustainable type of agriculture, contending that this is only true if non-sustainability is identified through the use of non-renewable resources, especially inorganic chemicals. In opposition to this position he states that: "...it must be questionable as to whether organic farming, as currently practised, can reasonably be regarded as sustainable…it is thus a mistake to equate 'sustainable' agricultural systems with 'organic' ones. A restriction on the use of inorganic chemicals is not a sufficient condition for sustainability, but it may not even be a necessary condition" (1993:4

Considering the rise and collapse of ancient civilisations, Carter and Dale (1974) argue that the fertility of large areas of Greece, Lebanon, Crete and North Africa were destroyed by low input, chemical-free unsustainable agricultural practices. The farmers whose agricultural practices contributed to this erosion and desolation were undoubtedly organic producers in terms of the inputs used, but they were 'organic by neglect'. Examples of the organic by neglect approach are still witnessed today. Hall, an organic inspector with the Organic Crop Improvement Association[3] (OCIA) in the USA, states that this idea that a crop is organic because 'nothing has been put on it' is all too common. This, he argues, is not a sustainable approach and "does a major disservice to the majority of organic farmers who are making excellent progress in developing healthy and naturally resilient whole farm systems" (Hall, 1996a)

These points support the view that focusing on particular inputs or tools in the identification of sustainable agricultural systems is insufficient. In response it might be argued that inputs and tillage methods are only one part of the picture, that organic production goes beyond these narrow production issues. Lampkin and Measures (1995:3) write that "the term 'sustainable' is used in its widest sense, to encompass not just conservation of non-renewable resources (soil, energy, minerals)

[3] The OCIA is the world's largest organic certification agency.

but also issues of environmental, economic and social sustainability." The IFOAM aims refer to the need

> "to interact in a constructive and life-enhancing way with natural systems and cycles…to consider the wider social and ecological impact of the organic production and processing system…to encourage and enhance biological cycles within the farming system, involving micro-organisms, soil flora and fauna, plants and animals…*to progress toward an entire production, processing and distribution chain which is both socially just and ecologically responsible*" (1998: 3). [our italics]

Clearly, the standards do not exist in a vacuum they represent an attempt to move from general principles, such as these from IFOAM, to specific practices and inputs, whether recommended or prohibited. The difficulty is that incorporating these wider concerns into standards for organic farming is problematical. Standards are far more able to refer to prohibited inputs than to deal with precise criteria for the assessment of whether producers and processors are acting in a manner which is "socially just" or "ecologically responsible". The significance of this increases when one considers the massive expansion of the organic sector currently underway in many countries, where the motivations of newly converting organic producers may well be different from the 'traditional' organic producer who associated closely with these broader principles (see Fairweather and Campbell, 1996, for an early attempt to distinguish between 'pragmatic' and 'committed' organic producers).

Part of the difficulty here is that these organic schemes must focus on prohibiting or encouraging the use of particular inputs or tools, whereas it is the use of these inputs that determines a system's sustainability. Stolze *et al.* (2000) argue that organic farming uses two methods to obtain environmental results: "the regulation of the use of inputs" and "the requirement of specific measures to be applied or, in some cases, of the outcome of environmental or resource use". The authors confirm the emphasis on the regulation of inputs explaining that "the first method is more important and the second is more a supplement"(2000:ii).

This orientation on specific inputs is hardly surprising since these schemes require producers to either be registered or not; there can be no grey areas, the produce is sold either with the organic symbol, or without. The criteria must therefore be clear, well-defined and open to inspection. Objectives such as the sustainability of farm families, farm workers and rural communities, which are frequently espoused by organic groups, are simply not amenable to this type of regulation. Individual producers may be committed to such goals, but most standards do not include them, and it is difficult to see how they could.

Hence Hall (1996b), an OCIA inspector, states "the best, most sustainable farms that I have ever been on have all been organic -truly inspirational stuff. I have also been on so-called organic farms with 1050 acres of soybeans out of 1100 acres total...Others have even less rotation than many conventional farms. The sustainability of organic farms runs across the entire range of sustainability, just like it does for conventional farms."

Raising issues such as 'organic by neglect' and associated issues may be seen by some as an example of what has been declared 'organic bashing'. This notion of an campaign against organic production by some exponents of modern, industrial agriculture is undoubtedly real. An example of someone who has gone on the offensive against alternative agriculture and organic farming in particular is Dennis Avery, a former agricultural analyst for the U.S. Department of State. His book 'Saving the Planet with Pesticides and Plastic: The Environmental Triumph of High-Yield Farming' (1981), counterposes "high-yield farming" with organic farming. He argues that organic production represents a serious threat to biodiversity because, in his view, the lower yields it generates would cause large areas of species-rich wildlife habitats to be lost to cultivation:

> "the public has been told that the organic approach to farming is kinder to the environment. The public has not been told that its low yields would force us to destroy millions of square miles of additional wildlands" (Avery quoted in BCPC, 1997).

The issues raised in this paper are motivated by a rather different set of concerns and priorities than Avery's. They flow from arguments initially developed in Rigby and Càceres (1997, 2001) where it was argued that the economic development of the organic sector was challenging some typical assumptions about the nature of organic production. This development has accelerated since then so that many of the features that have typically been associated with organic farming may no longer hold in 10 years time, as the sector grows and the conventional food and farming industry plays a greater role. Therefore, we contend, a greater degree of clarity is required as to what organic systems do and do not offer in pursuit of agricultural sustainability and what it is that is envisaged when people talk of a sustainable agriculture. For example, what are the characteristics of that sector in terms of farm size, the degree of mixed as opposed to mono cropping, the engagement of the population in food production, the role of the conventional food chain and supermarkets, the degree to which food will be locally sourced etc.

