Chapter 6

# Organic and Conventional Farmers' Attitudes Towards Agricultural Sustainability

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Additional information is available at the end of the chapter

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## 1. Introduction

This chapter examines organic and conventional farmers' understandings of agricultural sustainability. Defined in the Brundtland Report as: 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (World Commission on Environment and Development, 1987, p. 43), sustainability is a multi-faceted concept involving agronomic, ecological, economic, social and ethical considerations (Farshad & Zinck, 2003). It means different things to different people (Redclift, 1987; 1992 and O'Riordan, 1997). The focus in this chapter is specifically on the environmental dimensions of agricultural sustainability in the UK. Somewhat surprisingly, recent researchers have done little to engage critically with the concept of environmental sustainability. This may be because the socially and politically constructed concept is, according to Ilbery & Maye (2005), slippery and broad-ranging. However, this allows sustainability's fluid, constructed nature to be used more broadly and creatively (Maxey, 2007). It is now generally accepted that conventional farming systems have become environmentally unsustainable (Moore, 1962, 1966, 1970; Ratcliffe, 1962; Mellanby, 1967, 1970, 1981; Shoard, 1980; Burn, 2000; Pugliese, 2001; Storkey et al., 2011). Nevertheless, in late May 2012, Paul Christensen, chairman of the public body Natural England, said: 'I think we should embrace science [GM technology] that has increased [food] production'. This is in strict contrast to what the same body said in 2008, when it warned Gordon Brown not to rush headlong into GM crops (Gray, 2012). Such a change in emphasis reflects increasing concerns over food security, but it does raise issues over developing an agricultural system that is truly sustainable.

Aware of this dilemma, government policy in the UK now advocates the concept of sustainable intensification, which attempts to increase food production from the same area but without damaging the environment (Godfray et al., 2010; Lang & Barling, 2012). Supporters

of this approach claim that substantial increases in crop yield can be provided through science and technology. Examples include crop improvement, more efficient use of water and fertilizers, the introduction of new non-chemical approaches to crop protection, the reduction of post-harvest losses and more sustainable livestock (Maye & Ilbery, 2011). However, it is debatable whether sustainable intensification can be achieved without significant increases in the use of chemical inputs, leading Lang & Barling (2012) to describe the concept as an oxymoron.

In contrast, organic farming is a holistic production management system that promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. It also emphasises the use of management practices, in preference to the use of off-farm inputs, and recognises that regional conditions require locally-adapted systems (Codex Alimentarius Commission, 1999). In March 2008, the World Board of the International Federation of Organic Agriculture Movements (IFOAM) approved the following definition: 'Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and good quality of life for all involved'.

There are many different organic farming practices, each with its diverse views of nature and value assumptions. They involve a variety of alternative methods of agricultural production which evolve as new scientific research becomes available. However, they retain a fundamental philosophical perspective of working with, not dominating, natural systems and having respect for the natural environment (Lampkin, 1990; Fuller, 1997; Guthman, 2004). While some writers are concerned that organic farming systems are becoming 'conventionalised' in their production, marketing and distribution methods (Buck et al., (1997; Lockie & Halpin, 2005; Rosin & Campbell, 2009), others feel that they have the potential to 'develop in distinct ways in different national contexts' (Hall & Mogyorody, 2001, p. 401; see also Coombes & Campbell, 1998 and Guthman, 2004).

Provision of adequate water supplies is a key requirement for the sustainability of organic and conventional farming, the UK's two dominant agricultural systems. But, according to Edward-Jones & Howells (2001), there is no absolute and available measure of sustainability. Thus it is debatable which of these two farming systems is the more sustainable, although organic farming is more so in a bio-physical sense (Edward-Jones & Howells, 2001). Of course, extreme climatic events can have potentially serious consequences for agricultural sustainability, as demonstrated in the early months of 2012 in the UK. While the most severe water shortage since 1976 was reported in March 2012, April was the wettest month on record (Hall, 2012a and b).

Farming itself, through the use of fertilisers, fuel and methane produced by livestock, has the potential to adversely affect agricultural sustainability through increases in global temperatures. Climate change also poses the single greatest long-term threat to birds (RSPB, 2011), which have been used as significant indicator species of the environmental health and

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sustainability of agriculture since the early-1960s (Moore, 1962; Moore & Ratcliffe, 1962; Ratcliffe, 1963; Moore & Walker, 1964).

This chapter explores in further detail some of the key issues affecting the environmental dimensions of agricultural sustainability in the UK. More specifically, it uses an essentially behavioural approach to compare the perceptions and attitudes of those farmers loosely labelled 'organic' and 'conventional' towards environmental aspects of agricultural sustainability. The chapter has the following two interrelated objectives:

- To evaluate farmers' environmental perceptions, attitudes and behaviour towards organic farming and the development of more environmentally sustainable farming practices.
- To assess different environmental understandings of organic and conventional farmers, located in central-southern England, towards selected themes relating to environmental dimensions of agricultural sustainability.

The rest of the chapter is divided into four sections. The next section reviews some important dimensions of behavioural approaches to research. This is followed by a description of the 'extensive' and 'intensive' research methodologies adopted in the investigation. Section four provides insights into some farm and farmer characteristics, investigates farmers' perceptions and attitudes towards some key issues relating to agricultural sustainability, and examines farmers' contextual life histories and work routines. A final section provides a conclusion to the chapter.

## 2. Behavioural approaches

Morris & Potter (1995) defined behavioural studies as: '… one which focuses on the motives, values and attitudes that determine the decision-making process of individual farmers'. According to Wood (2000), although attitudes may remain constant over time and context, they do not directly explain behaviour because attitudes can be arrived at from different experiences. Behavioural approaches allow for the recognition of farmers as independent environmental managers who often make decisions about the management of resources on their farms independent from the state or other 'official' environmental managers. The focus on individual decision makers, together with the possibility of formulating interview-based research methodologies, are key reasons why behavioural approaches have been adopted by researchers endeavouring to 'understand' the decision making of farmers (Wilson, 1997). According to Beedell & Rehman (1999), such methodologies can be standardised and repeatable, thereby making them useful in monitoring change over time for EU policy-makers. These requirements have contributed to a recent increase in the application of 'behavioural approaches' to investigate issues such as food security and agricultural sustainability. Nevertheless, behavioural approaches which use inflexible structured questionnaire methodologies and focus on individual decision makers out of their social or familial milieus may appear elementary in attempting to understanding human behaviour (Burton, 2004). In order to alleviate such problems, Burton (2004) suggested combining quantitative and qualitative work in behavioural research.

