



‘Feed your Senses’: The effects of visiting a LEAF farm

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Report for LEAF (UK) as part of Open Farm Sunday 2008 – “Feed Your Senses” campaign

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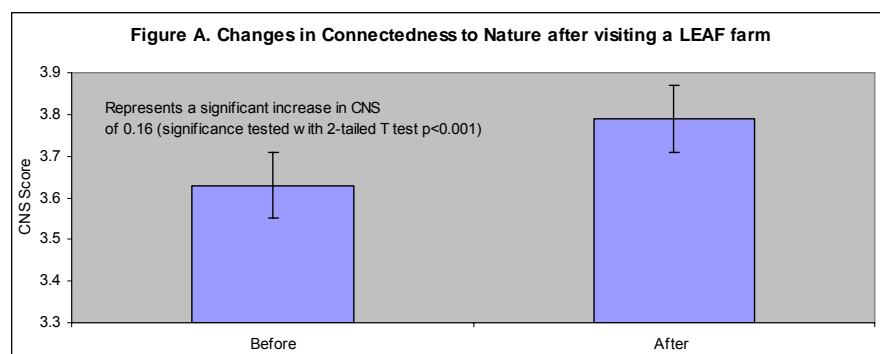
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1. Key Findings

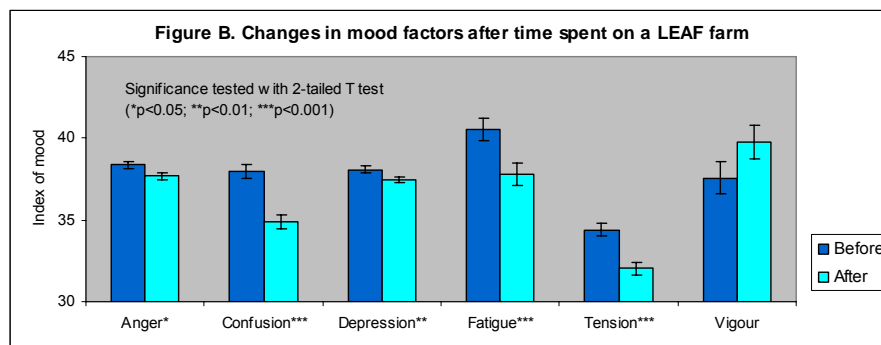
- 1.1 In recent years, there has been a substantial shift towards recognising that any area of land can provide many *different* environmental, recreational and health services at the same time and so therefore is multifunctional. LEAF has been promoting the importance of farming in harmony with the environment for many years and has become increasingly aware of the multiple services provided by farms (otherwise known as multifunctionality in agriculture).
- 1.2 As part of Open Farm Sunday - 'Feed your Senses' 2008 campaign, LEAF commissioned the University of Essex to carry out a study to observe any changes that occur in visitor well-being, connectedness to nature, public perceptions of farm services and visitors' food shopping habits, as a result of visiting a LEAF farm.
- 1.3 An analysis of some of the mental health and well-being benefits to visitors derived from spending time on a LEAF farm was conducted in April 2008. Visitors from a selection of LEAF farms around the UK took part in a survey to provide some empirical data addressing psychological health and well-being effects, information on visitor perceptions of farm multifunctionality, food sourcing habits and qualitative responses.
- 1.4 A mixed method design incorporating both quantitative data and qualitative narrative was used to collect data using a composite questionnaire. The questionnaires were administered immediately before and immediately after participants spent time on the LEAF farms, to enable comparisons to be made and to allow identification of any changes in health parameters as a direct result of exposure to the farm environment.
- 1.5 A total of 71 visitors from 3 different LEAF farm visits took part in this research, 80% of visitors were female and 20% were male, and ages ranged from the youngest of 18 years and the oldest at 84 years. The average age of LEAF farm visitors was 35 years.
- 1.6 An adapted form of the connectedness to nature scale was used in this study to assess whether visiting a LEAF farm and being exposed to nature increases an individual's sense of feeling connected to nature. There was a highly statistically significant increase in connectedness to nature scores ($p < .001$) between time one (before the visit) ($M = 3.63 \pm .07$) and time 2 (after the visit) ($M = 3.78 \pm .06$, $t(58) = 3.42$)¹. Visitors to LEAF farms experienced increased feelings of connection to nature after spending time on the farm. Participants under 30 saw a more pronounced increase compared to those who were over 30, although older visitors were generally more connected to nature to begin with.
- 1.7 Visitors completed the Profile of Mood States (POMS) questionnaire both immediately before and immediately after spending time on the LEAF farm, to enable any



¹ The eta squared statistic (.17) indicated a large effect size

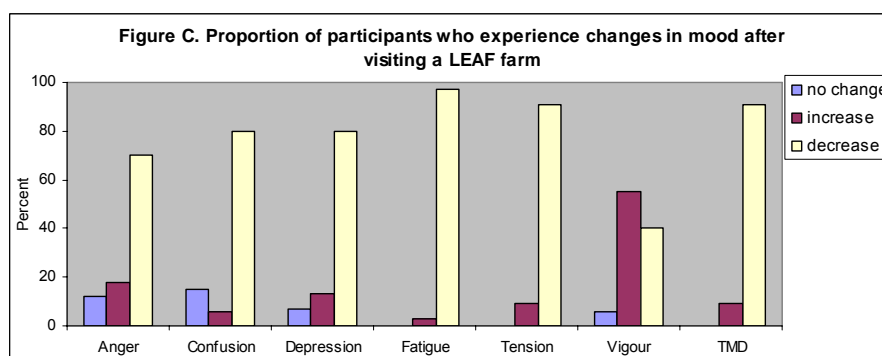
changes in health parameters to be evaluated. The Profile of Mood States results indicated that there were statistically significant² improvements in 5 out of the 6 mood factors. Over 70% of LEAF farm visitors showed a decrease in anger scores; over 80% showed a decrease in confusion; 80% showed a decrease in depression, over 95% showed a decrease in fatigue; over 90% of LEAF farm visitors showed a decrease in tension and over half (55%) showed an increase in vigour; after spending time on the farm.

1.8 The Total Mood Disturbance (TMD) score was then calculated to denote an overall assessment of emotional state. This method is regularly used



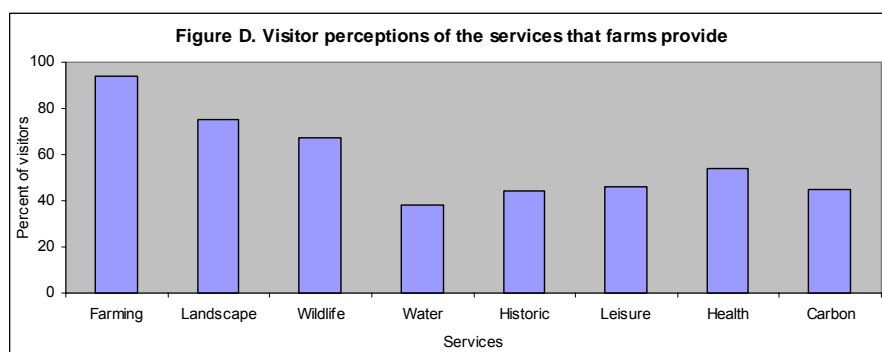
to provide an indicator of overall mood. There was a highly statistically significant decrease in participants' TMD scores ($p < 0.001$) between before ($M = 152.00 \pm 2.53$) and after spending time on the farm [$M = 141.71 \pm 1.82$], $t(57) = 4.50$ ³. The majority of participants (91%) experienced improvements in their overall mood after visiting the farm

1.9 The findings clearly show that spending time on a farm is effective in enhancing mood. Visiting a LEAF farm can significantly reduce feelings of anger,



confusion, depression, tension and fatigue, whilst also making participants feel more active and energetic. In our survey, visitors over 30 and those who are male have significantly raised vigour levels after a farm visit.

