
The effect and impact of LEAF Marque in the delivery of more sustainable farming: a study to understand the added value to farmers

A report prepared by the CCRI for LEAF

Research Team: Matt Reed, Nick Lewis and Janet Dwyer

May 2017



The Countryside and Community Research Institute

The University of Gloucestershire

Oxstalls Lane

Gloucester

GL2 9HW

United Kingdom

+44 (0)1242 714122

www.ccri.ac.uk

How to reference this report:

Reed, M., Lewis, N., and Dwyer, J. (2017) "The effect and impact of LEAF Marque in the delivery of more sustainable farming: a study to understand the added value to farmers." The CCRI, Gloucester, England.

Executive Summary

The broad aim of this research is to provide a study on the **impact and added value to farmers when adopting LEAF Marque**. It is based on thirty-seven interviews with LEAF Marque certified businesses, interviewed between December 2016 and February 2017. Twenty-five of these interviewees took part as anonymous contributors, while twelve have also prepared case studies. The evidence in the report is in three sections, an overview analysis based on the questionnaire, an analysis of the narratives regarding the benefits of participation and a collection of case studies. More specifically the report focuses on identifying the **financial, environmental and social benefits that can be attributed to LEAF Marque, and Integrated Farm Management (IFM) farm practices**.

We identify three broad groups of business types within this diversity: family farms, estates and horticultural enterprises. All are engaged in forms of innovation as they re-imagine their businesses to meet the demands of the present, and anticipate future opportunities. This innovation is apparent in novel forms of land tenure; a complex configuration of rented, leased and owned land, often across multiple sites. The development of new product lines, introducing novel fruits and vegetables while improving the qualities of established foods. On-farm the innovation continues with a constant drive to reduce fossil fuel usage, a move to biological control and the generation of energy.

All the participants in the research found value in LEAF Marque, which reached beyond their initial motivations for joining the system, and helped them develop their enterprises. The research participants report that LEAF Marque allows managers of the business to **engage in a critical reflection** on the strategic direction of their activities; this is particularly important where management capacity is limited. The focus on Integrated Farm Management results in **incremental savings**, making operations more efficient and resulting in often significant savings financial for members. As an example, in energy efficiency, 54% of participants who answered the question report making savings, with reported savings of between £10,000 - £17,000 per year. LEAF Marque provides participants with valuable market opportunities; mostly through access to higher value supply chains, 97% of participants reported improved access to market opportunities, with 23% receiving a price premium.

The focus of LEAF Marque on biodiversity and conservation management results in **marked improvements in observed farmland birds, insects and mammals**, often working in synergy with other programmes and schemes. 69% of respondents said that LEAF Marque helped with regulations or accreditation schemes. LEAF Marque, working with other pressures, has changed the emphasis on crop protection towards integrated pest management with a steady reduction in the use of fossil fuels and chemical inputs. Respondents report falls of between 8 - 20% in the use of plant protection products and a rise in the use of biological controls.

The integration of farming operations realises synergies, which can be seen in the management of resistance in weeds, such as blackgrass, and pests by farmers and growers concentrating on biological controls and ecosystem management.

LEAF Marque requirements help to build member's confidence in dealing with other compliance schemes; this can be practical such as in preparing paperwork, or in making members more confident in approaching audits. LEAF Marque provides opportunities for farmers and growers to network with their peers, to exchange relevant expertise and information, as well as opportunities for personal growth. For those who take up these networking opportunities, this is seen as a critical benefit to them and the business. LEAF Open Farm Sunday enables LEAF Marque certified businesses to showcase their activities, establishing and enhancing goodwill and understanding in the local community, which results in practical benefits as well as building pride in the farm team. Empowered by the training around LEAF Marque; members are increasingly representing their businesses and the industry more broadly in a bottom-up effort to control the narrative about food and farming.