Our view is that there have been some rather uncritical assumptions about what organic production and consumption involve, for example that organic food was necessarily produced on small, mixed local family farms. Hence organic production was often counterposed to the traits of conventional agriculture with which some people felt increasingly ill at ease. Examples of this are identified in Table 1.

Table 1. Widespread perceived characteristics of organic farming as opposed to conventional agriculture

Organic		Conventional
local food	vs	remotely sourced food
mixed cropping	vs	monoculture
small farms	vs	large farms
family farms	vs	agribusiness

It is not surprising that these perceptions developed since many of the organic farms and distribution networks that initially developed had many of these characteristics. Hence the organic food that people bought was often locally produced on small family farms and purchased via farm shops, box schemes and, more recently, farmers' markets.

As is outlined in the rest of the paper these assumptions are increasingly inaccurate. The immediate question is, does this matter? If the organic food which people consume is increasingly characterised in terms identified under the 'conventional' heading in Table 1, is this a matter of concern to consumers, producers, or both? This issue is explored in a number of ways in the rest of this paper:

- The issue of off-farm effects and the desirability of including these in sustainability assessments is discussed.

- The 'conventionalisation' of parts of the organic sector is outlined, and the specific issue of food transportation is discussed in terms of 'food miles' and greenhouse gases.

- This discussion of the globalisation of the organic food trade is broadened to consider the social effects of the sourcing of organic goods from developing countries.

- The development of the organic sector and the role of regulatory authorities on the future of organic production in the USA is analysed. This case is particularly interesting because the development of regulation there has been fiercely contested and because, it is argued, the conflict over the development of 'industrial organic' is something which is likely to develop more widely.

5. Sustainability Assessments: On- and Off-Farm Effects

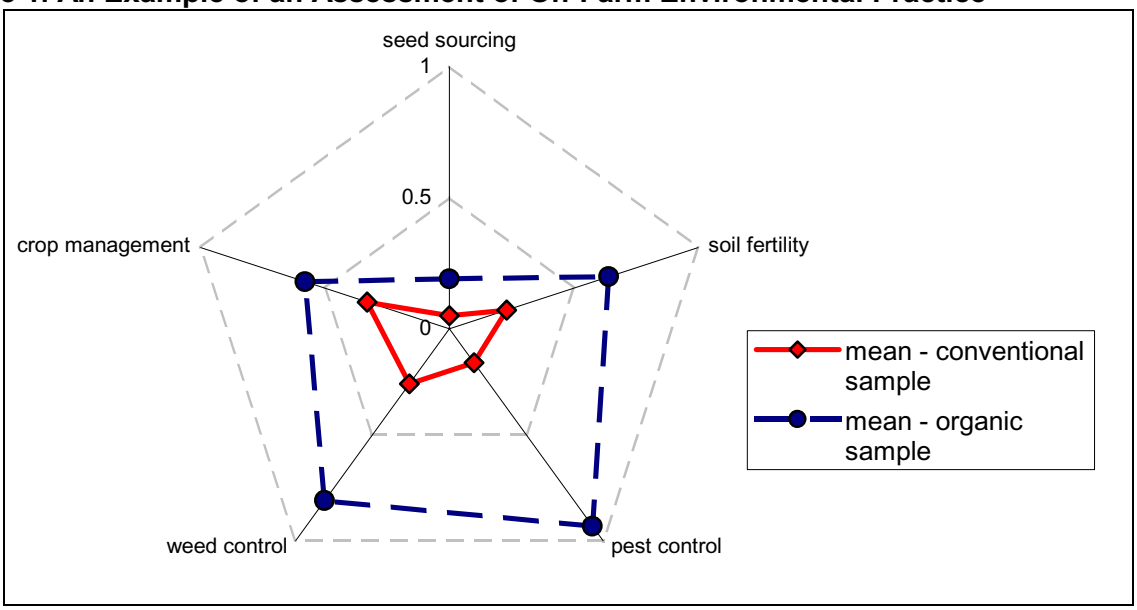
Work on impact assessment raises the problem of identifying which are the key aspects of a system's performance that should be measured, that is, what are the key aspects of agricultural sustainability and what are the associated indicators that should be monitored. This issue of indicator development is a rapidly developing area of work which is reviewed by Rigby *et al.* (1999), Moxey (1998) and Glen and Pannell (1998). Specific examples of work on constructing indicators of agricultural sustainability are to be found in Rigby *et al.* (2001), Müller (1998), Bockstaller *et al.* (1997), Gomez *et al.* (1996), Swete-Kelly (1996) and Taylor *et al.* (1993).

Part of the difficulty in assessing the sustainability of agricultural systems, an issue which many of the papers cited above address, is the fact that both the units of measurement and the appropriate scales for measurement differ both within and across the commonly identified economic, biophysical and social dimensions of sustainability. This is an issue which will not be solved simply by greater knowledge of the impacts of different production systems; even with complete information regarding impacts one will still have to consider trade-offs with movement towards targets in some respects accompanied by reverses in others.

Despite these limitations and difficulties this work in developing systems and tools to assess actual farming systems rather than endless discussions about differing formulations of the facets or dimensions of agricultural sustainability are to be welcomed. They are not definitive nor uncontested but the design and use of such indicators can be extremely useful in that it forces those involved in the discussion of sustainability to identify the key aspects of sustainable agriculture and to assign weights to them. In this process the discussion of sustainability may be coaxed from the realms of general discussion and abstraction to a more operational context, and ultimately to the discussion and classification of actual practices and farms.