1.10 Visitors to the LEAF farms were asked about the services that farms provide and were given a list of 8 services to choose from including: farming services, landscape

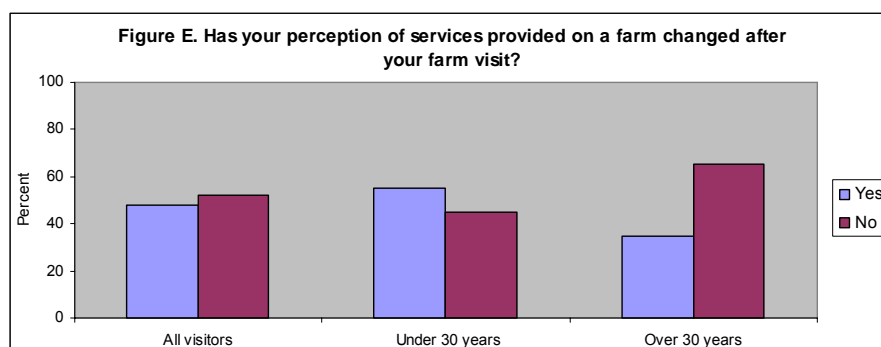


² (range between $p < 0.05$ and $p < 0.001$)

³ The eta squared statistic (0.26) indicated a large effect size.

features, wildlife biodiversity, water services, historic and heritage services, leisure and recreation, health services and carbon storing services. Visitors to the LEAF farms recognised that farms are important for a number of different services, the 3 main ones identified being, services to farming, landscape and wildlife biodiversity.

1.11 Many visitors (particularly those under 30), had changed their perceptions of farming after spending time on the farm and when asked in what way their



perceptions had changed, responses were varied but followed 2 main themes: benefits to wildlife from farming; and a raised awareness of food production, both in terms of animal welfare and the complexity of the farming system.

1.12 Some quotes from visitors concerning changes in perception of farming:

“The way the farm is working with wildlife”

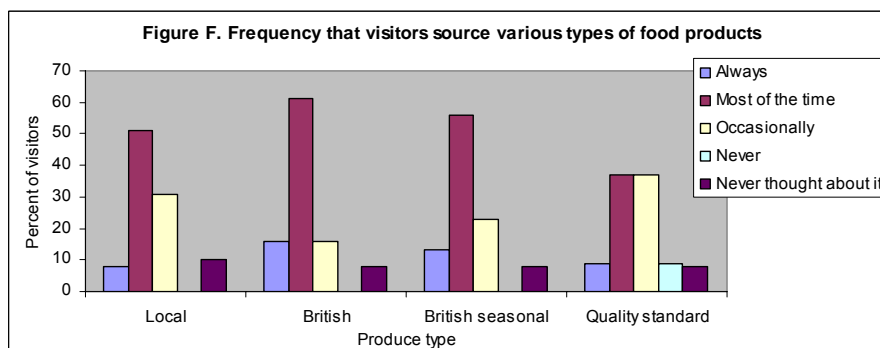
“Animals are not just for petting - there's more to it”

“Learnt about different crops in depth, different plants and activities”

“It will make me buy British, or at least look for local produce”

“I hadn't really thought about positive nature conservation by farmers”

1.13 Farm visitors were asked whether or not they purchased food from particular sources or with particular standards, such as produce that



is local, British, British and seasonal and food produced to high animal welfare and environmental standards (e.g. quality assurance, LEAF, Freedom Foods, Soil Association etc). The majority of visitors to the LEAF farms purchase food from all of these categories, but before the farm visit, the most popular and frequently bought types of produce were British seasonal and British produce. After having spent time on a LEAF farm, the majority of visitors said they were more likely to buy food from all four categories in future, particularly food produced to high animal welfare and environmental standards. This was especially the case where visitors to the farm were able to see and learn about livestock husbandry.

1.14 Farm visitors were also asked to tell us in their own words what they enjoyed most about their visit to LEAF farms and whether there was anything else that they would have liked to see or hear about on the farm visit. Responses were rich and varied but in terms of what visitors enjoyed most there were four emergent themes: i) the scenery and fresh air, ii) the farm walk, iii) contact with farm animals and iv) the tractor ride.

1.15 Some quotes from visitors to LEAF farms about what they enjoyed most:

"A good walk through the fields"

"The fresh air"

"Watching a lamb being born"

"I found it very informative, farming is more than just animals!"

"Time to reflect on what a farm actually does - importance of farms and of wildlife"

"Enjoying the conversations with the staff and discussing farming ways of life and culture"

"Seeing my son enjoy himself feeding orphaned lambs"

1.16 When asked whether there was anything else that could have been added to the visit to make it more enjoyable, the majority (65%) said 'no'. Some visitors who didn't see animals would have liked to, others just wanted better weather.

1.17 Spending time on a LEAF farm has been shown to increase connectedness to nature, which has been shown to be a precursor to increases in: subjective well-being, awareness of environmental issues and in environmentally friendly behaviour. The farm visit also resulted in visitors feeling better and experiencing enhanced mood. In addition spending time on the LEAF farm changed visitor perceptions of farming, with an increased understanding of the services that farms provide. LEAF farms represent an example of multifunctional agriculture and offer a way to recognise the variety of different public goods and services our farms provide rather than simply focusing on food production. Farm visitors also told us that their food shopping habits are likely to change as a result of visiting farms, with visitors becoming more likely to buy British and food produced to high environmental and animal welfare standards.

2. Background and Context for Research

2.1 About LEAF⁴

LEAF is “committed to a viable agriculture which is environmentally and socially acceptable and ensures the continuity of supply of wholesome, affordable food while conserving and enhancing the fabric and wildlife of the countryside for future generations”⁵.

Linking Environment And Farming (LEAF) was set up in 1991, when for the first time a group of farmers, environmentalists, food and agricultural organisations consumers, government and academics got together to do something positive for the farming industry. Motivated by a common concern for the future of farming and a keenness to develop a system of farming which was realistic and achievable for the majority of farmers, LEAF was established to develop and promote Integrated Farm Management.

LEAF demonstrates IFM principles through a nationwide network of volunteer Demonstration Farms carrying out IFM and showing other farmers how to adopt it, thus providing living and working examples of how Integrated Farming can produce affordable food in harmony with the environment.

2.2 Context for the research

Open Farm Sunday (OFS), which is organized by LEAF, has become the farming industry’s annual open day in June, where hundreds of farmers and landowners open their farms to the public. OFS is seen as an opportunity for people of all ages to don their wellies, go to their nearest LEAF farm and find out more about what farmers do, why they do it and why farms matter, whilst at the same time enjoying the countryside and often having the chance to taste produce from the farm as well⁶.

Each year there is a different theme for Open Farm Sunday and for 2008 the theme is “*Feed your Senses*”, where the emphasis is on highlighting the fact that farming not only provides our food but also many more public services, such as landscape features, wildlife biodiversity, flood protection, carbon sequestration and also health and well-being services.

As part of this ‘feed your senses’ theme, LEAF commissioned the University of Essex to carry out a study to examine public perceptions of the services that farms provide; visitors’ food shopping habits; and visitors’ mental health and well-being and whether these change after visiting a LEAF farm.

2.3 Aims of the study

The aims of the study carried out by the University of Essex are to:

- Carry out a snapshot analysis on selected LEAF farms to provide further data on psychological health and well-being effects derived from visiting LEAF farms.
- ascertain visitor perceptions of the multiple services provided on LEAF farms (multifunctionality)

⁴ Material for this section from LEAF website 2008

⁵ LEAF Mission statement

⁶ OFS website

- gather information on visitor food shopping habits
- discover what visitors enjoy about visiting a LEAF farm

3. Multifunctionality in Agriculture – multiple services from farms

In recent years, there has been a substantial shift towards recognising that any area of land can provide many *different* environmental, recreational and health services at the same time and so therefore is multifunctional. LEAF has been promoting the importance of farming in harmony with the environment for many years and has become increasingly aware of the multiple services provided by farms (otherwise known as multifunctionality in agriculture).

In the UK, the concept of a multifunctional landscape very much fits in with the principle that land should be managed for sustainable development. Sustainable development acknowledges that the natural environment is essential to a healthy society. In the UK a set of shared principles that provide a basis for sustainable development policy in the UK have been agreed by the UK Government, Scottish Executive, Welsh Assembly Government and the Northern Ireland Administration⁷.

In addition to the Government's general principles of sustainable development, the remit of Natural England directly supports the concept of multifunctionality of land. The general purpose of 'Natural England' is described in the Natural Environment and Rural Communities Act 2006⁸ as *"to ensure that the natural environment is conserved, enhanced and managed for the benefit of present and future generations, thereby contributing to sustainable development"*. Natural England aims to provide an integrated approach to sustainable land management, conserving the natural environment and aims to address multifunctionality of the land. The special focus for Natural England is on activities that contribute to environmental services, in particular conservation of biodiversity and also more recently on the health benefits of nature⁹.

Other land management organisations such as the National Trust have also recognised that land provides a range of environmental services, including clean water, protection from flooding, carbon storage and green spaces for public health, although consider that these services are not yet properly valued or provided for¹⁰. The National Trust has recommended that land needs to be better managed to meet the competing demands for food production, wildlife conservation and access to open spaces and that more land will need to have multiple functions in the future¹¹.