The classic behavioural approach refers to a broad range of studies that employ actor-oriented quantitative methodologies in the investigation of decision-making (Burton, 2004). Although criticised for their relative neglect of 'spatial science' and 'partial' treatment of people (Cloke et al., 1991), behavioural perspectives have been used widely in agricultural research (Wolpert, 1964; Gasson, 1973, 1974; Gillmor, 1986; Ilbery, 1978, 1985; Brotherton, 1990; Morris & Potter, 1995; Wilson, 1996, 1997; Beedell & Rehman, 1999, 2000; Burton, 2004; Kings & Ilbery, 2010, 2011) and successfully applied to the examination and understandings of farmers' environmental behaviours. Farmers make their environmental decisions as they perceive it, not as it is, but the action resulting from their decision is played out in a real environment (Brookfield, 1969). Behavioural approaches are appropriate for examining the perception/cognition, values, attitudes and opinions of farmers and how they relate to environmental dimensions of agricultural sustainability (see Kings & Ilbery (2011) for details of how perception/cognition relate to farmers' attitudes and behaviours).

This chapter adopts 'extensive' and 'intensive' approaches to the examination of organic and conventional farmers' attitudes, values and behaviours toward environmental components of agricultural sustainability. Lowland farmland bird populations are used as a key indicator of farmers' environmental awareness, concerns, attitudes and behaviours. An important reason for using farmland avifauna in this way relates to the Department for Environment, Food and Rural Affairs (Defra) use of wild bird population trends as a 'headline indicator' of the 'sustainability' of its policies and 'quality of life' in the UK (Anon, 1999).

Four key and linked areas of farmers' understandings of environmental aspects of agricultural sustainability are advocated in this study: 'responsible' behaviour, uptake of environmental schemes, readership of agricultural publications and conservation work. One may expect differences in each of these between organic and conventional farmers. For example, while conventional farmers may perceive responsible behaviour as keeping the land in a good, fertile condition for growing crops and raising livestock, organic farmers may espouse concerns for protecting the land from environmental degradation. Likewise, one might expect organic farmers to be more interested in joining environmental schemes such as Countryside Stewardship and LEAF. This, in turn, might reflect the reading of different agricultural journals and magazines, as well as different attitudes towards conservation work, with perhaps organic farmers engaging more in pond, hedge and woodland creation and conventional farmers in creating pheasant cover.

## 3. A methodological framework

The methodology used for examining farmers' characteristics and attitudes towards the four environmental components of agricultural sustainability themes was in two distinct stages. Stage one consisted of hour-long telephone interviews with twenty-five organic farmers and twenty-five conventional farmers – located in central-southern England. Most farmers can be contacted by telephone, although they may not be listed in business or private telephone directories. Organic farmers, selected from the official regional Soil Associ-

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ation and Organic Farmers and Growers membership lists, were interviewed first. Each respondent was asked to provide details of a local conventional farmer who they thought was appropriate for interview. This method provided dependable geographically linked pairs of farmers during the investigation. The study was limited to farms/farmers in central-southern England. Any concerns about providing a reliable national representative sample were unwarranted as it was anticipated that the sample may or may not be representative of farms and farmers in the UK as a whole. A questionnaire was designed for use in the 'extensive' data gathering approach. These data were analysed both quantitatively, using summarising statistics, and qualitatively, in the form of farmers' quotations and illustrative farm cameos to emphasise the arguments being developed about environmental dimensions of agricultural sustainability. This analysis was used to support, illustrate and broaden the statistical data related to farm/farmer characteristics. The resulting similarities and differences between the two study groups provided environmental insights into their behaviour in relation to agricultural sustainability.

Stage two of the methodology consisted of 3 hour on-farm intensive qualitative/ interpretive interviews, with five geographically linked pairs of organic and conventional farmers who, earlier in the investigation, had been involved in the extensive telephone survey. It is important to note that the reference codes assigned to the ten respondents in section 4.3 are not always the same as those used in sections 4.1 and 4.2. The organic farmers were coded OF1 to OF5 and the conventional respondents CF1 to CF5 to facilitate data analysis. An illustrative sample of different ages, farm holdings of different sizes and systems was selected in preference to a representative sample. An interview guide was designed which also prompted respondents to talk about their life histories and work routines. The interviews were recorded using a Digital Audio MiniDisc-recorder with stereo microphone and transcribed soon after for analysis. In contrast to the extensive telephone survey, the data generated from stage two of the methodology were analysed using a textual approach using words and meanings. Any interesting or unusual quotations and paraphrases made by respondents were analysed in order to demonstrate attitudinal similarities and differences. The interviews produced contextual findings relating to the respondents' environmental understandings and behaviours towards agricultural sustainability which provided a broad picture of environmental dimensions of agricultural sustainability in central-southern England.

In the next section, the adopted 'extensive' and 'intensive' research methodology will be used primarily to examine and gain insights into the perceptions, values, opinions and behaviours of organic and conventional farmers in relation to their awareness and understandings of environmental dimensions of agricultural sustainability.

## 4. Examining farmers' attitudes and behaviours

The behavioural approach is used first, to examine farm and farmer characteristics; second, to examine the attitudes, understandings and behaviours of organic and conventional farm-

ers (located in central-southern England) in relation to environmental dimensions of agricultural sustainability; and third, to ascertain if farmers' attitudes and behaviours support those expressed earlier in the analysis.