Those participating in LEAF Marque report that it offers a systematic way for them to continuously improve the operations of their business, saving them money, improving the environment, giving them new social connections and a wider set of business opportunities. In this combination of benefits, they feel LEAF Marque offers a unique opportunity to develop their businesses whilst contributing to the advancement of wider agricultural industry.

Contents

Executive Summary.....	3
1. Introduction.....	7
2. Aims	8
3. Methods and structure of this report.....	8
4. LEAF Marque and Integrated Farm Management	9
5. Previous research and key areas of benefit	11
6. Business Types	12
7. Reasons for becoming LEAF Marque certified.....	14
8. Questionnaire Overview Analysis	16
8.1 The Scope and scale of businesses.....	16
8.2 Financial Benefits	17
8.3 Organisation and Planning	18
8.4 Soil Management and Fertility	18
8.5 Crop Health and Protection.....	19
8.6 Pollution Control and By-product management	20
8.7 Animal Husbandry	21
8.8 Energy Efficiency	21
8.9 Water Management.....	23
8.10 Landscape and Nature Conservation	23
8.11 Community Engagement.....	24
9. Narrative Analysis	24
9.1 Financial Benefits	25
9.2 Organisation and Planning	25
9.3 Soil Management and Fertility	28
9.4 Crop Health and Protection.....	30
9.5 Pollution Control and By-Product Management.....	34
9.6 Animal Husbandry	35
9.7 Energy Efficiency	36
9.8 Water Management.....	40
9.9 Landscape and Nature Conservation	41
9.10 Community Engagement.....	42
9.10 a. LEAF Open Farm Sunday.....	43
9.10 b. Educational visits.....	45
9.10 c. Representing the industry	46
10. Further Considerations	46
11. Conclusions	48
12. Case Studies	50
A - Barfoots Senegal – Fresh Thinking.....	50
B - Frogmary Green Farm – Food for Thought	54
C - TaylorGrown.....	57
D - A J and C I Snell	60
E - Royalcress SA.....	62
F - Mercer Farming – Packington Freerange	65
G - Ragley Home Farms	69
H - Brixworth Farming	72
I - Intercrop.....	75
J - Overbury Enterprises	78
K - The Leckford Estate.....	81
J – G’s Espana SA	83
13. Appendices	86

13 a. Frequency Tables.....	86
13 b. Questionnaire.....	87

1. Introduction

The report is concerned with the **benefits of LEAF Marque certification**, as observed by those who take part in it. It is about the difference that the system makes to their businesses, and how they take advantage of it to promote the **profitability and broader sustainability of their enterprises**. These are narratives of diversity, different crops, in widely varied climates, with businesses with similar but distinct goals and people who share a professionalism towards agriculture but express that in very different ways. All are united in wanting to produce the highest quality food possible, via the most sustainable methods that is still affordable for consumers. The explanations of the interactions of the LEAF Marque system within these businesses places emphasis on the skill and knowledge required to manage a contemporary agricultural enterprise.

As LEAF Marque certified businesses, the participants are appreciative of the difference it makes to their businesses, to the land they farm, the people they work alongside and the communities of which they are a part. This purpose of this report is to allow these people to explain how and why they think this. Their answers do relate to the importance of making and saving money, but also to the wider ambitions that are fulfilled by agricultural businesses. Within the report are narratives of those who invest enormous amounts of pride, imagination and innovation in supplying food to other people, while trying to improve the farmed environment. Balancing these financial, environmental, personal and social goals so that they become compatible cannot be reflected adequately in numbers, so in this report, we focus on the experience of those whose daily work is trying to find this equilibrium. This is presented in three sections, an overview developed from a questionnaire, an analysis of the explanations about the benefits of the LEAF Marque system and a series of case studies about its impact.

2. Aims

The broad aim of this research is to provide a qualitative study on the impact and added value to farmers (economic, environmental and social) when adopting LEAF Marque.