The multifunctional character of land has been particularly realised by many in the agricultural sector (including LEAF). Although the core aim for agriculture remains the production of food, fibre, oil and other primary products, it also provides other important benefits to society and the environment. These include landscape and aesthetics, recreation and amenity, water accumulation and supply, nutrient recycling and fixation, wildlife habitats, storm protection and flood control as well as carbon sequestration¹². These public services gained from land have been the focus of the recent Millennium Ecosystem Assessment¹³ and Defra. In a recent report Defra recognised the need for valuing multiple ecosystem services, both those that are well known, such as: food, fibre and fuel provision and cultural services (e.g. recreation and appreciation of nature); and those that are less well-recognised such as: climate regulation, flood protection, soil formation and nutrient cycling¹⁴.

⁷ <http://www.sustainable-development.gov.uk/what/what.htm>

⁸ OPSI 2006

⁹ Natural England 2007a, b

¹⁰ National Trust 2008a

¹¹ National Trust 2008, Hine et al 2007

¹² Pretty et al 2000, Tegtmeier and Duffy 2004

¹³ Millennium Ecosystem Assessment. 2005

¹⁴ Defra 2007a

In the past the focus has been on the negative side effects of agriculture: water pollution (from pesticides, fertilisers and soil, from farm waste, *Cryptosporidium* from livestock etc); the loss of landscape (hedgerows, picture postcard fields) and biodiversity (wildlife, farmland birds etc.); the spread of food-borne diseases (salmonella, BSE etc.) and gaseous emissions (methane from livestock). However, the concept of multifunctionality in agriculture switches the focus onto the positive side effects of farming.

This was backed up by the Curry Commission, which recommended that subsidy payments under the Common Agricultural Policy (CAP) should be decoupled from production. This establishes the principle that agriculture and land management also have many positive side-effects, contributing to public goods such as biodiversity, landscape aesthetics, water quality, carbon sequestration and so on¹⁵

The multifunctional nature of the services provided therefore gives a multifunctional value for the land. From a review of the current literature and previous work on the multifunctionality of land carried out by the University of Essex¹⁶, 8 key services produced by the land have been identified (as highlighted in Table 1).

Table 1. Key services produced by the land

Service type	Issues
1. Farming services	Food, fibre, oil and other primary produce from farms and from other land management (e.g. forestry)
2. Biodiversity	Wildlife in fields, on farms and in non-farmed habitats and ecosystems
3. Historic and heritage	Presence of scheduled monuments (sites and buildings of archaeological and historic importance)
4. Water services	i. Flood protection through rain water absorption and coastal management of sea. ii. Water retention by land into rivers and aquifers
5. Climate change mitigation	i. Carbon sequestered into organic matter in soils or above ground biomass. ii. Carbon saved by reductions in fossil fuel use iii. Carbon saved by biomass-based renewable energy production to avoid carbon emissions iv. Effects of vegetation in reducing air pollution v. Effects of greenspaces on microclimate
6. Landscape character	The unique natural and man-made features of a particular regional landscape, e.g. stone walls, sunken lanes, hedgerows, water meadows, farm buildings etc.
7. Leisure and recreation services	Activities undertaken by the public in rural areas, such as walking, cycling, fishing, boating, horse-riding
8. Health services	The mental and physical health benefits to individuals arising from exposure to green places and engaging in physical activity.

Source: Hine et al 2007

¹⁵ Dobbs and Pretty 2004

¹⁶ Pretty et al 2000. Dobbs and Pretty 2004 and Pretty et al 2008, Hine et al 2007

3.1 Farming services

Agricultural land in the UK has been predominantly valued for the farming services that it provides, with the principle focus on food production. However changes in the Common Agricultural Policy go some way to show that farming is now slowly being recognised as multifunctional, with potential for providing important services such as biodiversity, landscape conservation and mitigating climate change for example.

It is generally accepted then that many that farmers and other land managers should be paid for the public services they produce¹⁷ and this is supported by the new combination of agri-environmental schemes in England. The story for agriculture in the UK is that there appears to be good prospects for further enhancing agriculture's multifunctionality in a coordinated way that builds on past experiences¹⁸.

3.2 Wildlife biodiversity

Biodiversity is the term used to describe the biological diversity of an area, the variety of life and the natural processes of which all living things are a part¹⁹. That is, wildlife in fields, on farms and in non-farmed habitats and ecosystems. There is much to be gained from conserving biodiversity as we depend upon plants and animal species for food, medicines and raw materials.

Defra has also recognised the many ecological services provided by key habitats in its report "*Valuing the Benefits of Biodiversity*" which highlights services that include those to water (flood prevention and control and water quality), climate change mitigation (the filtration of air pollution and carbon sequestration), leisure and recreation, physical health and mental well-being and historical significance²⁰. In addition, while Natural England's remit is to address the multifunctionality of the land, with a special focus on activities that contribute to environmental services, a particular interest is in the conservation of biodiversity²¹.

3.3 History and heritage

The abundance of scheduled monuments (sites and buildings of archaeological and historic importance) in rural areas shows that the UK countryside is also important for its history and heritage. The rural areas are the landscapes that have inspired our poets and artists past and present and the countryside features on our postcards, calendars and tourist boards²².

3.4 Water services

Land provides water services in two key ways: i) Flood protection through rain water absorption and coastal management of sea and ii) Water retention by land into rivers and aquifers. Vegetation can reduce run-off and increase rainfall capture which can reduce the risk of flooding in low-lying areas and can recharge both groundwater aquifers and the moisture content of soils²³. Areas of farmland often vary widely in their capability to provide flood protection and water storage.

¹⁷ Sutherland 2004

¹⁸ Dobbs and Pretty, 2004

¹⁹ UNEP 2006

²⁰ Defra 2007b

²¹ Natural England 2007

²² Sutherland 2004

²³ Hough 1995, Tibbatts 2003

3.5 Landscape character

Agricultural practices have historically shaped the character of landscapes all over the UK. The unique natural and man-made features of a particular regional landscape such as stone walls, sunken lanes, hedgerows, water meadows, farm buildings etc are a direct result of farmers managing the countryside. The UK has been modified in this way for so long that farmland is considered to *be* the countryside²⁴. Recent changes in agri-environment policy with the new Environmental Stewardship scheme means that measures that subsidise the conservation of particular landscape features are now included, thus a step in the right direction to recognise, maintain and enhance landscape quality and character.

3.6 Carbon sequestration

The countryside agricultural land can provide climate change mitigation services depending on land management practices. Climate change mitigation can be achieved through the following mechanisms: i) Carbon sequestered into organic matter in soils or above ground biomass, ii) Carbon saved by reductions in fossil fuel use, iii) Carbon saved by biomass-based renewable energy production to avoid carbon emissions, iv) air pollution reduced by presence of vegetation and v) microclimate changes due to presence of greenspaces.

Carbon sequestration is defined as the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere²⁵. Agricultural management practices can contribute to carbon emissions through several mechanisms including: i) the direct use of fossil fuels in land management operations; ii) the indirect use of embodied energy in inputs that are energy-intensive to manufacture (particularly fertilizers); iii) the cultivation of soils resulting in the loss of soil organic matter. Conversely, land management and farming practices can also act as accumulators or sequesters of carbon by: sequestering carbon into organic matter in soils or above ground biomass; saving carbon by reductions in fossil fuel use; and saving carbon by biomass-based renewable energy production. Farming and land management practices therefore offset losses when organic matter is accumulated in the soil; where carbon is stored in woodland as a permanent sink; or where crops are used as an energy source that substitutes for fossil fuels.

3.7 Leisure and recreation services

The UK countryside is important for leisure and recreation service provision for the population. Some 1.2 billion day visits were made to the countryside in 2002/3²⁶ and 0.77 billion visits to the countryside and seaside coasts in 2005²⁷. The total value of the countryside in terms of expenditure on leisure trips in 2005 has been calculated by Natural England as £11.4 billion.

National Parks, Country Parks, Wildlife Reserves, grasslands, woodlands, hills and valleys alike all over the UK provide beautiful and accessible arenas for recreation and are valued for this service. Farms and farming landscapes are increasingly being seen as providing a leisure and recreation services as well, and organisations such as LEAF regularly promote spending time on farms for enjoyment and education, through schemes such as OFS.

²⁴ Sutherland 2004

²⁵ FAO 2000

²⁶ Countryside Agency 2004

²⁷ Natural England 2007c

3.8 Health services

There is a growing body of evidence on the positive relationship between exposure to nature (incorporating a variety of outdoor settings, from the open countryside, fields and forests, to street trees, allotments and gardens) and an individual's health²⁸. The key message emerging is that contact with nature improves psychological health by reducing pre-existing stress levels, enhancing mood, offering both a 'restorative environment' and a protective effect from future stresses²⁹.