### 4.1. Contrasting organic and conventional farms and farmers

The analysis began with an examination of farm/farmer characteristics of the 50 telephone interviewees as they are likely to influence farmers' relationship with the four core themes related to environmental aspects of agricultural sustainability. A number of significant similarities and differences were found in terms of farm/farmer characteristics during the extensive organic and conventional farmer telephone survey. First, conventional farms (average size 202.3ha) were larger than organic farms (average size 85.4ha), although the size of both farm types was extremely variable (see Table 1).

| | | Organic farmers | | | Conventional farmers | | |
|---|---|---|---|---|---|---|---|
| **Hectares** | **Acres** | **Frequency** | **%** | **Mean ha** | **Frequency** | **%** | **Mean ha** |
| 0-40 | 0-100 | 14 | 56 | 15.57 | 2 | 8 | 36.5 |
| 42-202 | 101-500 | 9 | 36 | 91.44 | 17 | 68 | 107.53 |
| 203-405 | 501-1000 | 1 | 4 | 364 | 3 | 12 | 296.33 |
| 406-810 | 1001-2000 | 1 | 4 | 730 | 2 | 8 | 526 |
| "/>810 | "/>2000 | 0 | 0 | 0 | 1 | 4 | 1133 |
| Total | | 25 | 100 | | 25 | 100 | |

**Table 1.** Distribution of sampled organic and conventional farms

Secondly, if cereals were grown on any of the organic farms, they were usually used as livestock fodder or seed. This study was in accord with Ilbery et al's, (1999) findings that in national terms central-southern England is a marginal cereal production area. Grass and fodder enterprises associated with organic livestock were the most common organic types found on the surveyed organic farms. Lampkin (1990) notes that grassland is often the most trouble-free and least expensive land to convert to organic production. Inorganic fertiliser applications to conventional grassland is incompatible with the maintenance of biological diversity (Sotherton & Self, 2000). Within the context of this chapter, biodiversity, as it is commonly referred to, is defined as the variation of plant and animal life at a respondent's farm. A key priority facing agricultural sustainability is the protection of the environment and natural resources such as water, soil and biodiversity (Defra, 2006). Biodiversity is therefore essential for maintaining agricultural sustainability. According to Willer & Gillmor (1992), many farmers experiment with organic grassland production before deciding to convert their whole farm to organic production. This contrasted with more arable crops being grown on conventional farms. Thirdly, a wide range of livestock was found on the organic farms such as chickens, pigs, cattle (beef and dairy cows), sheep, goats and deer, with some

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organic farmers having up to four different animal species. In contrast, dairy cattle, beef cattle or sheep were usually the norm on the conventional farms.

Fourthly, more organic than conventional farms were owner-occupied. This is linked to the first key point that organic farms tend to be smaller than conventional farms and, subject to other influencing factors such as land quality and location, may therefore be less expensive. Organic farms are also more diverse in their enterprises thereby providing greater levels of biodiversity and agricultural sustainability, in contrast to the greater size dictated by specialisation. Fifthly, more than three times as many conventional as organic farmers were of mixed tenure. This may be partially explained by these conventional farmers renting additional land with a view to obtaining significant economies of scale; for example, as required by monocultures in the cultivation of GM crops which are considered by many researchers to be unsustainable.

Finally, the two survey groups had similar numbers of vocational qualifications, although organic farmers had the highest number of qualifications towards the upper end of the education spectrum (Table 2). Examining qualifications relating specifically to agriculture shows that more conventional than organic farmers have a national certificate in agriculture. In contrast, only the organic farmers have a higher degree or Doctorate.

| | Organic | | Conventional | |
|---|---|---|---|---|
| | **Frequency** | **Percentage** | **Frequency** | **Percentage** |
| Certificate | 1 | 4 | 0 | 0 |
| National Cert in Agriculture | 1 | 4 | 5 | 20 |
| Ordinary Diploma | 3 | 12 | 2 | 8 |
| Higher Diploma | 0 | 0 | 2 | 8 |
| Degree | 6 | 24 | 1 | 4 |
| Higher Degree | 2 | 8 | 0 | 0 |
| Doctorate | 1 | 4 | 0 | 0 |
| None | 11 | 44 | 15 | 60 |
| **Total** | **25** | **100** | **25** | **100** |

It should be noted that only the highest qualification awarded to each farmer has been used in this table.

**Table 2.** Qualifications obtained by farmers

To gain insights into farmers' attitudes towards environmental dimensions of the core agricultural sustainability theme, 'responsible countryside behaviour', respondents were asked how farmers should 'behave' in the countryside. The term 'behave responsibly' was used more by organic than conventional farmers. Organic farmers also used words such as 'stewards, keepers, custodians or protectors', contrasting with conventional farmers who prefer-

red to use the words 'looking after, care and good condition'. This highlights an important difference between the two survey groups. While conventional farmers understand responsible countryside behaviour as having tidy farms with neatly trimmed hedges and weed-free fields through herbicide usage, organic respondents' understanding and implementation of the term is untidy farms with 'over grown' hedges and less attention paid to removing weeds. The latter farming practices result in greater levels of biodiversity, essential for agricultural sustainability, than on the conventional farms.

The actual countryside behaviour of respondents was examined by asking four related questions directly linked to four specific environmental dimensions of agricultural sustainability: first, membership of agri-environmental schemes; second, participation in conservation work; third, membership of environmental organisations; and fourth, 'readership' of agri-environmental journals and magazines.