More specifically the report focuses on:

- Identifying financial benefits that can be attributed to LEAF Marque and Integrated Farm Management (IFM) farm practices;
- Identifying environmental benefits due to LEAF Marque and IFM farm practices;
- Identifying social benefits arising from LEAF Marque and IFM practices;
- Developing specific 'case studies,' that can be used to illustrate these benefits in a meaningful way, within LEAF's wider impact, promotional and campaigning work.

3. Methods and structure of this report

We described the methodology used in this report as 'mixed methods', as it relies on three bodies of data, which relate to one another. The first pool of data is that derived from the questionnaire and is used to create an overview of the impacts, the second is an analysis of the narrative from the participants about those impacts and the third is case studies focused on specific enterprises. Taken together these provide the body of evidence on which the analysis presented here is based.

The sample for this report is both purposeful, it features only those who are LEAF Marque certified, and stratified, there is an element of selection to ensure that different product types feature in the research. All those who took part did so on a voluntary basis, with a clear understanding of the ethics of the study (see below). The data was collected through an interview tool, which guided the discussion, with the interviews taking between 20 – 80 minutes. The interviews are divided into two groups. Twenty-five people consented to a telephone interview, their answers were recorded at the time and collected through an

online questionnaire tool, which facilitated secure storage of their answers as well as providing analytical tools. Twelve people agreed to take part as case studies, and wherever possible these interviews took place face to face, apart from where interviewees were based outside of the UK, or it was not possible to meet in person. In total of thirty-seven people took part in the research. These case studies used the same questionnaire tool to allow for comparability, but answers were in greater depth.

The ethical agreement for these interviews shared a common framework. No quotes in this report are attributed to particular people without their consent; this means that everyone who features in a case study has agreed on the content. LEAF provided the contact details of participants, but they are not aware of what was said by participants. To build a picture of the difference LEAF Marque makes to these businesses those contributing to the report anonymously have simple labels, either they are a 'farmer' or a 'grower', with a number between 1 – 25 and details which might allow their businesses to be identified have been obscured. These precautions are to enable people to speak candidly about their firms in a competitive market situation. While in this report we use the convention of referring to a person acting or receiving a benefit, generally participants are referring to decisions made on behalf of their enterprise or family business.

4. LEAF Marque and Integrated Farm Management

LEAF Marque is an environmental assurance system recognising sustainably farmed products. The LEAF Marque is an industry recognised global system and certification covers the whole farm businesses. It is a higher level environmental standard, and it is a requirement that the producer is a certified full member of an appropriate baseline assurance scheme (e.g. Red Tractor Assurance or GLOBALG.A.P.) for each enterprise on the farm. LEAF Marque is based on LEAF's Integrated Farm Management (IFM) principles. IFM is a whole farm business approach that delivers more sustainable farming using the best of modern technology and traditional methods to deliver prosperous farming that enriches the

environment and engages local communities. The aim of IFM is to stimulate continuous improvement in the businesses and therefore motivate businesses into innovative practices.



Figure 1 - LEAF Integrated Farm Management (IFM)

The LEAF Marque Standard sets out the requirements of LEAF Marque certification. These are based around the nine sections of Integrated Farm Management and cover how farming and growing is conducted, and more broadly how the agriculture is managed on the holding. LEAF Marque certification requires the business to fully comply with all the Essential control points within the LEAF Marque Standard. The LEAF Marque Standard is currently available in four languages: English, Spanish, French and Italian.

LEAF Marque inspections are annual, taking place either alongside other assurance schemes or as a stand-alone inspection. These inspections are conducted by independent, appropriately qualified inspection bodies. One requirement of the LEAF Marque Standard is completion of the LEAF Sustainable Farming Review (LSFR). This online management tool provides guidance to support their implementation of IFM and their preparation for LEAF Marque certification as well as generates action plans, policies and review dates.

LEAF conceptualise the relationship between Integrated Farm Management IFM, Integrated Crop Management (ICM) and Integrated Pest Management (IPM), as show in Figure 2 below.