In addition, recent studies have found that 'green exercise' (the *synergistic* benefits of engaging in physical activities whilst simultaneously being directly exposed to nature) results in significant improvements in self-esteem and mood measures, as well as leading to significant reductions in blood pressure³⁰. Recent research also suggests that therapeutic applications of various green exercise activities and other nature based approaches, such as therapeutic horticulture³¹, ecotherapy³² and care farming³³ effectively promote health and well-being. Collectively such nature-based approaches have been termed 'green care' – see Box 1 for more information on 'care farming' and green care.

The health services provided by our countryside and our farmland are often overlooked. Contact with nature by visiting farmland and the associated health benefits this brings, is another service that agriculture can provide, and therefore represents another aspect of multifunctionality.

Box 1. Care Farming

Care farming (also referred to as 'farming for health', 'social farming' or 'green care in agriculture'), is defined as *"the use of commercial farms and agricultural landscapes as a base for promoting mental and physical health, through normal farming activity"*³⁴. It aims to provide health, social or educational benefits through farming activities for a wide range of people. These may include those with defined medical or social needs (e.g. psychiatric patients, those suffering from mild to moderate depression, people with learning disabilities, those with a drug history, disaffected youth or elderly people) as well as those suffering from the effects of work-related stress or ill-health arising from obesity. Care farming represents a partnership between farmers, health and social care providers and participants. Although care farming is a well-established movement in many European countries such as the Netherlands and Norway³⁵, it is a relatively recent development in the UK. The care farming movement is however gaining popularity in the UK and several LEAF farms are also care farms.

Green care thus extends the notion of multifunctionality of the countryside and farming, whereby farmers under the recent policy reform will no longer receive public payments for food production, but are able to receive financial support for the provision of a range of environmental and social goods and services. There is great potential for the use of farms (as well as forests, canals, and nature reserves), to provide programmes of green care, which could bring greater connections between people and the land (both farmed and non-farmed), and thus greater understanding of the environment. Green care could link policy priorities for farming, conservation, countryside and health agencies, and help create healthy places for the general public.

²⁸ Pretty *et al.*, 2003, 2005a, 2005b, 2007; Peacock *et al.*, 2007, Mind 2007, Bird 2007, Burls 2007

²⁹ Kaplan and Kaplan 1989, Kaplan 1995, Hartig *et al.*, 1991, 2003, Louv 2005

³⁰ Pretty *et al.*, 2005b, 2007, Peacock *et al.*, 2007, Hine *et al.*, 2008a

³¹ Sempik *et al.*, 2003

³² Peacock *et al.*, 2007, Mind 2007

³³ Hine *et al.*, 2008

³⁴ Hassink 2003, Braastad 2005, NCFI (UK) 2008

³⁵ Hassink *et al.*, 2006

4. Methodology

An analysis of some of the mental health and well-being benefits to visitors derived from spending time on a LEAF farm was conducted in April 2008. Visitors from a selection of LEAF farms around the UK took part in a survey to provide some empirical data addressing psychological health and well-being effects, information on visitor perceptions of farm multifunctionality, food sourcing habits and qualitative responses.

A mixed method design incorporating both quantitative data and qualitative narrative was used to collect data using a composite questionnaire. The questionnaires were administered immediately before and immediately after participants spent time on the LEAF farms, to enable comparisons to be made and to allow identification of any changes in health parameters as a direct result of exposure to the farm environment.

Health

The questionnaires included internationally recognised, standardised tools which measured participants' mood, a connectedness to nature scale, visitor perceptions of multifunctionality and information on food sourcing. Qualitative questions were also asked for detailed narrative and more information on farm activities. Participants were asked to complete the questionnaires individually and not to compare or discuss their answers with other visitors.

The standardised tool incorporated to determine changes in psychological states derived from time spent on a LEAF farm, measured mood. Questions were answered according to how the participant felt at *that particular moment in time*. Mood change was measured the Profile of Mood State questionnaire (POMS)³⁶. This is a short form one-page version of the POMS test which has a background of successful use for mood change post-exercise. The POMS subscales measured were anger, confusion, depression, fatigue, tension and vigour. In addition, a Total Mood Disturbance (TMD) score was calculated to denote an overall assessment of emotional state. This method is regularly used as it provides an indicator of overall mood³⁷. POMS is not suitable for completion by children.

Connectedness to nature

A measure for connectedness to nature was also included in the composite questionnaire. This measure is based on the standardised and validated Connectedness to Nature Scale (CNS)³⁸, which is a '*new measure of individuals' trait levels of feeling emotionally connected to the natural world*'. Connection to nature is considered to be an important predictor of ecological behaviour and subjective well-being. Connectedness to nature has also been shown to be related to an increase in both awareness of environmental issues and in environmentally friendly behaviour³⁹. A simplified version of the CNS, adapted (but not validated) by the University of Essex was used in this context to assess whether visiting a LEAF farm and being exposed to nature increases an individual's sense of feeling connected to nature.

Multifunctionality of farms

In order to measure the perception of different services provided on farms, a question was included that referred to the 8 services of land as outlined in section 3.

Food sourcing habits

To allow some continuity from questions asked at previous OFS events on public knowledge of food production and food sourcing habits a question on food sourcing habits was also added to the 'Feed your Senses' questionnaire.

³⁶ McNair *et al* 1984

³⁷ McNair *et al*. 1992, p.6

³⁸ Mayer and Frantz 2004

³⁹ Hine *et al* 2008

5. Results

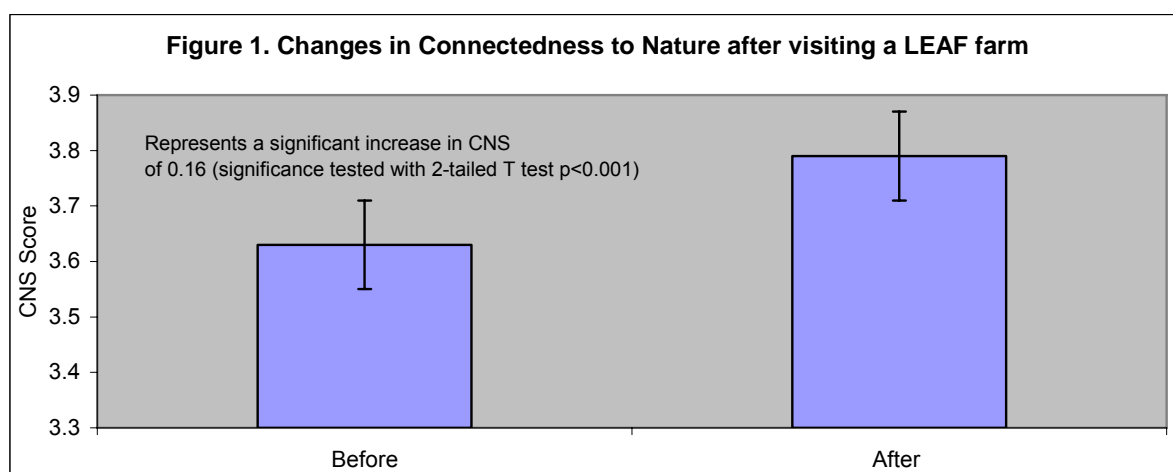
5.1 General

The study took place in April 2008 and a total of 71 visitors from 3 different LEAF farm visits, took part in this research by completing the composite questionnaire. Of the 71 visitors who took place in the study, 80% were female and 20% were male and ages ranged from the youngest of 18 years and the eldest at 84 years. The average age of LEAF farm visitors was 35 years.

5.2 Connectedness to nature

An adapted form of the connectedness to nature scale was used in this study to assess whether visiting a LEAF farm and being exposed to nature increases an individual's sense of feeling connected to nature. The maximum possible score on this scale, which indicates the most connectedness to nature, is 5 and the lowest possible score, depicting the least connectedness to nature is 1.