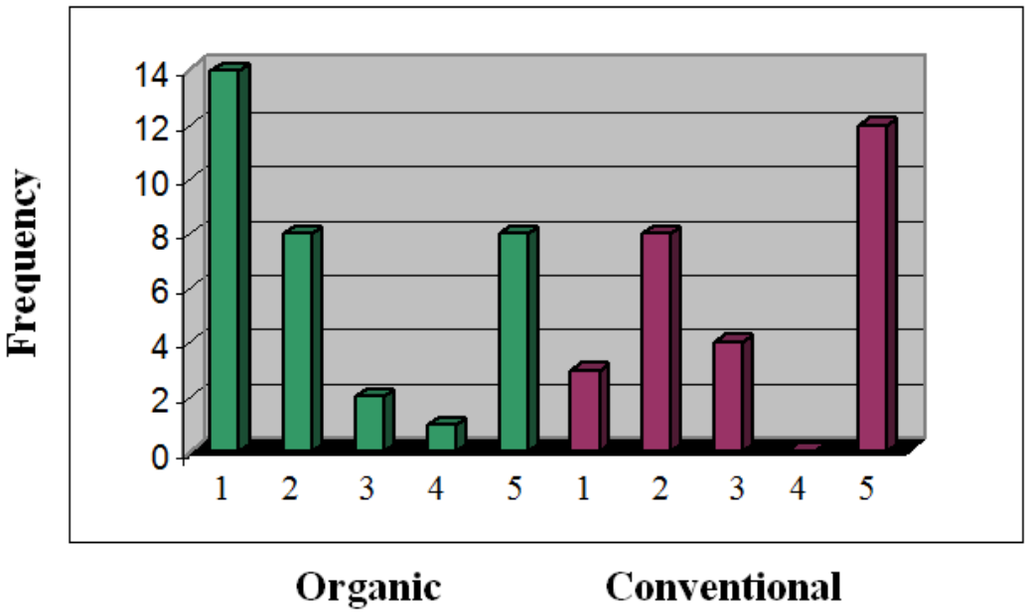


**Figure 1.** Farmers' uptake of agri-environmental schemes. 1 = Countryside Stewardship Scheme; 2 = Set-aside Scheme; 3 = Environmentally Sensitive Areas; 4 = Linking Environment and Farming; 5 = None

The data in Figure 1 suggest that organic farmers are more interested in joining agri-environmental schemes than conventional farmers. Many more organic than conventional farmers belong to more than one scheme. In excess of half of the organic farmers were in the Countryside Stewardship Scheme, contrasting with just over one tenth of conventional farmers. The Countryside Stewardship was the government's main scheme for countryside until the introduction of Environmental Stewardship. Farmers entered 10-year agreements to manage land in an environmentally sustainable way in return for annual payments (Defra, 2002). There were equal numbers of both types of farmer involved with the set-aside scheme which has played an important role in biodiversity and agricultural sustainability.

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Some interesting differences emerged between the two survey groups concerning the type of conservation work carried out by farmers (see Table 3). First, more organic than conventional farmers undertake conservation work, with a much higher proportion involved in hedge laying and wood planting demonstrating their ecocentic attitudes. Secondly, conventional farmers see the creation of pheasant cover as conservation works and nearly 1 in 4 do not undertake any kind of conservation work. Conservation work, particularly the recreation of ponds, woods and hedges by some organic farmers, plays a vital role in helping to restore agricultural sustainability to pre intensification levels.

| | Organic farmers | | Conventional farmers | |
|---|---|---|---|---|
| | **Frequency** | **%** | **Frequency** | **%** |
| Don't do conservation work | 1 | 4 | 6 | 24 |
| On-farm conservation | 24 | 96 | 19 | 76 |
| Off-farm conservation - voluntary/ Contract | 3 | 12 | 0 | 0 |
| Hedges: planting, laying and restoration | 19 | 76 | 4 | 16 |
| Woodland: plant, coppice and pollard | 15 | 60 | 4 | 16 |
| Ponds: create and maintain | 6 | 24 | 3 | 12 |
| Meadows: plant and maintain | 5 | 20 | 4 | 16 |
| Pheasant cover | 0 | 0 | 4 | 16 |
| **Totals** | **24** | **96** | **19** | **76** |

**Table 3.** Frequency of farmers carrying out conservation work

Membership of environmental institutions was quite low among both groups of farmers. But, differences did emerge which reflected attitudes towards conservation work and environmental components of agricultural sustainability. Thus, while organic farmers preferred the Wildlife Trust, Woodland Trust and Friends of the Earth, conventional farmers usually preferred the Game Conservancy Trust. This raises the important question about how 'green' such environmental agencies actually are. The most frequently mentioned agency was the Game Conservancy Trust, which was dominated by conventional farmers whose main countryside leisure pursuit is shooting.

Further significant differences between organic and conventional farmers were found in relation to the readership of magazines and journals. Thus, while *Farmers Weekly* and, to a much less extent, *Farmers Guardian* were the most popular conventional farmers' reading, the *Living Earth* and *Organic Farming* were read most widely among organic farmers. The periodicals preferred by the organic respondents were primarily concerned with environmental and sustainability issues other than agriculture. The most popular magazine overall by far was the *Farmers Weekly*. Generally, organic farmers seemed more critical in their reading habits than conventional respondents. These findings reflected the earlier differences be-

tween the two groups of farmers in terms of membership of environmental organisations and agri-environmental schemes. It is not surprising, therefore, that considerable differences in perceptions, attitudes and understandings emerged in relation to the closely linked environmental dimensions of agricultural sustainability concepts.

### 4.2. Exploring environmental dimensions of agricultural sustainability

Section one introduced six environmental concepts related to the core theme of agricultural sustainability. These, in order of least environmentally acceptable to most acceptable, are:

- Global climate change and extreme weather events
- Genetically Modified crops
- United Kingdom and European Union agricultural policy
- Conventional agriculture
- Organic farming systems
- Lowland farmland avifauna

A number of wide ranging differences of opinion were found between many of the interviewees towards the related environmental dimensions of agricultural sustainability concepts during the following farmer discussions which may shape their attitudes towards agricultural sustainability. For example, a number of organic farmers believed that global climate change is caused by burning fossil fuels and they suggested some resulting agricultural changes such as growing new varieties of crops:

'Well global climate change is going to have a profound effect on agriculture. The worst predictions suggest that all countries will have to grow different crops' (OF1).