An example of such an assessment of real farms is shown in Figure 1 where the practices of a number of organic and conventional farms are scored and averages plotted on a radar/ polygon/web diagram which offers the opportunity of including different type of information without the need to collapse the information to a single scale. In this case farms were assessed in terms of their seed sourcing, crop management, pest, weed and soil fertility practices. The radar diagram is used to indicate what proportion (i.e. 1.0 is the maximum) of available 'points' the farms score in each category. Hence the further from the origin the farms are plotted, the more sustainable are their practices.

Figure 1. An Example of an Assessment of On-Farm Environmental Practice



Source : Rigby *et al.*, 2002

Having made a case for detailed on-farm assessments and development of indicators of sustainable agricultural practice, a cautionary note now follows. Any assessment made of the system is going to be partial, there are therefore questions regarding the spatial and temporal scales that are to be involved and hence one is faced with some rather sharp choices. The appropriate spatial scale may range up from the level of the plot, field, enterprise, farm, community, sector and beyond, depending on the type of analysis being considered.

While any such analysis will be limited, the issue raised here is that an analysis that stops at the farm gate may miss very important environmental effects beyond, and that the scale of these off-farm effects is likely to be growing as the sector develops.

Here the issues of off-farm environmental effects and the development of the sector become somewhat fused. Essentially we are arguing that the development of the sector and the growing international nature of the market in organic goods is accentuating the off-farm environmental effects as well as changing the nature of the organic sector, beginning to challenge the assumptions identified in Table 1 about the characteristics of organic production.

For example, Patrick Madden, President of the World Sustainable Agriculture Association wrote in 1996:

> "I am frankly alarmed by the trend of globalisation of trade (especially in agriculture)…I am very concerned that establishment of national and international certification standards will draw huge multinational organizations into that segment of agriculture, and that countless family farms will become extinct, and many rural communities will be devastated, and food security will be worsened in very many places."

In a very perceptive article entitled 'Is Organic Enough?' organic producer Bill Duesing (1995) wrote that

> "The energy-intensive, distant, large scale, corporate-controlled global food distribution system.…will be happy to offer organic as an option, and will keep working to increase its share of our food dollars….If the organic food system falls into the same patterns of scale, distance and control as the conventional food system, human beings will have very little work to do as the scale of operations in increased, and as production is moved to regions with the lowest labor, land and energy costs"

In the 1980s and early 1990s there was little reason to worry about the off-farm effects of the organic food system because it was small and there was very little movement of inputs and outputs across large distances within countries and virtually none between countries.

What has happened since is an increase in the processing, packaging and transportation of organic goods as the big players in the conventional food sector become more involved in the organic market. Hence Duesing's point about "the same patterns of scale, distance and control as the conventional food system" is even more pertinent than when he wrote in 1995. We will return to these issues of the role of multinational agribusiness players and the globalisation of the organic market in Sections 7 & 8, but first some attempts to capture these off-farm effects are discussed.

6. Food Miles: "the same patterns of scale, distance and control"

As organic produce becomes a larger part of the global food system, and as such is processed, packaged and transported more, the environmental effects are becoming more serious and hence the on- and off-farm environmental trade-offs are becoming more worthy of attention.

'Food miles' is one measure of this increasing conventionalisation of organic food. They capture the distance food travels from producer to consumer. Leaving aside the nature of production on-

farm and processing and packaging off-farm, the movement of food has implications in terms of both energy use and a range of pollutants that result. The pollutants are particularly significant in terms of the Kyoto Protocol since many of them are greenhouse gases (GHGs), specifically

- carbon dioxide (CO_2)
- methane (CH_4)
- nitrous oxides (NO_x)
- volatile organic compounds (VOCs)

Currently, the UK emits around 150 million tonnes of carbon per year. The IPCC (Intergovernmental Panel on Climate Change) have recommended that emissions be reduced by at least 60% in order to stabilise the climate. While the generation of GHGs from cars and power stations feature prominently in the public understanding of climate change, the figures associated with the food we consume are quite striking. For example, a 'typical' UK family of four generate the following CO_2 emissions annually:

- 4.2 tonnes from their house
- 4.4 tonnes from their car
- 8 tonnes from the production, processing, packaging and distribution of their food

(Sustain, 2001)

The basis for these large amounts of CO_2 and other GHG emissions are growth in food movements at both the national and international level. At the national level supermarkets increasingly dominate both the conventional and organic food markets. In 1994 supermarkets accounted for 62% of UK organic sales, in 1996 the figure was 60% and in 2000 the figure had reached 80%. While the value of sales via the farm gate, box schemes, markets and independent shops may have risen, proportionally they are becoming less important.

Supermarkets operate on the basis of the 'Just in Time' centralised distribution system. 'Just in time' is the process whereby goods get to the supermarket, or components to the assembly line 'just in time' to be utilised. This entails a complex system of ordering, delivery planning and distribution centres. The purpose is to turn goods over as quickly as possible, and reduce stockholding to a low level. Overwhelmingly, this involves the use of long-haul trucks operating to very tight delivery schedules. As a result the average distance between supermarkets and distribution centres in the UK is 69km, or 138km on a round trip. One result of the Just in Time system's operation is that 30% of all freight vehicles travel empty.

Of the total emissions of pollutants in the UK in 1998, road transport accounted for:

23% of CO_2 (Carbon Dioxide)
38% of VOCs (Volatile Organic Compounds)
47% of NOx (Nitrous Oxides)
73% of CO (Carbon Monoxide)

DTLR (2000)

The use of this JIT system has been one cause of the shift from rail to road transport. Use of rail freight has declined significantly in the UK, particularly in the food sector. Road freight now accounts for, on average, 65% of commercial freight movements and over 98% of food freight.