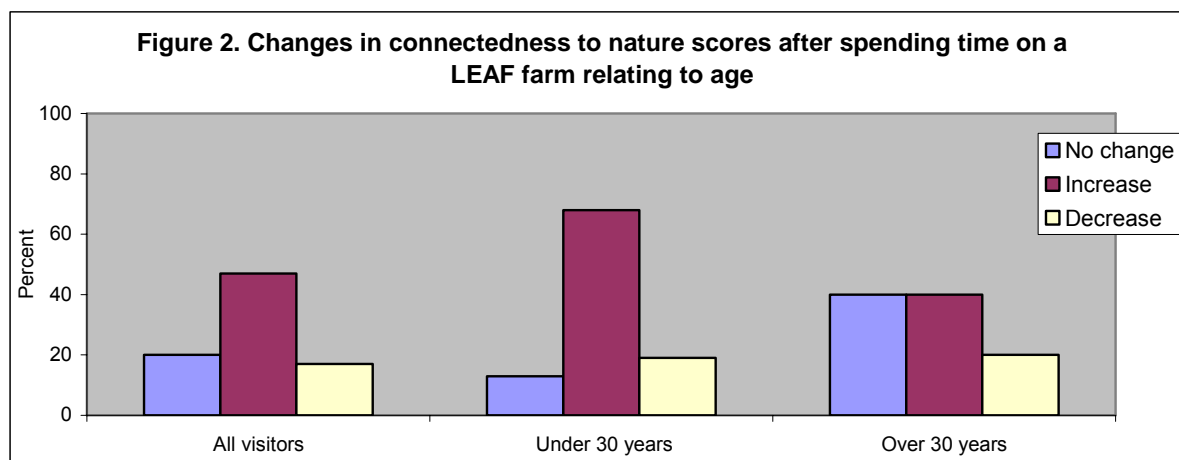
In the survey the highest connectedness to nature score was 4.71 and the lowest was 2.00. The mean connectedness to nature score of visitors at the start of the visit was 3.65 and after the visit of 3.80 which implies an increase in connectedness to nature after visiting a LEAF farm. To test whether this change was statistically significant or merely a coincidence, a paired-samples t-test was conducted. There was a highly statistically significant increase in connectedness to nature scores ($p < .001$) between time one (before the visit) ($M = 3.63 \pm .07$) and time 2 (after the visit) ($M = 3.78 \pm .06$, $t(58) = 3.42$)⁴⁰ - see Figure 1.



Over half of the visitors to the LEAF farms saw an increase in their connectedness to nature scores after spending time on the farm. However, there were variations depending on the age of the farm visitor. More noticeable increases in connectedness to nature scores were observed in younger visitors, those who were under 30 years of age (from a mean score of 3.54 before to a mean score of 3.75 afterwards), when compared to older visitors, the over 30s (mean score of 3.72 before to mean score of 3.84 afterwards). On the other hand, the over 30s age group had higher connectedness to nature to start with, before the farm visit,

⁴⁰ The eta squared statistic (.17) indicated a large effect size

than the younger visitors. The proportion of visitors who saw changes in their connectedness to nature scores is shown in Figure 2.



To summarise, visitors to LEAF farms experienced increased feelings of connection to nature after spending time on the farm. Participants under 30 saw a more pronounced increase compared to those who were over 30, although older visitors were generally more connected to nature to begin with.

5.3 Health and well-being

Visitors completed the Profile of Mood States (POMS) questionnaire both immediately before and immediately after spending time on the LEAF farm, to enable any changes to be evaluated.

Anger

Anger scores of visitors to LEAF farms varied from the lowest possible score of 37 up to a score of 47. The mean score before the farm visit was 38.5 and the mean score after the visit was 37.6, showing a decrease in participants' feelings of anger after spending time on the farm. To see if these changes were statistically significant or a chance phenomenon, a paired sample t-test was conducted. There was a very statistically significant decrease in anger scores ($p < .01$) between time one (before the visit) ($M = 33.37 \pm .29$) and time 2 (after the visit) ($M = 37.68 \pm .21$, $t(58) = 2.61$)⁴¹ - see Figure 3.

Over 70% of LEAF farm visitors showed a decrease in anger scores after spending time on the farm (Figure 4).

Confusion

Confusion scores of visitors to LEAF farms varied from the lowest possible score of 30 up to a score of 50. The mean score before the farm visit was 37.98 and the mean score after the visit was 34.9, showing a decrease in participants' confusion levels after spending time on the farm. To see if these changes were statistically significant or down to coincidence, a paired sample t-test was conducted. There was a highly statistically significant decrease in

⁴¹ The eta squared statistic (.11) indicated a moderate effect size

confusion scores ($p < .001$) between time one (before the visit) ($M = 37.98 \pm .59$) and time 2 (after the visit) ($M = 34.90 \pm .41$, $t(58) = 5.62$)⁴² - see Figure 3.

Over 80% of LEAF farm visitors showed a decrease in confusion scores after spending time on the farm (Figure 4).

Depression

Depression scores of visitors to LEAF farms varied from the lowest possible score of 37 up to a score of 50. The mean score before the farm visit was 38.25 and the mean score after the visit was 37.46, showing a decrease in participants' feelings of depression after spending time on the farm. To see if these changes were statistically significant or a chance phenomenon, a paired sample t-test was conducted. There was a very statistically significant decrease in depression scores ($p < .01$) between time one (before the visit) ($M = 38.05 \pm .32$) and time 2 (after the visit) ($M = 37.46 \pm .16$, $t(58) = 2.62$)⁴³ - see Figure 3.

The majority (80%) of LEAF farm visitors showed a decrease in depression scores after spending time on the farm (Figure 4).

Fatigue

Fatigue scores of visitors to LEAF farms varied from the lowest possible score of 34 up to a score of 57. The mean score before the farm visit was 40.43 and the mean score after the visit was 37.80, showing a decrease in participants' feelings of fatigue after spending time on the farm. To see if these changes were statistically significant or simply coincidence, a paired sample t-test was conducted. There was a highly statistically significant decrease in fatigue scores ($p < .001$) between time one (before the visit) ($M = 40.56 \pm .84$) and time 2 (after the visit) ($M = 37.80 \pm .69$, $t(58) = 3.37$)⁴⁴ - see Figure 3.

Over 95% of LEAF farm visitors showed a decrease in fatigue scores after spending time on the farm (Figure 4).

Tension

Tension scores of visitors to LEAF farms varied from the lowest possible score of 31 up to a score of 48. The mean score before the farm visit was 34.49 and the mean score after the visit was 32.02, showing a decrease in participants' tension levels after spending time on the farm. To see if these changes were statistically significant or a chance phenomenon, a paired sample t-test was again conducted. There was a highly statistically significant decrease in tension scores ($p < .001$) between time one (before the visit) ($M = 34.41 \pm .51$) and time 2 (after the visit) ($M = 32.02 \pm .32$, $t(58) = 4.70$)⁴⁵ - see Figure 3.

Over 90% of LEAF farm visitors showed a decrease in tension scores after spending time on the farm (Figure 4).

Vigour

Vigour scores of visitors to LEAF farms varied from the lowest possible score of 26 up to a score of 64. The mean score before the farm visit was 37.72 and the mean score after the visit was 38.08, showing an increase in participants' vigour levels after spending time on the farm. To see if these changes were statistically significant or down to coincidence, a paired