In contrast, several conventional farmers thought that changes in weather patterns are part of the normal course of events. Historically, climate has always changed and is therefore likely to do so in the future. Some researchers, similar to conventional farmers, suggest that fear of global warming derives from politics and dogma rather than scientific proof (Plimer, 2009). Global climate change is a particularly important issue because it has the potential to reduce provision of water supplies, as discussed earlier, so essential for the sustainability of organic and conventional agriculture. However, not all extreme weather events have such potentially negative effects on agricultural sustainability. At the time of writing (30th June 2012), it was announced by the Environment Agency that there had been more rainfall for late spring and early summer than at any time since 1910, when the first readings were made. Nearly half of the rivers the Environment Agency monitors are at exceptionally high levels, with all rivers higher than, or at normal levels for the time of the year (Alleyne, 2012). But, earlier this year, crop failure was occurring widely due to extreme drought conditions. More recently, 'excessive' widespread flooding has also resulted in large-scale crop failure. Both types of 'extreme' weather event have proved to be detrimental for environmental components of agricultural sustainability.

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Equally harmful, most organic farmers in the survey believed that government policy had caused a lot of damage to the countryside thereby reducing biodiversity and agricultural sustainability, typically stating: '… grubbing out hedges was a mistake' (OF11). In contrast, most conventional farmers said that the damage to the countryside was minimal, typically commenting: 'I suppose some places where the water comes from you have to be a bit careful with nitrates and things …' (CF10). Conventional farmers seemed to have more faith than organic farmers in the government's willingness to rectify such past environmental damage to the countryside, typically commenting: 'Yes, they [the government] are under pressure by the public to do so' (CF25). Many more conventional than organic farmers (16-2) claimed that there is an important relationship between government and environmental issues, characterised by comments such as: 'I think the government has become anti-farming – they are doing more and more for the environment and cutting back on agriculture' (CF4). In contrast, twice as many organic as conventional farmers thought that: 'This present government is not getting more environmentally friendly' (OF18). The attitudes revealed by the above comments indicate that most organic respondents have greater levels of environmental concern for their farms than many of the conventional farmers.

Another important concern of many organic farmers is the perceived environmental problems associated with GM technology, typically commenting: 'I see no situation, with our present knowledge of GM, where it would give environmental benefits – you are asking for trouble – I can't see any sensible person agreeing with it being a good thing' (OF20). This contrasted with most conventional farmers who seemed a little more accepting of GM technology than the organic respondents, typically saying: 'I haven't a huge fear of them as long as we observe the science …' (CF24). Conventional farmers were generally less critical of GM crops than the organic respondents, and seem to place their main emphasis on the potential environmental benefits to be gained from reductions in pesticide use. However, one organic respondent raised the issue that GM crops are associated with monocultures. Monocultures are generally unsuitable for many lowland farmland birds as they may have to rely on fewer prey species, particularly during adverse weather conditions. In contrast, on most arable organic farms birds are able to move to alternative food-bearing habitats. A consequence of such intensive farming methods is the loss of the incidental habitats, often associated with organic farming, which reduces biodiversity and thus agricultural sustainability.

Many organic farmers were equally concerned about the environmental sustainability of conventional farming. For example, more than 50 per cent organic farmers said that conventional agriculture is harmful to the environment and therefore unsustainable. Several gave specific reasons for their environmental concern such as conventional farmers using high levels of nitrate and pesticides on crops. This contrasted with many conventional farmers who were less likely to believe that conventional agriculture is having negative environmental impacts. Almost all organic farmers were critical of conventional respondents in the way in which conventional agriculture damages water quality through pesticides usage. Such practices are likely to have a detrimental effect on future agricultural sustainability. Organic respondents' attitudes towards this issue were epitomised by comments such as: 'I definitely think it [conventional agriculture] has a negative effect on water quality'. In contrast, only 40

per cent of conventional farmers said that conventional agriculture is harmful to water quality and a further twenty per cent said that conventional agriculture didn't affect water quality, with quotes like: 'pesticides – it doesn't make any difference'.

At the other end of the spectrum, the surveyed organic farmers were very critical of pesticide use which can reduce biodiversity and thus agricultural sustainability. This contrasted with conventional farmers, who believed they need to use pesticides to produce their crops but, nevertheless, are aware of the dangers of over-use of such chemicals. Typical organic farmers' responses included: 'Conventional farming is lazy farming; it's farming out of a can, whereas with organic farming, you have to farm with your head' (OF2). Other organic farmers were more detailed with their response, such as the 54 year old owner/tenant organic farmer who said:

'If you read the magazine that the conventional farmers read, the *Farmers Weekly*, you will notice that the magazine is paid for by pesticide adverts. The biggest adverts saying this is the time to spray with this or that. This is the way [conventional] farmers are being educated' (OF5).

Some conventional farmers agreed with organic farmers that conventionally produced crops sometimes use high levels of pesticides; however, they tended to justify their position by typically saying: 'I think that we are forced by economics to using and growing the things [crops] the best we can – if we want to be farmers we have to do it that way' (CF24).

In contrast to their understandings that conventional farming is unsustainable, almost three quarters of organic respondents thought that organic agriculture is environmentally sustainable. A number of independent studies support that viewpoint (Morgan & Murdoch, 2000; Hansen et al., 2001; Lotter, 2003; Darnhofer, 2005; Kings & Ilbery, 2010; 2011). This contrasted with the conventional farmers who were generally not in support of those views, typified by the following comment: 'I think organic grass farmers cause more problems with nitrates than I do by ploughing clover [into their soil]' (CF13). Interestingly, one in two organic respondents claimed environmental concerns to be their main reason for adoption of organic methods and a further twenty per cent thought they had always farmed organically. Such comments reveal their ecocentric attitudes towards agricultural sustainability. Significantly, half of those who emphasised environmental reasons had a degree or higher degree, possibly suggesting a link between higher education and environmental awareness.

It emerged that most of the organic respondents believed that organic arable farmers use a lot of fossil fuels in their mechanical weeding processes, as typified by this comment: 'The burners they use I would think they use a colossal amount of fuel' (OF2). This practice contributes to climate warming and is therefore liable to have a detrimental effect on long-term agricultural sustainability through reduced crop yield and/or failure. This finding does not support the belief that organic farming systems are always environmentally sustainable. It is noteworthy that several organic respondents declined to comment, possibly because they were aware that more fossil fuels are used in mechanical weeding processes than chemical methods of weeding. Interestingly, most conventional farmers in the survey did not disapprove of organic farmers regarding this issue.