The implications of increasing supermarket domination of the organic market go beyond the national transportation effects. Supermarkets source on the basis of a number of factors primarily: range, quality, availability, volume and price. Hence they seek large volume suppliers who can supply at competitive prices all year round. This involves a large amount of overseas sourcing and hence international food movements increasingly characterise both the organic and conventional food markets.

Considering this development with respect to conventional food for a moment, one observes that, for example, UK producers' share of the domestic strawberry market fell from 70% in 1985 to 51% in 1995, when over 1000 tonnes of Californian strawberries and 12,000 tonnes of Spanish strawberries were flown to Britain during the summer.

In what she characterises as the 'great food swap' Lucas (2001) catalogues a whole series of movements of food to and from the UK, some examples of which are catalogued in Box 1.

Box 1. 'The Great Food Swap'

In 1998, Britain imported 61,400 tonnes of poultry meat from the Netherlands and exported 33,100 tonnes of poultry meat to the Netherlands.

Britain imported 240,000 tonnes of pork and 125,000 tonnes of lamb while it exported 195,000 tonnes of pork and 102,000 tonnes of lamb.

In the UK in 1997, 126 million litres of liquid milk was imported to the UK, while 270 million litres of milk was exported from the UK.
23,000 tonnes of milk powder was imported to the UK and 153,000 tonnes exported.

In 1996 the UK imported 434,000 tonnes of apples, 202, 000 of which came from outside the EU. Over 60% of UK apple orchards have been lost since 1970.

For example, UK imports of fish products and fruit and vegetables by plane between 1980 and 1990 increased by 240% and 90%, respectively.

Source: Lucas, 2001

The globalisation of the organic sector and, in Duesing's words, the development of the same patterns of scale, distance and control mean that organic food is increasingly being shipped around the world. These international movements of food now see organic imports from the southern hemisphere often appearing in UK supermarkets. Hence as well as the shift from rail to road, there is an increasing use of air transport to move both conventional and organic food across national borders.

The implications of this change in terms of the distances food is being moved as well as the modes of transport employed are apparent when considering the figures in Table 2 which gives estimates of the GHG emissions and energy used to move a tonne of freight each kilometre, for each mode of transport.

It is apparent that the emissions of GHGs per tonne kilometre moved for air transport are considerably higher that for all other transportation methods. Hence in the context of global warming, as well as issues such as energy use, moving food between countries by air has serious effects. In the context of Kyoto this may seem a disturbing trend, however air transport is excluded from the reductions agreed under the Kyoto Protocol. Furthermore, aviation fuel is one of the cheapest fuels in the world, exempt from much taxation

Air imports to the UK doubled between 1980 and 1990 (SAFE Alliance, 1994). During the 1980s, air imports of fish products increased by 240%, and of fruit and vegetables by 90%. In 2000, 93% of Kenya's fresh horticultural exports to the UK were air freighted (Sustain, 2001). In terms of tonne-kilometres, imports of food products and animal feed in 1992 accounted for double that of within country freight movements (Jones, 1999).

Table 2. Greenhouse Gases and Energy Used per T-km of freight movement

	Energy Use	Emissions per T-km (g)				
	Kj/T-km	CO_2	HCs[a]	NOx	CO	VOCs[b]
Rail	677	41	0.06	0.2	0.05	0.08
Boat	423	30	0.04	0.4	0.12	0.1
Road	2,890	207	0.3	3.6	2.4	1.1
Air	15,839	1,206	2	5.5	1.4	3

[a] Hydrocarbons
[b] Volatile Organic Compounds
(source: Sustain, 1999)

The coefficients in Table 2 offer the prospect of some basic accounting of the transportation effects of the importation of organic goods into the UK (or indeed for any country). For this to be done in a systematic way the data required comprise (i) organic imports (weight), (ii) source country, and (ii) transportation method. While the latter can often be deduced, the UK nor indeed any country (to our knowledge) keeps records of how much organic produce is imported from which countries. In the absence of government agency records (it is still anticipated at UKROFS[4] that the UK will, at some point, start collecting this information) the obvious source of data collection is the supermarkets who dominate this import market, however we were unable to obtain such data presumably because, for a range of possible reasons, it is regarded as sensitive.

As well as allowing the GHG and energy effects of this trade to be assessed, such data would make it possible to:

(a) consider the trade offs between the on-farm environmental benefits of organic production (reduced agrochemicals etc) and the transportation effects (higher GHGs, energy use), and

(b) the environmental trade offs between imported organic produce (lower pesticides, higher GHGs etc) and more locally produced conventional food (higher agrochemicals, lower GHGs etc)

In this way, radar diagrams of the type presented in Figure 1 could be used to structure and analyse these increasingly significant trade-offs.

The absence of such systematic data means that one can only provide some illustrative figures. Michelsen *et al.*, (1999) identifies some examples of organic imports to the UK (and other countries) which are used in Table 3 to provide some indications about the nature and results of the calculations. Note that in the absence of information to the contrary these imports are assumed to have arrived by sea, resulting in CO_2 and other emissions far below those which would result from air transport. Since these figures represent intercontinental pollution, they are not included in any national emission accounts.

[4] UK Register of Organic Food Standards

Table 3. Examples of Organic Imports to the UK, 1998.