⁴² The eta squared statistic (.35) indicated a large effect size

⁴³ The eta squared statistic (.11) indicated a moderate effect size

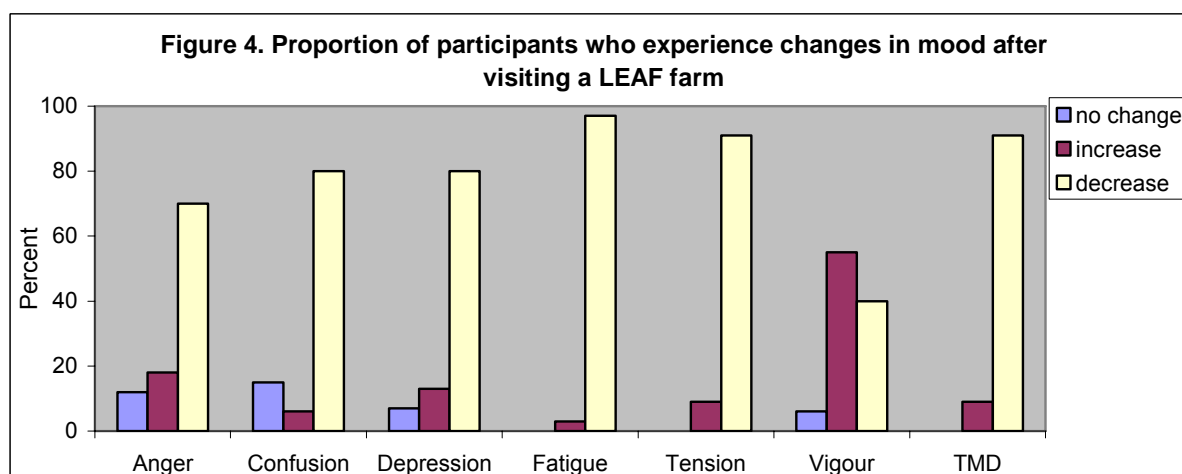
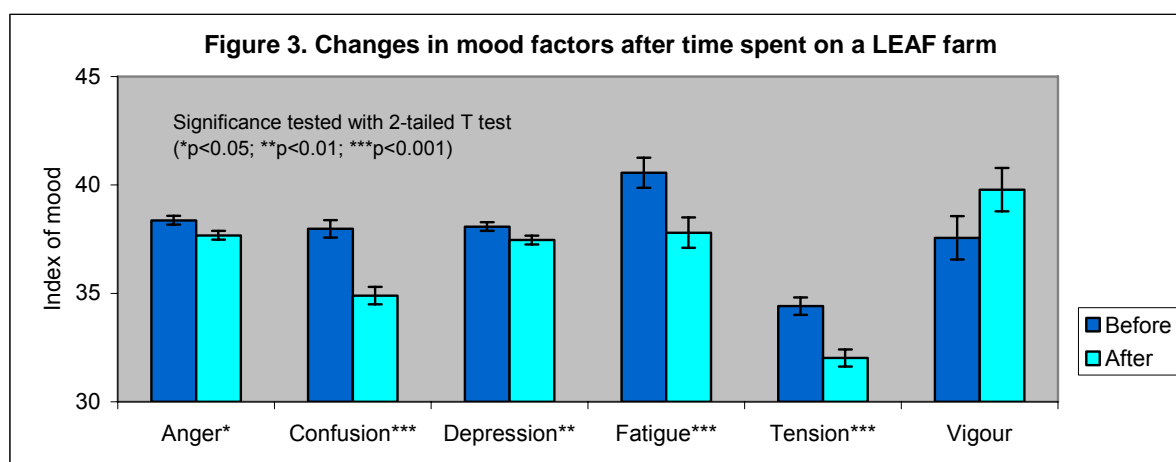
⁴⁴ The eta squared statistic (.16) indicated a large effect size

⁴⁵ The eta squared statistic (.28) indicated a large effect size

sample t-test was conducted. Although the mean scores showed an increase in vigour scores on the whole after participants spent time on the farm, the increase was not found to be statistically significant.

Over half (55%) of LEAF farm visitors showed an increase in vigour scores after spending time on the farm (Figure 4).

Figure 3 highlights the improvements in all 6 mood factors and Figure 4 shows the percentage of participants who showed improvement in the different mood states.

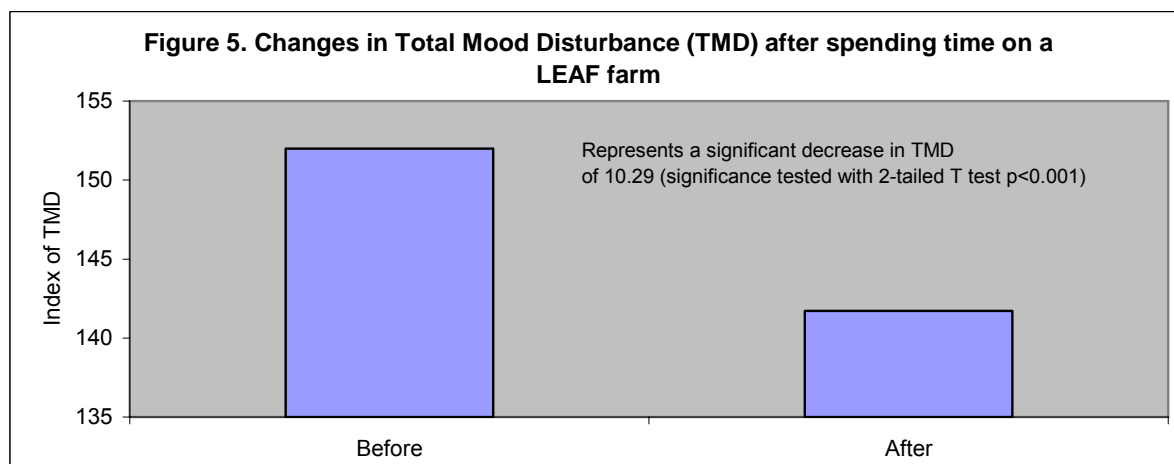


Total Mood Disturbance

A Total Mood Disturbance (TMD) score was calculated to denote an overall assessment of emotional state. This method is regularly used as it provides an indicator of overall mood. TMD scores of visitors to LEAF farms varied from the highest score of 217 down to a score of 115. The mean score before the farm visit was 151.91 and the mean score after the visit was 141.71, showing a decrease in participants' TMD scores after spending time on the farm (*Note – the lower the score, the better the overall mood*).

There was a highly statistically significant decrease in participants' TMD scores ($p < 0.001$) between before ($M = 152.00 \pm 2.53$) and after spending time on the farm [$M = 141.71 \pm 1.82$],

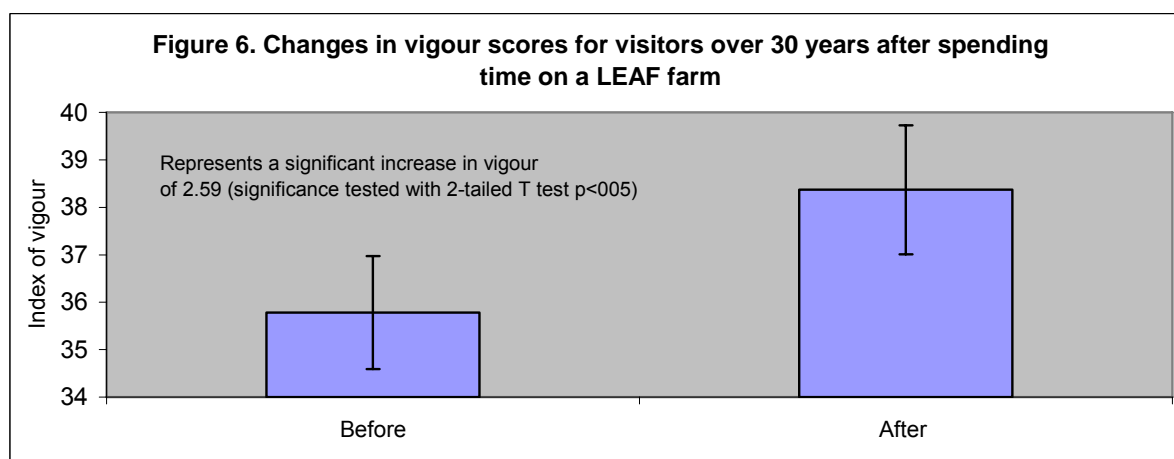
$t(57) = 4.50$ ⁴⁶. The changes in Total Mood Disturbance are shown in Figure 5. The majority of participants (91%) experienced improvements in their overall mood after visiting the farm (Figure 4).



Variations in mood changes by age and gender

On the whole, the changes in mood observed by spending time on the LEAF farm did not show any statistically significant differences when comparing either different age groups or differences between men and women.

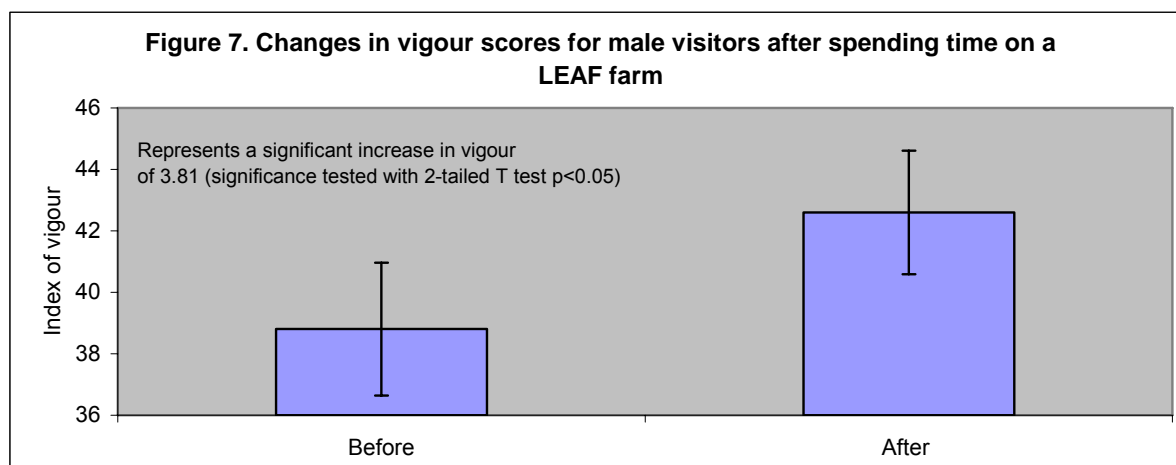
However the exception to this rule was with visitors' energy levels, their feelings of vigour. Although the increases in vigour levels observed as a result of spending time on the LEAF farm were not shown to be statistically significant for the visitor population as a whole, there were some differences by age and gender.