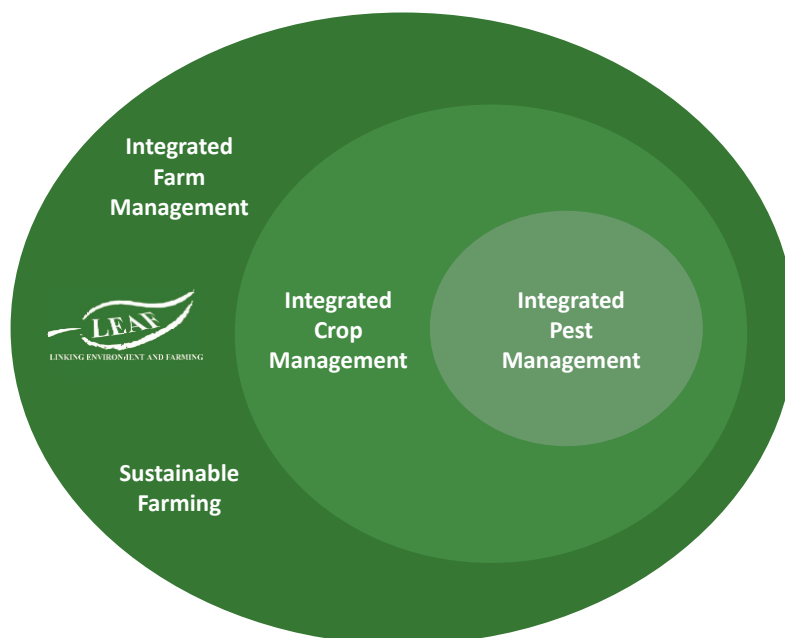


Figure 2 - How Integrated Farm Management, Integrated Crop Management and Integrated Pest Management interact

In practice, as illustrated in this research, the point of innovation may arise in any of these areas but will because of the integration of operations come to influence the other areas. This can be seen in this report in the concern to manage resistant weeds and pests as part of IPM changing over farming and growing operations.

5. Previous research and key areas of benefit

The CCRI conducted a qualitative report as to the benefits brought to LEAF members in 2010¹, which includes data from two online surveys of LEAF members in 2008 and 2010, the research found the following main advantages of the system to be;

¹ Mills, J, Lewis, N. and Dwyer, J. (2010) *The Benefits of LEAF Membership: a qualitative study to understand the added value that LEAF brings to its farmer members*. Report to LEAF (Linking Farming And Environment).

- “LEAF farmer membership had resulted in significant financial benefits to farmers in relation to on-farm cost savings, additional income, market benefits and adherence with regulatory requirements.”
- 86% of those interviewed, LEAF membership had increased their awareness and understanding of the farm environment
- 49% of those interviewed could link biodiversity benefits directly with their LEAF farmer membership
- 77% of those interviewed felt they had more contact with the public because of LEAF farmer membership.

Broadly this research corresponds to the previous findings but provides contemporary evidence as to how these themes are put into practice.

6. Business Types

It has become a tradition in policy and press discussions to refer to farm types based on the kind of crop or product that is grown on the farm. The participants in this report illustrate how such an approach is not always reflective of the diversity, dynamism and sophistication of many contemporary agricultural businesses. Unless we are aware of the variety of forms of these businesses then the strategies that are pursued, and the role of the LEAF Marque system within them, is likely to be unclear. At the end of the report we present 11 case studies of businesses that are LEAF Marque certified, illustrating this diversity.

If we view the businesses of the participants on a spectrum from the most traditional through to the most contemporary, then it becomes apparent of how this diversity, dynamism and sophistication is now deeply embedded. At the most traditional end of the spectrum are those people who are the principals of family farms, transferred from one generation to the next, and primarily based on family farm partnerships (see Packington

Free Range case study). Most of these businesses have a core area of land which the family own and is augmented by adjacent land that is rented in or leased. It is quickly apparent that these farm businesses are based on diversified activities, with significant farming operations running in parallel to other businesses based on, or from, the farm. Alongside this diversification is the entrepreneurialism of the business principals who also work in other firms, some participants in this report are Directors of producer organisations for example. In two case studies (A J and C I Snell and Frogmary Green Farm) this entrepreneurialism has seen people from farming backgrounds create highly, innovative businesses of considerable scale within one generation.