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Lowland farmland bird populations are strongly influenced by all of the above environmental dimensions of agricultural sustainability. The analysis therefore attempts to draw together some of these closely related concepts through an examination of respondents' attitudes, beliefs and awareness of lowland farmland avifauna. The first loosely worded question asked respondents how they thought modern agriculture relates to farmland birds, thereby enabling answers which could relate to any of the previous linked concepts such as conventional farming. The core point to emerge from the analysis was that organic respondents believe organic farming systems are 'better' for birds than conventional agriculture, typified by the following comment: 'This is just a small organic dairy farm and it's full of birds but I work on another farm [as a contractor], which is an intensive dairy farm and there's no birds on it' (OF7). However, some conventional farmers, whilst acknowledging that intensive farming has been harmful to birds in the past, tended to justify the current population levels and mix of farmland avifauna by blaming government agri-environmental policy for reducing agricultural sustainability: 'There are fewer birds now [on lowland farmland] because farmers have been forced out of mixed farming systems' (CF1).

Similar to earlier discussions regarding government policy, the majority of members of both groups of respondents had little faith that the government would be successful in its aim of restoring farmland bird populations to sustainable 1970 levels by 2020. Organic farmers typically commented: '2020 is a frightfully convenient date – it's the sort of date that governments love – it's well into the future and people have short memories' (OF1). Equally as cynical, typical conventional respondents' comments included: 'Not if they [the government] put a ban on hunting and shooting – there are too many pests – I kill 80-100 Carrion Crows and Magpies each year' (CF1). It seems unlikely that the population of corvids will remain sustainable in CF1's farm location if he continues with his current attitudes and patterns of behaviour. Importantly, it may be that climatic factors have been overlooked in the distribution of birds by other influences, such as the alteration of habitats, for example, as caused through the intensification of agriculture. Recent anecdotal evidence suggests that farmland birds have had a very poor 2012 breeding season due to extremely high rainfall levels noted earlier. Generally, the attitudes and behaviours of organic farmers suggest a more a sustainable approach than the conventional respondents towards lowland farmland avifauna, which are used as significant indicator species of the environmental health and sustainability of agriculture.

### 4.3. On-farm intensive qualitative interviews

Farmers' contextual life histories and work routines were examined to ascertain if these helped to explain some of the results revealed in sections 4.1 and 4.2 regarding concerns related to environmental components of agricultural sustainability.

#### Contextual life histories and work routines

Although the ten separate descriptive farmer contextual life histories, obtained from the intensive farm interviews, may not be representative of conventional and organic farmers generally, examination of their life histories and the way in which they relate to farming and the farm environment revealed some thought-provoking insights into their environmental atti-

tudes, beliefs and behaviours towards environmental dimensions of agricultural sustainability. Most of the conventional respondents seemed to place great importance on their early work experience on other farms and saw this as a crucial building block from which they have developed their own particular 'style' of farming. This experience was common to respondents CF3, CF4 and CF5, and typified by respondent CF3 who finished school aged fifteen: ' … the best thing I did was going round a multitude of farms working for other people, because you see how different people tackle the same job from a different angle'. OF1 also considered that his early on-farm practical experiences influenced his farming philosophy: 'those early years spent almost entirely outside doing physical work must have been formative and very important to me'. A common denominator of these four farmers is that they all started in farming at a young age without formal qualifications, although OF1 and CF5 gained a National Diploma in Agriculture when older. As discussed in the previous section, independent research shows that environmental concern for issues related to agricultural sustainability was correlated with variables such as age and education.

Another important insight to emerge from the life histories is that the conventional respondents' idea of agriculture was often well-organised, neat and tidy farms with the land in 'good shape', as epitomised by CF1, CF3 and CF4. This was illustrated by CF1 who, when seeing litter, would stop his truck to collect it. CF3 also demonstrated his extreme tidiness by apologising for failing to remove what appeared to be the last remnant of scrub so essential for farm biodiversity and, ultimately, productive, wildlife friendly and sustainable agriculture. These attitudes and on-farm behaviours contrasted significantly with respondents OF1 and OF4's high level of environmental concern and seemingly less tidy approach to farming. According to CF4, his sister (OF4): 'is a muddler … a policeman said to somebody [about her dwelling] I would never know whether it's been burgled or not'. These attitudes and behaviours support the earlier findings towards the core environmental dimension of agricultural sustainability theme 'responsible countryside behaviour', which showed that conventional farmers' often have tidy farms, neatly trimmed hedges and fields kept weed-free through herbicide usage. This contrasted with organic farmers' untidy farms with 'over grown' hedges and less concern about removing weeds, with their associated invertebrates and weed seeds, which contribute significantly towards increased levels of biodiversity, an important environmental components of agricultural sustainability.

Several of the conventional farmers showed technocentric attitudes. According to O'Riordan (1981), technocentrism is a mode of thought which recognises environmental problems but believes that society will always solve them through technology and achieve unlimited material growth. This contrasted with the more ecocentric attitudes of some of the organic respondents. Ecocentricism can be defined as a mode of thought which regards humans as subject to ecological and system laws; essentially it is not human-centred (anthropocentric) but centred on natural ecosystems, of which humans are just another component (O'Riordan, 1981). A final insight to emerge was that most of the organic respondents planted hedges and created ponds, thereby directly contributing to biodiversity and agricultural sustainability. Organic farmers also had a vision of farming more closely linked to the 'natural' environment than several of the conventional farmers, whose concept of 'nature' was re-

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lated to planting pheasant cover and providing 'good environments' for foxes. CF1 claimed to be a keen naturalist and countryman and recalls happy childhood memories of: '… shooting rabbits and squirrels with a 410 hammer gun'. These findings support the results from the examination of the core theme of farmers' conservation work where it was found that more organic than conventional farmers undertake conservation work, with many carrying out hedge laying, pond creation and wood planting. This type of habitat creation plays an important role in helping to restore agricultural sustainability to pre intensification levels. In contrast, conventional farmers are more likely to see the creation of pheasant cover as conservation work.