Product	Tonnes	From	Mode	T-Km(Mill)	CO_2 (tonnes)
Cereals	5000	Australia	Sea	107.3	3219.9
Potato	13150	Various	Sea	39.5	1183.5
Fruit	25200	Various	Sea	176.4	5292
Vegetables	64520	Various	Sea	193.6	5806.8
Milk Products	3000	Holland	Sea	0.3	9.0
Various	3375	Egypt	Sea	10.3	12453
			TOTAL	**527.3**	**27 964**

Source: Bown, 2002

Clearly these shipments represent only a small fraction of the organic freight coming to the UK, and do not capture the movement of, for example, fruit and vegetables being flown from sub Saharan Africa to the UK. This issue of international shipment of foodstuffs is not unique to organic goods, what is occurring is a growing convergence between the supply networks of the two sectors. In many cases the organic and conventional produce will be sourced from the same country or countries similarly distant from the UK. However, in the absence of supermarket data, casual observation in UK supermarkets in Manchester identified many cases where organic produce was being sourced from further away than conventional produce. Examples of this are given in Table 4.

In some cases this sourcing may be driven simply by availability, but in others it is likely to be price differentials that lead to overseas sourcing. The example of organic milk is pertinent here. For many years the shortfall in UK organic milk supply was highlighted, and so many UK dairy producers converted to organic (partly because of plummeting conventional prices). However supermarkets began to buy more of their milk from elsewhere within the EU because of price differentials with an end result that the UK was importing organic milk while UK organic dairy producers had no alternative but to sell their milk on to the conventional market.

This points to the development of trade-offs between on-farm environmental effects having to be traded off against the off-farm effects associated with packaging and transport over long distances. Hence one is likely to be trading off, in crude terms, agro chemical use against GHG emissions and energy use.

The release of necessary data and some analysis of the nature of these trade offs would help develop the dialogue regarding how the organic sector is developing and the implications of that development.

Table 4. Examples of Organic Sourcing from More Distant Locations

	Origin	
	Organic	**Conventional**
Asparagus	South Africa	UK
Cabbage	Portugal	UK
Sweetcorn	Morocco	Greece
Tomatoes	Morocco	UK
Mushrooms	Mexico	Egypt
Oranges	Argentina	Spain
Apples	USA	UK, France

Source: Bown, 2002

7. Organic Imports & Developing Countries

Organic imports from developing countries are calculated to be worth US$500 million (IIED, 1997; Blowfield, 1999; Robins *et al.*, 2000, Barrett *et al.*, 2002). Europe represents the largest single organic market, with an estimated value of US$5 billion in 1997 (Willer and Yussefi, 2000). In Europe as a whole, supply continues to lag behind growing demand (FAO, 2001). Although in 1999 the UK domestic supply of organic produce grew by 25%, it could not meet the increasing demand. As a result, 70% of organic food sold in the UK is imported (Barrett *et al.*, (2002)). Over 80% of commodities such as fresh produce and beverages are imported which is in contrast to the very low import proportions for goods such as organic meat produce and eggs (Soil Association, 1999).

Barrett *et al.*, (2002) report that in 2000 the EU listed import authorisations for the import of organic food from over 60 developing countries (European Commission, 2000) and that within the EU, the UK ranks third as a first destination for the import of organic produce from developing countries, some way behind Germany and the Netherlands.

As is discussed below many of these organic imports to the UK are from southern hemisphere countries, implying long distance transport, and in addition many of the suppliers are developing countries. Some of the implications and issues regarding the impact in these countries is provided in Section 6. Some indicative figures regarding the level of organic imports from developing countries is provided in Table 5, while the number and distribution of organic import authorisations to the EU amongst developing countries are shown in Table 6.

Table 5. UK organic imports annually from selected developing countries

Country	Metric tonnes	Principal crop by volume
Brazil	2640	Citrus products
Bolivia	358	Diverse
Chile	470	Diverse
China	616	Diverse
Dominican Republic	1295	Bananas
Egypt	160	Vegetables
India	1033	Tea
Mexico	5494	Coffee
Sri Lanka	730	Coconut products

Source : Barrett *et al.*, (2002)

Factors causing an increasing interest in organic production in Africa include disappointment in, and non availability of, some Green Revolution technologies, the scope within organic systems to build on indigenous knowledge, and the attraction of higher(export) prices for such produce (IFOAM, 2002)

Leaving aside the off-farm environmental effects, the broader social implications of this shift to sourcing organic exports from developing countries is an issue also worthy of some attention. It might be hoped that the production of high value export crops would offer an opportunity for some farmers in developing counties to generate revenues for investment on- or off-farm sufficient to be able to shift out of poverty.

Table 6. Import authorisations for the import of organic produce into the EU from developing countries

Country	Number	Country	Number
India	115	Guinea	6
Mexico	113	Cameroon	6
Sri Lanka	103	Togo	5
China	61	Thailand	5
Brazil	56	Philippines	5
South Africa	51	Malawi	5
Guatemala	36	Ghana	5
Bolivia	35	Ethiopia	5
Peru	34	Mauritius	4
Madagascar	34	Cuba	4
Egypt	33	Zambia	3
Dominican Republic	32	Vietnam	3
Paraguay	27	Vanuatu	3
Morocco	25	Kenya	3
Tunisia	20	Uruguay	2
Columbia	19	Tonga	2
Burkina Faso	19	Papua New Guinea	2
Costa Rica	15	Nepal	2
Tanzania	13	Ivory Coast	2
Chile	13	Comoros Islands	2
El Salvador	11	Burma	2
Zimbabwe	10	Seychelles	1
Uganda	10	Namibia	1
Indonesia	10	Jamaica	1
Nicaragua	9	Guyana	1
Honduras	9	Gambia	1
Ecuador	9	Gabon	1
Pakistan	7	Cape Verde	1
Sudan	6	Belize	1

Source : Barrett *et al.*, (2002).