The second grouping of farms are those people farming on estates, several of which have a long history and a strong ethos of conservation in their management, based on an area of land which has an identity. The participants in this research who manage estates are directed by the owners to reflect the wider range of responsibilities that are part of that tradition. This requires them to balance a need to make a profit in their farming operations, with responsibilities to others – such as local villagers (see Overbury Enterprises and Ragley Estate case studies). As well as managing farming operations, often on these estates are office buildings, domestic lettings and treasured natural assets. These businesses are multifaceted in maintaining a balance between the need to run a profitable farming enterprise in the context of unique opportunities and responsibilities.

The third cluster of farms is those who are using a complex configuration of rented, leased and owned land, often across multiple sites within and beyond the UK. More often configured as limited companies or partnerships, in this report they represented some of the smallest businesses but also the largest. Renting land, either by the season or through a long-term arrangement places certain responsibilities on the business, including persuading landlords that their land will be respected. With fewer of the capital assets of land ownership, these businesses are more often engaged in horticulture and fruit production. These businesses are more analogous to non-agricultural enterprises, but their relationship to the land and growing ties them very firmly to their peers.

The participants in the research had a range of job descriptions that tracked these business configurations. Farmers were in the first grouping, estate managers in the second, and research and development, technical and quality assurance managers in the third. The latter two groups tended to have more formal educational qualifications, with post-graduate degrees not being uncommon. The third grouping had the highest representation of women with four women speaking for these ten businesses participating in the research.

7. Reasons for becoming LEAF Marque certified

Participants were asked twice directly about LEAF Marque benefits, in addition to more detailed questions. After chance to review the role of being LEAF Marque certified their answers developed and deepened. The reasons for becoming LEAF Marque certified first ventured were overwhelmingly transactional, concerned with the immediate benefits and causes, later answers were more nuanced.

For many involved in supplying the multiple retailers, Waitrose especially, becoming LEAF Marque certified was the gateway into the supply chain. Some saw this as a requirement that they 'had to' undertake, that they were 'forced to' take part, while for others it was an opportunity "to support Waitrose in their values and goals" (Grower 24). Frequently, this was presented as something that was common in the sector, and certainly not unusual:

"[One of our] customers required it, so we did it at short notice for that customer but found it to be focused and so formalised it, the LEAF Marque audit, is not overly stressful - documenting it really helped, in the past, we had not necessarily recorded it as carefully."

(Farmer 9)

For arable producers, they immediately volunteered two strong reasons for LEAF Marque: the opportunity to either supply into a contract with Archers Daniels Midland (ADM) that gained them a premium for Oil Seed Rape (OSR) and a second group who are involved in supplying Jordan's, again for which there is a premium. Each of these opportunities had an impact on income (see below)

“LEAF Marque fits in with the ethos of the farm and what the owners want from it, there is a financial benefit from the contracts, and then it fits in with the HLS scheme.” (Farmer 17).

Often this was combined with how LEAF Marque was commensurate with the values of their farm, reflecting the wishes of the owners and their attitudes. The case studies, such as the Mercer brothers at Packington Freerange, Nick Bragg at Frogmary Green Farm and Barfoots are using LEAF Marque to demonstrate their environmental credentials to others and themselves, cementing a dynamic of innovation into the business.