For older visitors to the LEAF farm (those over 30 years of age) the increase in vigour levels was found to be statistically significant when a paired sample t-test was conducted. There was a statistically significant increase in vigour scores for those over 30 ($p < .05$) between time one (before the visit) ($M = 35.78 \pm 1.19$) and time two (after the visit) ($M = 38.37 \pm 1.36$,

⁴⁶ The eta squared statistic (0.26) indicated a large effect size.

$t(30)=2.24$ ⁴⁷ - see Figure 6. Whereas the changes in vigour level for the under 30s were not found to be significant statistically.



Similarly for male visitors, the increase in vigour levels was also found to be statistically significant when compared to female visitors, after a paired sample t-test was conducted. There was a statistically significant increase in vigour scores for men ($p < .05$) between time one (before the visit) ($M=38.80 \pm 2.16$) and time 2 (after the visit) ($M=42.60 \pm 2.01$, $t(10)=2.51$)⁴⁸ - see Figure 7. Whereas the changes in vigour level for the female visitors were not found to be significant statistically.

In summary, the findings clearly show that spending time on a farm is effective in enhancing mood. Visiting a LEAF farm can significantly reduce feelings of anger, confusion, depression, tension and fatigue, whilst also making participants feel more active and energetic. In our survey, visitors over 30 and those who are male have significantly raised vigour levels after a farm visit.

5.4 Visitor perceptions of multifunctionality in agriculture

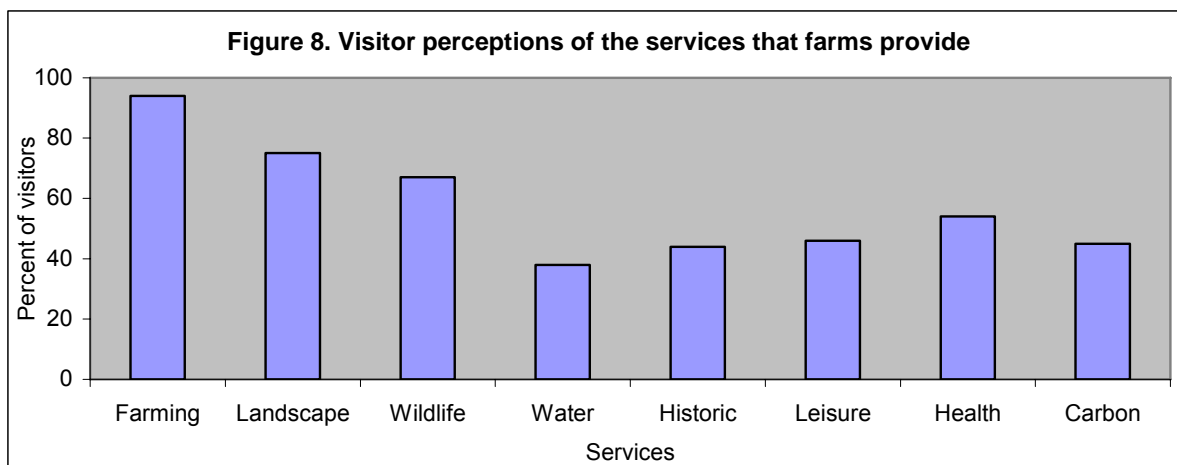
Visitors to the LEAF farms were asked about the services that farms provide and were given a list of 8 services to choose from including: farming services, landscape features, wildlife biodiversity, water services, historic and heritage services, leisure and recreation, health services and carbon storing services.

Which services?

Understandably 94% of visitors acknowledged that farms are important for farming services, whilst 75% recognised that farms are important for landscape features and 67% acknowledged that farms are important for wildlife biodiversity. Water services featured the least in our public perceptions of farm services with only 38% of visitors highlighting this service. More details are shown in Figure 8. The results however are encouraging as visitors to the farms recognise that farming provides not only our food, but other valuable services in addition.

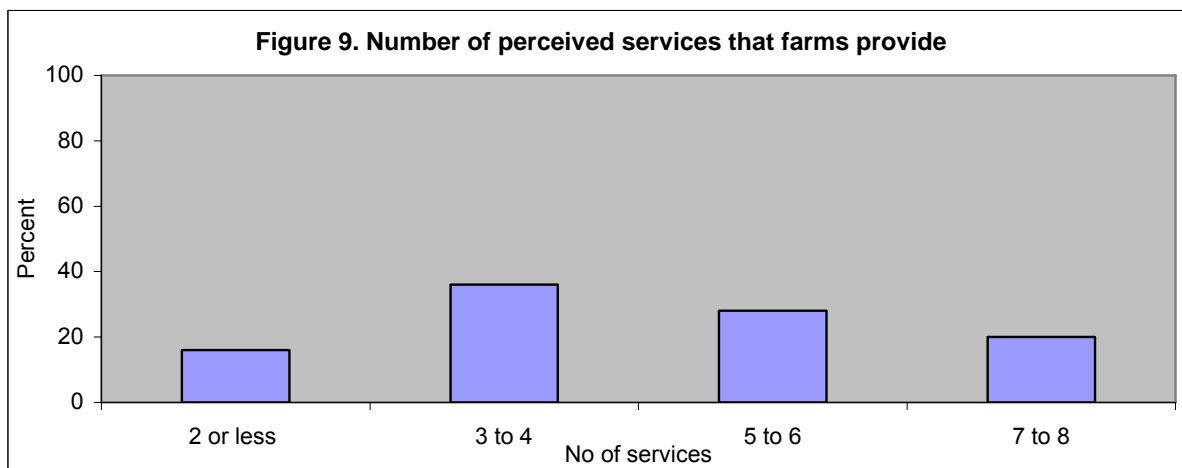
⁴⁷ The eta squared statistic (0.15) indicated a large effect size

⁴⁸ The eta squared statistic (0.41) indicated a large effect size



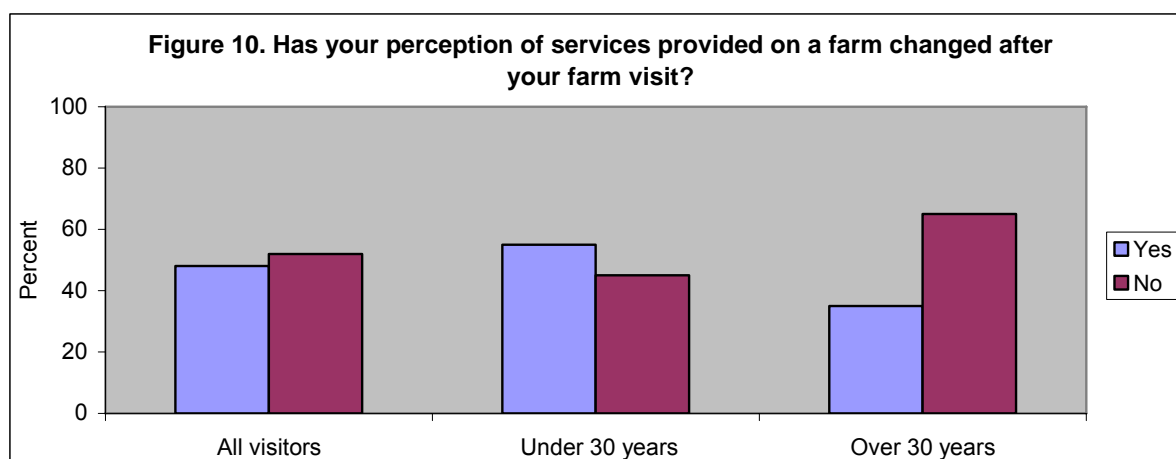
Number of services

The majority of participants (64%) identified that farms are important for between 3 and 6 of the 8 services as shown in detail in Figure 9.



Changes in perception

After the farm visit, participants in the study were asked if their perceptions of the services that farms provide had changed in any way. The results were divided with approximately half of visitors responding that their perceptions had remained unchanged and the other half saying that perceptions had changed. However when differences in age were examined, the data illustrated that those visitors under 30 showed more changes in farming services perception than those over 30 (see Figure 10).



When visitors were asked in what way their perceptions had changed after spending time on the LEAF farms, responses were varied but followed 2 main themes: benefits to wildlife from farming; and a raised awareness of food production, both in terms of animal welfare and the complexity of the farming system. Some of the comments from visitors are shown in Box 2.