Barrett *et al.*, (1999) writing specifically about Kenya's exporting of horticultural crops (which are exported from a number of sub Saharan African countries) note that the supermarkets dominate this export trade, handling 70% of Kenya's exports of these crops. They argue that:

> "Supermarkets are thus in a powerful position to influence what is actually grown in Africa, how it is grown and by whom, which reflects their need to keep profit margins as high as possible, as well as ensuring that the needs and demands of their customers are satisfied…Most importers predicted that smaller operations will become progressively marginalized as large-scale producers invest heavily to expand operations and are able to meet the ever increasing demands of the EU and UK regulatory framework."

Reynolds, writing about the international organic and fair trade movements, also considers which type of producers in the South are providing the organic exports.

> "A number of studies suggest that due to the substantial costs and risks of organic production, much of the international trade is controlled by medium and large enterprises, challenging the assumption that it is small farms that benefit from the growing organic market. While marginal

> producers may be unable to afford to enter the organic trade, 'Increasingly...larger farmers are seeing organic production as a good commercial proposition' (Crucefix, 1998: 12)"

Speaking specifically about the rapidly growing organic banana trade, she argues that

> "The smallest organic banana producers are those in the Dominican Republic, but even here growers are mid-sized farms by local standards. Most Latin American organic bananas are grown on plantations. For example, Dole Food Corporation – which controls 25 percent of the conventional banana trade and a significant share of the US organic sector – has in recent years become a major organic banana supplier."

For Reynolds, it seem clear that the patterns of organic trade that are developing between the South and the North are indeed replicating those of the conventional sector. The environmental concerns that motivate so many organic purchasers in the North, she argues, should not obscure the fact, she argues, that the social implications of their purchasing in the source country are ambiguous:

> "While some consumers may assume that purchasing certified organic products has progressive social implications, the organic trade in many ways re-enforces the traditional subordination of Southern producers. Voices from the South have virtually no say in the standards being used to define organic production by IFOAM or by legislation in major markets. At a national level, one can legitimately question whether encouraging colonial agro-exports like coffee or bananas, reconstituted under the label "organic," is environmentally or socially sustainable. At the level of the producer, one finds that marginal organic farmers in the South are likely to be as dependent on exploitative middlemen, corporate buyers, and volatile prices as conventional producers, unless they enter into fair trade networks."

This last issue of fair trade networks is an important one. Implicit in the suggestion is a negative answer to Duesing's question as to whether organic is enough. She points to a struggle to retain the 'progressive' aspects of organic production. This points towards a struggle for the meaning of organic production. On one side are those who see 'organic' as a movement with social and environmental principles at its heart, whereas others regard it as a production standard, nothing more. Regardless of where one stands in relation to this divide, the old, rather uncritical, assumptions about what organic farming represents are being challenged and participation in the debate about the future of the system, from producers and consumers, would seem timely.

This struggle or battle for 'organics', may be something that is regarded as occurring implicitly with the different supply networks that have developed in the sector. The development of farmers' markets, box schemes, farm gate sales, fair trade importing etc may be seen as examples where those involved in the organic sector are attempting to develop alternative networks and patters of control than exist in the conventional sector. In this sense they are reflecting inclinations common in the conventional farming sector with the buying power of supermarkets often berated by farmers (Raven & Lang, 1995). A survey recently found that 98% of farmers believe their future would be more secure if they 'went back to basics… selling direct to the public' (Sustain, 1999).

It is in the USA that the tensions and divisions over the future of organic production have the most longest and perhaps most bitter history. The reasons for this are complex, but in addition to the general trends identified in this paper that are causing tension regarding a vision for the future of the sector, the regulatory process has illuminated and deepened these divisions to a quite startling degree.

8. Regulatory 'Capture' and 'Industrial Organic' in the USA

As with many western countries there had been many years of local organic certification organisations in the USA regulating the small niche market for organic goods. By the 1980s in the USA there were moves to shift to federal regulation. The most obvious reason for this was the growth in the market

alongside a proliferation of certifying agencies, posing the risk of confusion and even fraud. According to Vos (2000), however, there was an additional reason for the move:

> "there were rumors that the USDA, along with the FDA, was considering banning the term 'organic' altogether, apparently because the rising popularity of organic foods was calling into question the products and practices of conventional agribusiness (Bowen, 1998). In this climate of suspicion, some leading members of the organic movement began lobbying members of congress, which ultimately led to the introduction…of the Organic Foods Production Act (OFPA) into the 1990 Farm Bill"

Following this the National Organic Standards Board (NOSB) was established to formulate national standards and make recommendations to USDA. A consultation process then began to solicit input from the organic sector. Between 1994 and 1996 recommendations were submitted to USDA and in 1997 the National Organic Program Proposed Rule (NOPPR) was released. The release of this rule by USDA caused consternation and anger among many, and was taken by many involved in the organic sector to indicate that USDA was a "captured" agency entirely unsuited to regulate the organic sector. In short, it was argued that agro-industrial interests, viewing the profitable and expanding organic sector with increasing interest, had shaped the proposed rules to suit its own needs. Vos takes this view arguing that

> "The language of the rule, while appearing to be transparently democratic in its solicitation of commentary, reads like a public repudiation of the organic tradition. It dismisses, questions, and overturns NOSB recommendations at almost every turn, ….the controversy appears to be a collision between two mutually incomprehensible discourses, thoroughly and irretrievably at odds with each other"

The most commonly cited problems with the rule (it publication elicited nearly 300 000 responses to USDA) were the inclusion within the standards of:

- genetically modified organisms
- sewage sludge
- food irradiation

The use of sewage sludge would have assisted large-scale operations in the procurement of the necessary nutrients without establishing closed nutrient cycling systems, hence the rule facilitated large scale organic monocropping. Permitting GMOs would have facilitated pest control of large operations. Ionised radiation would have enabled the organic industry to use the same mass processing and distribution techniques that characterize the conventional food system.