At this point, many interviewees argued that much of what LEAF Marque offered them was “common sense” and the sort of thing that they “would be doing anyway” or “it is chicken and egg”. At first, this seems to be paradoxical, but as other participants explain the impact on them, and careful attention is given to their arguments, it becomes clear what these farmers mean. As one participant explained, often the effect is subtle;

“There are so many [benefits], and they are so subtle it is hard to choose one particular thing ...LEAF has made us go a lot further than we would have gone.” (Farmer 1)

Others viewed it as part of continuing development, finding opportunities and improving performance. The case studies show how LEAF ideas and the ethos of businesses intertwine, nudging ideas forward and pushing improvements with monitoring data. Farmer 2 argued that with the margins in agriculture being so tight, a successful business needs to be ‘hyper-efficient’ and a system such as LEAF Marque brings those, “fragmented aspects and additional responsibilities together” and they are made aware of that. The farm now takes pride in that necessity, “you can’t change one thing 100%, but if you can make a 1% change over 100 things, then you are making a difference.”

Charles Matts, Brixworth Farming, explained that at first, he had struggled to understand the benefits of LEAF Marque, but it allowed him to coordinate with those he farms with and achieve their shared environment goals:

“I think I get it now, it is a bore writing these things down, and then going back and reviewing it with the whole team, making annual improvements, thinking about it once a year does sharpen us up, it does nudge us in the greener direction we want to go, I’m not saying we are the greenest business, but I have confidence that we are making improvement.”

Farmer 10 explained that the LEAF process became a “subconscious thing - because you write the plan you do it” and that it formed an important backstop to his process of developing the farm, making him more confident:

“[I] probably do things on the farm because I’m a member of LEAF - it has stopped me making some mistakes.”

Amongst a subgroup of the farmers and growers, in particular the older farmers, they wanted to be clear about the role that they played in making LEAF Marque a success. While being supportive of LEAF Marque, and consistent in their support for it, these participants wanted to be clear that LEAF Marque was not a template that could be laid across the farm without the active, skilled and knowledgeable intervention by themselves. They argued that LEAF Marque augments their farming knowledge and entrepreneurial drive rather than replaces it. Those who report the greatest success from, and satisfaction with, the system view it as a partnership with them being encouraged to be ambitious and reflective, fitting in with the style of their business and the ethos of its stakeholders.

8. Questionnaire Overview Analysis

In this section, we present findings from an analysis of the interview questionnaire, which provides an overview of the benefits and impact of LEAF Marque.

8.1 The Scope and scale of businesses

The 37 participants in this research illustrate the diversity of LEAF Marque membership, regarding both size and scope of business operations.

- The smallest number of employees was five people, and the largest 600.
- The smallest production site was 15 hectares, and the largest amount of land was over 4000 hectares.
- Just over half (55%) the research participants had been in LEAF Marque for more than five years, with 22.5% having part of the system for less than two years.

8.2 Financial Benefits

LEAF Marque membership has resulted in **substantial financial benefits** to participants often including significant cost savings, through improved market access and for some, additional sources of income.

- **Significant extra income** can be derived from LEAF Marque membership;
 - 36% of those who answered the question reported an improvement in their income^{2G},
 - 23% of participants who responded to the question reported also **receiving a premium** for their product because of LEAF Marque ^G.
- 97% reported that LEAF Marque had secured them access to market opportunities.
- 36% of participants who answered the question said that LEAF Marque had **improved the quality of the product** ^H.
- Most participants in the research were reluctant to discuss details of these improvements, but several reported additional income in the region of £30,000 per year.

² See Appendices for Frequency Tables; letters relate to questions in those tables.
CCRI Full Report May 2017

- Many participants have **gained important access to additional sources of revenue**, such as agri-environment schemes, the Renewable Heating Initiative (RHI) and renewable energy payments as part of their wider awareness of energy efficiency (see below).

8.3 Organisation and Planning

There was a widespread appreciation of the role that LEAF Marque plays in **improving the strategic planning of businesses**, and for many respondents, this was the key benefit of the system in enabling them to improve other areas of their enterprise.

- 69% of respondents said that LEAF Marque had **helped them with the paper work** around regulations or accreditation schemes.
- 36% of respondents who answered the question said that LEAF Marque had **helped them get into an agri-environmental scheme**, giving them opportunities to create synergies between conservation activities on the farm and gaining extra income.