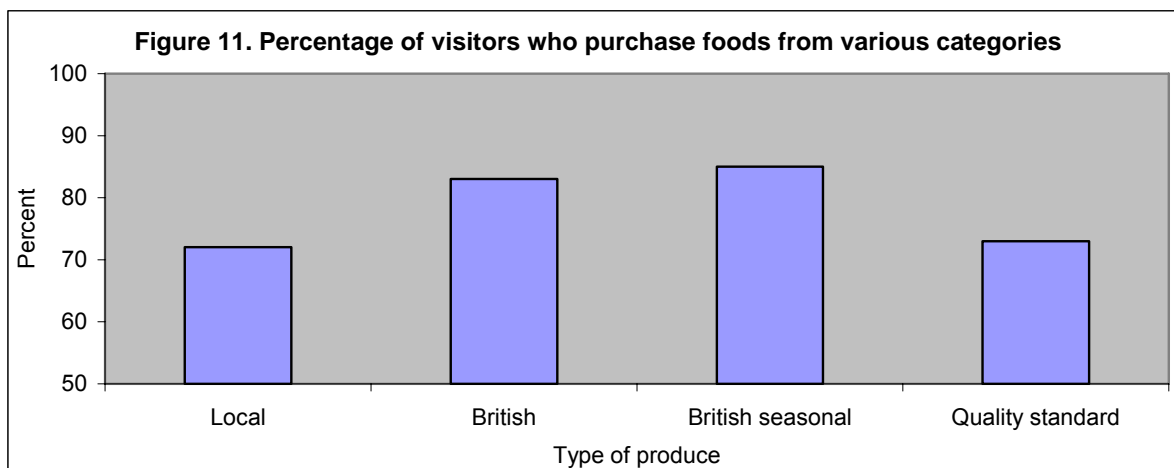
Box 2. Changed views of farming after the LEAF farm visit

- *“The way the farm is working with wildlife”*
- *“Animals are not just for petting - there's more to it”*
- *“Learnt about different crops in depth, different plants and activities”*
- *“Realisation as a 'Townie' how much human outlay as well as monetary”*
- *“Knowing how land is prepared and how food is grown, showing children how to take care of wildlife and future effects”*
- *“I am more likely to buy local lamb back in Staffordshire”*
- *“It's not just about animals”*
- *“It will make me buy British, or at least look for local produce”*
- *“The care of stock and commitment”*
- *“It's about supporting wildlife”*
- *“I hadn't really thought about positive nature conservation by farmers”*

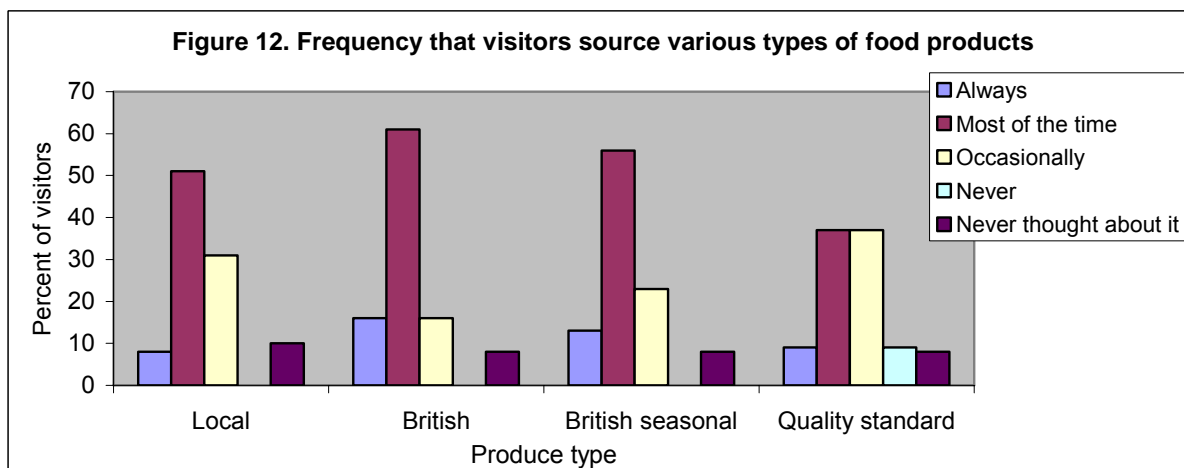
To summarise, visitors to the LEAF farms recognised that farms are important for a number of different services, the 3 main ones identified being, services to farming, landscape and wildlife biodiversity. Many visitors, particularly those under 30, had changed their perceptions of farming after the visit with enhanced awareness of the benefits to wildlife from farming and an increased knowledge of food production.

5.5 Food sourcing

Farm visitors were asked whether or not they purchased food from particular sources or with particular standards, such as produce that is local, British, British and seasonal and food produced to high animal welfare and environmental standards (e.g. quality assurance, LEAF, Freedom Foods, Soil Association etc). The majority (over 70%) of people bought food from all of these categories with British seasonal (85%) and British (83%) being the most popular (see Figure 11).



Visitors were also asked how frequently they purchased food from these particular sources or categories and the categories most frequently bought by participants were British and British seasonal as shown in Figure 12.



After the farm visit, the visitors were asked if having spent time on a LEAF farm, they would change their food sourcing habits and either be more or less likely to buy from the various categories or whether there would be no change at all. Between 52 and 64% of visitors were more likely to buy food from all four categories in future, with the highest change in the ' food produced to high animal welfare and environmental standards' option. The full results are shown in Figure 13.

Where visitors to the farm were able to see and learn about livestock husbandry, then 71% of people said they were more likely to buy food produced to high animal welfare and environmental standards in future as a result of spending time on a LEAF farm.



In summary, the majority of visitors to the LEAF farms purchase food from particular sources or with particular standards, such as produce that is local, British, British and seasonal and food produced to high animal welfare and environmental standards. The most popular and frequently bought categories before the visit were British seasonal and British produce. After having spent time on a LEAF farm, the majority of visitors said they were more likely to buy food from all four categories in future, particularly food produced to high animal welfare and environmental standards. This was especially the case where visitors to the farm were able to see and learn about livestock husbandry.

5.6 Qualitative responses

Farm visitors were also asked to tell us in their own words what they enjoyed most about their visit to LEAF farms and whether there was anything else that they would have liked to see or hear about on the farm visit. Responses were rich and varied but in terms of what visitors enjoyed most there were four emergent themes: i) the scenery and fresh air, ii) the farm walk, iii) contact with farm animals and iv) the tractor ride. Many visitors also commented on how informative and well-organised they found the visit. Further comments from respondents can be seen in Box 3.

Box 3. What visitors enjoyed most about their visit to a LEAF farm

- *“Chance to ask questions and opportunity for possible school links”*
- *“The scenery”*
- *“Tractor ride”*
- *“Bottle feeding the lambs”*
- *“A good walk through the fields”*
- *“Going around the farm”*
- *“The walk, picking up flowers”*
- *“The scenery by the river”*
- *“It was hands on which made it an enjoyable experience”*
- *“There were no cows!”*
- *“The stream, birds and walk”*
- *“Finding different colours in the field”*
- *“Learning about the farm, get to find different activities we can do with children”*
- *“The fresh air”*
- *“Watching a lamb being born”*
- *“Nature is a fun way for children to learn”*
- *“It was fun and I love the open space and the variety”*
- *“I found it very informative, farming is more than just animals!”*
- *“Seeing my son enjoy himself feeding orphaned lambs”*
- *“Time to reflect on what a farm actually does - importance of farms and of wildlife”*
- *“Enjoying the conversations with the staff and discussing farming ways of life and culture”*
- *“Seeing a working farm in action - excellent visit!”*
- *“The interaction between the farmers and seeing exactly what goes on behind the scenes”*
- *“Good promotion on the importance of buying British - supporting local produce. An excellent day –“great preparation for all the family”*
- *“Very interesting meeting John the farmer, and talking about how he uses his land and the changes the land has gone through”*
- *“Learning what a farmer does - different types of machinery “*
- *“Personally - the farm walk despite the weather - it was lovely!”*

When asked whether there was anything else that could have been added to the visit to make it more enjoyable, the majority (65%) said ‘no’. Some visitors who didn’t see animals would have liked to, others just wanted better weather. Other comments are shown in Box 4.

Box 4. Anything else that visitors would like to have seen or heard about on the farm

- *“Livestock - this was an arable farm”*
- *“No, I loved it!”*
- *“Where to buy local lamb on a regular basis”*
- *“Sunshine!!”*
- *“I would have liked to have seen more toilets!!!”*
- *“It would have been nice to include some animals”*

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