In addition to these, so called "big 3", issues there was also ambiguity over antibiotic use, a flat fee for registration which was seen as potentially disastrous for small producers. In addition to these problems with USDA's proposal, the rule also forbade any organisations identifying their produce as having being produced under more stringent conditions. There the rule represented a cap, with no language allowed which differentiated standards from the USDA level.

The storm of protest that followed publication of this rule forced USDA to back down on the "big 3" however the revised rule retained the flat rate registration fee and remained both a floor and a ceiling. For these and other reasons the regulation has still proved highly unpopular with many in the organic sector. Vos cites a member of the Washington State Organic Advisory Board:

> "the rules…give the impression that the NOP would be a sort of Trojan horse attempting to introduce an alien agenda into the organic industry. It is difficult not to perceive that these agendas are the very same ones generally embedded in USDA policies which give the impression that the USDA is an agent of large agribusiness interests"

There is, it is argued, a trend perhaps most developed in the USA between (i) growing profits in the organic sector alongside crises in the conventional food sectors, (ii) growing industrialisation of the

organic production, processing packaging and transportation, (iii) pressure from the agribusiness in terms of the shape of organic regulation.

Pollan (2001) reviews the development of the organic sector in the US and the emergence of 'industrial organic'. His case study is an interesting one in that it is Cascadian Farm which was an pioneer organic farm in the 1970s, which encountered major growth and was eventually bought out by General Mills a large food conglomerate. Pollan notes that this seems to be an example of the general trend of growing involvement of conventional food giants in the sector:

> "The organic movement has become a $7.7 billion business: call it Industrial Organic. …organic is now the fastest-growing category in the supermarket. Perhaps inevitably, this sort of growth … has attracted the attention of the very agribusiness corporations to which the organic movement once presented a radical alternative and an often scalding critique.… And now that organic food has established itself as a viable alternative food chain, agribusiness has decided that the best way to deal with that alternative is simply to own it. The question now is, What will they do with it? Is the word "organic" being emptied of its meaning?"

What the large scale conventional firms like Gerber's, Heinz, Dole, ConAgra and A.D.M. (who all developed or bought or acquired organic brands after 1990) brought was a model of large scale growing, buying, processing and sales. Returning to Pollan's case study, he notes that General Mills no longer buys from Cascadian Farm as it's too small, instead the berries grown there are sold at the roadside while the company buys berries for freezing from as far away as Chile.

The question he then poses is

> "whether the logic of an industrial food chain can be reconciled to the logic of the natural systems on which organic agriculture has tried to model itself. Put another way, Is 'industrial organic' a contradiction in terms?"

As well as an industrial approach to production and processing, the conventional corporations have brought a more precise targeting of their consumers. General Mills who Pollan discusses in his article are clear that their target consumer is not what they call "the true natural" but instead "the health seeker", people whose motive in buying organic food is not primarily the broader aims associated with organic production, but health. Interestingly, when Pollan speaks to senior staff at General Mills regarding whether "organic food is better for you?" he receives a fairly impressive array of evasive and meaningless answers, shown in Box 2. These answers will no doubt confirm to many their doubts and fears regarding the development of corporate or industrial organic.

Box 2. 'Is organic food better for you?'

"I don't know yet"

"'Wellness' is perhaps a better word"

"Better? It depends. Food is subjective. Perceptions depend on circumstances"

"I'm certain its better for some people. It depends on their particular beliefs."

"The question is, 'do consumers believe organic is healthier'?"

"Is it better food?…You know so much of life is what you make of it. If its right for you, its better – if you feel its better, it is."

The Company's Organic Slogan:
"Taste You Can Believe In."

Source: Pollan, 2001

9. CONCLUSIONS

This paper has provided a brief review of the meaning of agricultural sustainability, the origins of organic farming and the development of the latter in relation to the former. Some background has also been provided in relation to the sustainability of agricultural and land use systems and indicators thereof.

Some questions have then been posed regarding the development of the organic food sector in the context of its growing global importance in terms of (i) proportion of agricultural land, (ii) growing share of consumer food purchases, and (iii) growing attractiveness to many farmers, processors and retailers as a profitable activity in the context of economic crises in the conventional food sector. Concerns have been raised regarding the future development of the organic sector and, it has been argued, typical assumptions about what the organic sector comprises are becoming less tenable because of the nature of this development.

Before drawing this material together in conclusion, it is worth restating that the evidence points to the substantial on-farm environmental benefits of organic production systems. Stolze *et al.*'s review of the environmental impacts of organic farming in Europe finds that "organic farming clearly performs better than conventional farming in respect to floral and faunal diversity" (2000:ii). In terms of soil it is concluded that "organic farming tends to conserve soil fertility and system stability better than conventional farming systems…no differences between the farming systems were identified as far as soil structure is concerned" (2000:ii). Regarding water quality the review concluded that "organic farming results in lower or similar nitrate leaching rates than integrated or conventional agriculture" (2000:iii). Stolze *et al.* conclude that nutrient balances on organic farms are often close to zero and that "energy efficiency…is found to be higher in organic farming than in conventional farming in most cases" (2000:iv).

The concerns raised in this paper are premised on the belief that organic farming, as do many other 'alternative' agricultural systems such as IPM, offers positive development options for agriculture in certain contexts. However, we argue that as the organic sector becomes larger and more international, the environmental and indeed social effects beyond the farm gate warrant greater attention. Sustainability assessments will always be partial and limited, but an awareness that the off-farm effects may be increasingly significant is necessary. The intention here is to develop indicators and analysis of on- and off-farm environmental effects and to help analysis of trade-offs. It is not to deepen the analytical paralysis that seems pervasive in discussions of agricultural sustainability; development of indicators and frameworks pertaining to only on-farm effects is still work to be welcomed.