Having gained some further insights into the five geographically linked organic and conventional farmers' environmental perceptions, attitudes and behaviours, the examination turns to farmers' work routines which may reveal additional insights into environmental dimensions of agricultural sustainability. Respondents' work routines revolved around the recurring times of seasons, the cycles of planting and harvesting of crops, and the cycles of birth and death of livestock and ultimately people. However, organic farmers' work routine was usually more complex than the conventional case study respondents due to the diversity of their enterprises. This supports the earlier findings in the farmer characteristics section. Many respondents' work patterns were built around their livestock; for example, specialist dairy farmer CF2's work routine was dictated throughout the whole year by milking his cows twice a day. He sees himself as a producer of 'good English food [milk] for the housewife.' Similarly, a mixed farmer's comments seem to set in stone the inflexibility of his work routine: 'It's the dairy herd we have to milk twice a day, so that's it – all year round' (CF3), although this situation would be equally true of an organic dairy farm. CF1's daily activities revolved around his flock of 1,000 ewes; however, this work routine was disrupted when a ram could not be restrained.

Some farmers claimed their work routine is very tiring. The often exhausting seasonal work was epitomised by a mixed organic respondent who kept a wide range of livestock on her farm, including fish in a recently excavated lake thereby increasing biodiversity levels on her holding. She illustrated some of the complexities of her daily work routine by detailing several aspects of a 'typically' tiring day during the lambing season:

'Parts of my routine are seasonal. It usually starts at six thirty, but at half past three this morning I was still trugging away getting a lamb to feed. I had one lamb that we saved whose eyes were pecked out by a crow, but it hadn't healed properly and it went straight into joint ill and died' (OF2).

This description demonstrated vividly the rhythm of life and death on her farm and showed her individual care and attention to livestock. She emphasised the importance of feeding her animals with natural healthy food to ensure their good health.

The diversity of OF4's holding and the size, type and biodiversity of her farm's hilly terrain strongly influenced her work routine. Her contextual life history revealed that, in contrast to the other organic respondents, she had off-farm jobs thereby adding to the complexity of her daily work routine. Her brother's (CF4) weekday work pattern revolved principally around

three issues: first, his non-farming duties with his children because his wife works full time as a teacher; second, early morning feeding and moving his sheep between fields as necessary and; third, having a regular shoot in the pheasant cover he created. This supports the earlier findings that conventional farmers often see the creation of pheasant cover as conservation works.

The weekday work pattern of OF1 was strongly influenced by the limitations on the amount of time he can work at any one period, due to his serious illness which requires eating and resting at frequent intervals: 'My work routine revolves around my illness – I have had ME for seventeen years and can only work for short periods then I have to have a rest' (OF1). In line with other farmers, he said his work pattern was dictated by the seasons and he used words such as 'revolves' which indicate a cyclical pattern of time. He claimed that his farming practices were 'based on nature and natural processes which work best on their own', thereby further revealing his ecocentric attitudes and behaviours.

Initially, it seemed surprising that all the respondents focused on the daily routine of looking after livestock when some are mixed farmers; however, this may indicate that the immediacy and care required by farm animals is considered more important than, in the short term, raising crops. Many of the quotations demonstrated the cyclical nature of farming as a common thread linking all farmers. However, the organic farmers seemed to have a significantly closer relationship with their livestock than conventional respondents, which may simply be due to them caring for smaller numbers of animals; however, other factors such as the life experiences of OF2 as a nurse and her ecocentric attitudes may also be important.

The attitudes and behaviours of both groups of respondents during their work routines helped support earlier findings towards environmental dimensions of agricultural sustainability. This was epitomised by some organic farmers' individual concern for their stock and considerable interest in carrying out conservation work. This often contrasted significantly with some of the conventional farmers' who showed little interest in conservation work other than related to shooting.

## 5. Conclusion

This chapter used an essentially behavioural approach to examine the environmental attitudes, understandings and behaviours of organic and conventional farmers (in central-southern England) towards four core agricultural sustainability themes and a range of supporting and interrelated environmental dimensions of agricultural sustainability concepts. Whether loosely labelled organic or conventional, a diverse series of environmental perceptions, attitudes and behaviours emerged from the respondents. For example, in terms of 'responsible countryside behaviour', conventional farmers tended to have tidy farms with neatly trimmed hedges and weed-free fields, with the aim of maintaining their land in good, fertile condition. Burton (2004) also noted that: 'a number of researchers found that conventional farmers have a penchant for landscapes that are neat, clean and ordered'. In contrast, organic respondents generally had relatively untidy farms with 'over grown' hedges and

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paid considerably less attention to removing weeds. Both of these play important roles in the biodiversity element of agricultural sustainability. Organic farmers were also more interested in joining environmental schemes than conventional farmers, with many belonging to more than one scheme, particularly those associated with the 'natural' environment such as Countryside Stewardship and LEAF. However, similar numbers of organic and conventional respondents were in a set-aside scheme, which later proved to be of great benefit for agricultural sustainability through increased biodiversity. However, many conventional farmers' revealed how genuine their attitudes were by initially entering their least fertile fields into the scheme for financial reasons, rather than environmental.

More organic than conventional farmers carried out conservation work, with a much higher proportion involved in the recreation of ponds, woods and hedges. This type of habitat creation is important in helping to restore agricultural sustainability to pre intensification levels. In contrast, conventional farmers saw the creation of woods and pheasant cover as conservation works. The periodicals read by the organic respondents were mainly concerned with environmental and sustainability issues other than agriculture, thereby providing insights into their attitudes towards environmental dimensions of agricultural sustainability. Membership of environmental institutions was quite low among both groups of farmers. Differences did emerge, however, reflecting attitudes towards conservation work and agricultural sustainability. Thus, while organic farmers preferred the Wildlife Trust, Woodland Trust and Friends of the Earth, conventional farmers, whose main countryside leisure pursuit is shooting, were more in favour of the Game Conservancy Trust. This supports the earlier finding that many conventional farmers see the creation of woods and pheasant cover as conservation work further suggesting that all environmental institutions are not equally 'green'.