Food miles and their ability to capture some off-farm environmental effects seem a useful analytical tool, particularly in conjunction with the coefficients in Table 2 which allow food movements to be converted into GHG emission and energy consumption data. An audit of a nation's trade in organic goods now seems feasible once the necessary data are released.

Evidence has been presented not only regarding the global trade in organic goods, but regarding the growing role of the organisations that dominate conventional food movement, processing and sales. Hence both the supermarkets and agribusiness giants such as Dole have become involved to an extent which seemed unlikely even 10 years ago. Similarly, the profile (in northern hemisphere countries at least) of organic farmers is changing. Historically organic farmers became involved primarily because of environmental motives, now many conventional producers have converted as organic production seems a route out of economic crisis.

The question is does it matter? Are these trends, the changing profile and motives of those involved in the sector and the conventionalisation of organic supply chains, an issue worthy of consideration? Some will argue that these trends are not, essentially, problematic, that if organic food is ever going to be a mass consumed food rather than, in the North at least, a middle class luxury good, then it needs to be provided at a cheaper price and the only way to do this is by

production and selling on a larger scale. In this view the ethical viewpoint of an organic company's CEO is of little relevance, if the production standard is met there is not a problem.

Of course any discussion of 'cheap' and 'expensive' food raises issues of which costs are included and which are not. Pretty *et al.* (2000) argue that, under the current system, the UK consumer effectively pays three times for their food – once at the till, and twice through the tax system to cover agricultural subsidies and ecosystem clean-up costs. For the UK they calculate these latter two costs to be £3 billion/year and £2.3 billion/year respectively, or 86p in every £1 spent by the consumer.

For others the development of the organic sector outlined here poses profound problems, as the patterns of scale, distance and control mimic those of the conventional sector, in response to which, for these critics, organic was developed. In addition, this development is seen as transforming the nature of organic food itself. The mass food market exerts pressures back up the food supply chain changing the scale of production, the varieties grown, the methods of production. These pressures are acknowledged by a farm worker interviewed by Pollan (2001) who explains that

> "The maw of that processing plant beast eats 10 acres of cornfield an hour…and you're locked into planting a particular variety like Jubilee that ripens all at once and holds up in processing. So you see how the system is constantly pushing you back toward monoculture, which is anathema in organic. But that's the challenge -- to change the system more than it changes you."

If these pressures are regarded as unacceptable, then what alternatives are to be offered? Discussion about what organic should be, and by implication what a sustainable agricultural system might look like requires discussion of issues such as whether monocropping is acceptable or whether farms should nutrient cycle, whether small farms are perceived as the future, about the extent to which food provided should be local and/or seasonal.

Finally, the issue of regulation deserves some attention. How the regulations regarding organic production, transport and processing are produced is of crucial importance. The case of the USA is most striking in that the result of the drafting of national organic standards appears to have resulted in substantial numbers within the organic sector regarding the regulatory authorities as having been captured by conventional agribusiness interests. This is despite what appears to have been an extensive and open consultation process. Comparative analysis of the regulatory process in the US and other countries would seem appropriate in this context. The US experience does raise questions regarding participatory consultation processes about 'who participates', 'who makes that decision', 'what is the basis and range of participation', because the result in the US was a common view that the process and the resulting standards bore little relation to each other.

Finally, it would be misleading to give the impression that the issues highlighted here are being ignored by the organic sector, indeed many of the quotations and sources used here have been from those involved in organic production and sales. The increasing breakdown in the assumption that, for example, organic food was locally produced has been implicitly acknowledged by the Soil Association in the UK which launched an "Eat Organic, Buy Local" campaign in 2001. In addition, concerning the issues of developing country organic exports and the social implications of this trade, the Soil Association and the Fairtrade Foundation launched a pilot project in January 2003 to combine organic and Fairtrade certification which will apply to British and imported foods.

These responses by the organic sector seem to confirm the unravelling of the old assumptions. There appear to be a range of questions and issues which still need addressing regarding the development of a more sustainable agriculture. Questions regarding the size of farms, the unsuitability or otherwise of monocropping, whether a greater degree of processing and transport of organic goods dictates the nature of on-farm organic production, and whether organic production is a 'movement' or simply a production standard that Con Agra can employ as effectively as a small farmer selling locally.

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Organic agriculture occupies only 1% of global agricultural land, making it a relatively untapped resource for one of the greatest challenges facing humanity: producing enough food for a population that could reach 10 billion by 2050, without the extensive deforestation and harm to the wider environment.Â The study, Organic Agriculture in the 21st Century, published in Nature Plants, is the first to compare organic and conventional agriculture across the four main metrics of sustainability identified by the US National Academy of Sciences: be productive, economically profitable, environmentally sound and socially just. Sustainable agriculture is farming in sustainable ways, which means meeting society's present food and textile needs, without compromising the ability for current or future generations to meet their needs. It can be based on an understanding of ecosystem services. There are many methods to increase the sustainability of agriculture. When developing agriculture within sustainable food systems, it is important to develop flexible business process and farming practices. Sustainable agriculture supports organic and low carbon food production. It also avoids the use of artificial fertilisers and pesticides as well as genetically modified organisms. Farms that are sustainable also make use of better farming practices..Â Becoming a regular reader of sites like ours will help. Knowing what is and what isnâ€™t sustainable is the first step to leading a more sustainable lifestyle. The second step is using that knowledge to make more informed choices. There are many ways that you can choose to eat and live more sustainably