Respondents' attitudes towards global climate change varied significantly as exemplified by more organic, than conventional farmers, environmental concern for the loss of some of the UK's most fertile agricultural land in East Anglia thereby adversely affecting agricultural sustainability. Organic farmers used this land loss as evidence of global climate change taking place due to the burning of fossil fuels. This contrasted with a number of conventional farmers who thought that such weather changes are part of the normal course of events. The attitudes of the two farmer groups were quite similar regarding the reduction of water supplies, essential for the sustainability of both types of farming, possibly because it may directly affect their livelihood.

Conventional farmers were not generally critical of GM technology and the associated potential dangers of cross-pollination of GM crops with native plant species. This contrasted with the strong ecocentric attitudes of the organic respondents who condemned GM crops totally with their perceived environmental dangers. The main reason that conventional farmers gave for not being critical of GM crops was their belief that environmental benefits would be gained from reductions in pesticide use. These findings may be related to conventional farmers anticipating future benefit from GM technology. In contrast, organic farmers may see such technology to be damaging to themselves, their families and the environment without the possibility of future benefit (Hall & Moran, 2006).

Interestingly, both groups of respondents' attitudes towards government policy regarding environmental issues such as agricultural sustainability varied considerably. On the one hand, most organic farmers believed that government policy had caused a lot of damage to the countryside and had little faith in government policy restoring such damage thus reflecting their ecocentric attitudes. On the other hand, most conventional farmers had some faith in government policy in restoring countryside damage, which they claimed was minimal thereby demonstrating their belief in the importance of a conventionally farmed countryside. However, there is a strong causal relationship between the intensification of agriculture, caused by the Common Agricultural Policy since its inception, and the decline in agricultural sustainability. For example, 620,000 miles of hedgerows were destroyed between 1984 and 1990. Such practices resulted in an average decline in farmland bird populations of 43 per cent between 1970 and 2009.

Probably somewhat unsurprisingly, the attitudes of both farmer groups varied considerably towards conventional agriculture. For example, fewer conventional than organic farmers believed that conventional agriculture has negative environmental impacts. In contrast, most organic farmers said that conventional agriculture is unsustainable because conventional farmers tend to use high levels of nitrate and pesticides on their crops. Most organic farmers were also very critical of the way in which conventional agriculture harms water quality, through pesticides usage, leading to damage to agricultural sustainability. This contrasted with conventional farmers, who believe that it is essential for them to use pesticides to grow their crops, but claimed to be aware of the dangers of over-use of such chemicals.

The attitudes of both groups of farmers towards organic farming were equally diverse, demonstrated by half of the organic respondents claiming that environmental concerns were their main reason for adopting organic methods. Significantly, half of those who emphasised environmental reasons had a degree or higher degree, possibly suggesting a link between higher education and environmental awareness. This finding is supported by Dunlap et al., (2000) who found that environmental concern was correlated with variables such as age and education. Most organic farmers said that they believed that organic agriculture is environmentally sustainable. In contrast, conventional farmers were generally not in support of those views, sometimes suggesting that organic grass farmers cause more problems with nitrates than they do, for example, by ploughing clover into their soil. Most of the organic respondents accepted that a lot of fossil fuels are used in their mechanical weeding processes. Such practices contribute to climate warming and are therefore liable to have a detrimental effect on long-term agricultural sustainability through reduced crop yield and/or failure. This suggests that organic farming systems are not always as environmentally sustainable as is often claimed.

Organic farmers' attitudes towards lowland farmland bird populations were revealed by their greater interest, knowledge and understanding of farmland avifauna than the conventional respondents. For example, some organic respondents claimed that organic farming systems are 'better' for birds than conventional agriculture. However, some conventional farmers, whilst acknowledging that intensive farming has been harmful to birds in the past, justified their opinion by blaming government agri-environmental policy for forcing them

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out of mixed farming. Most members of both groups of respondents had little faith in government agri-environmental policy as it relates to farmland bird populations. Many respondents were generally cynical about the government and believe they will be unsuccessful in achieving their objective of restoring farmland bird populations to 1970 levels by 2020. Importantly, Defra announced on 24th May 2012 its plans to spend £375,000 on a licensed three-year trial of Common Buzzard *Buteo buteo* capture and nest destruction on three shooting estates in Northumberland (Pitches, 2012). In contrast, possibly because of the outrage from conservationists regarding this proposal, Defra announced during the first week in July 2012 that farmers can apply for payment through agri-environmental schemes to provide supplementary food for farmland birds during their leanest months. Such mixed messages leave in considerable doubt that the government is serious in their aim of reversing the long-term declines of farmland birds and restoring sustainable populations to 1970 levels by 2020.

Generally the attitudes and behaviours revealed by the contextual life histories and work routines supported the findings revealed from the earlier analysis. For example, conventional farmers often see the creation of pheasant cover as conservation works contrasting with the more environmentally friendly attitudes of the organic farmers who often plant hedges and excavate ponds thereby helping to restore agricultural sustainability. Organic farmers' work routine was found to be more complex than the conventional respondents due to the diversity of their enterprises, thereby further contributing to farm biodiversity and agricultural sustainability.

The wide ranging differences of opinion and behaviours demonstrated by the respondents in this chapter may influence their environmental attitudes towards agricultural sustainability. It is important that the technocentric attitudes of many conventional farmers become more in line with the ecocentric attitudes of most organic farmers if long-term agricultural sustainability is to be realised. For example, similar to organic farmers, more conventional farmers could be encouraged to join agri-environmental schemes and environmental institutions with the aim of luring them from their perceived key traditional role of producers of good healthy food.

The behavioural approach adopted in this chapter proved useful in contributing towards sensitive understandings of organic and conventional farmers' perceptions, attitudes and behaviours. This was not accomplished without problems concerning the discrepancies experienced between respondents' attitudes and their physical on-farm behaviours. This study provided a conceptual and empirical contribution towards geographical research, knowledge and understandings of the environmental dimensions of agricultural sustainability in the UK.

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