8.4 Soil Management and Fertility

Participants were very clear of the advantages of improved soil management, in terms of soil structures, impacts of water filtration and improved fertility. For most participants, it was too early on in their work to comment and any specific improvements:

- 64% of participants who answered the question agreed that LEAF Marque had **improved the condition of the soil** on the land that they farm ^D.
- 34% participants in the research report **regularly testing for soil organic matter**, with scores ranging between 3.5 – 7 (out of 10) on their consultants' scoring systems.

- All those participants who are testing their soils indicate that the levels of soil organic matter are improving.
- 90% of participants in the research who answered the question report observing **improvements in the condition of the soil and the life within it**. 47% are involved in forms of formal testing for increases in soil biodiversity, ranging from counting earthworms through to experimental work with University researchers, with 53% using anecdotal observations.
- 28% of participants report improved water infiltration on their fields as part of the improvement of soils.

8.5 Crop Health and Protection

The scope of crops and production systems being discussed meant that there was little uniformity in detailed responses, but three themes were apparent. A reduction in the use of plant protection products, an increase in the use of biological controls and an increased focus on managing the possibility of resistance.

- **A general decrease in the use of plant protection products** with reports of falls of between of 8 – 20%, with resulting cost savings on these products.
- For many growers and farmers, the tool of first choice has become biological controls. These range from the use of nematodes and bacillus, predatory insects and Falcons for bird scaring.
- Improved biodiversity on the farm is an important tool in pest management, with careful thought being given to encouraging pollinators and protecting predators. Within different systems these may be insects, raptors, owls or snakes. The wider objective being to boost populations of beneficial insects.

- A trend has been seen in the lessening of the use of herbicides, with targeting “herbicides applied to 40% of our land rather than 100%”, the widespread use of weed suppressing green manures and the emerging practice of fumigant cover crops as well.
- Tillage patterns and practices, as well as rotations, have been altered to counter the spread of blackgrass in arable systems.
- Three participants report they have voluntarily stopped using metaldehyde and one has also stopped using glyphosate.
- A broadly precautionary approach has been adopted of viewing all control measures as a resource to be carefully deployed to prevent resistance building, or it being counterproductive by becoming either a pollutant in water and/or as a crop residue.

8.6 Pollution Control and By-Product Management

With such a public focus on food waste, LEAF Marque members were keen to report on how they avoid any of their product not being used purposefully.

- 32% of participants have **secondary markets for their produce**. The most common way of absorbing excess production for include accessing wholesale markets for processing into juices, jams and packaged foods.
- 11% report sending waste product to anaerobic digestion (AD) so that energy can be recovered from it and the nutrients returned via the digestate.
- The creation of risk registers tailored to each business looking to pollution events that might threaten business operations, including improved physical security around storage facilities (bunding, bio-beds), not moving some potential pollutants

(slurry) across water sources and avoiding some chemicals altogether (metaldehyde, glyphosate).

- Working with responsible bodies such as national parks, Natural England and water companies to reduce diffuse pollution at source.

8.7 Animal Husbandry

Those participants in the research who also reared animals were consistent in viewing the welfare of the animals as being of the highest priority because:

- Consumers expect very high levels of welfare and not achieving this would be a threat to the continuity of the business.
- Poor animal health reduces the optimal performance of the business by increasing costs and lowering productivity.

8.8 Energy Efficiency

The opportunities for saving on energy, and gaining income by generating it, are considerable as reflected in the range of activities undertaken by LEAF Marque members;

- 54% of participants who answered the question said that LEAF Marque improved **energy efficiency in their business** ^c,
 - The savings reported from greater fuel efficiency ranged from £10,000 - £17,000 per year.
- **Savings in electricity were widespread** and incremental. Savings on specific pieces of equipment can be considerable, in one case £800 a year on a refrigerator, or in another ⅓ of energy costs through managing pumps more efficiently, or 10% of the total bill through voltage converters. Other savings on lighting, such as through

fitting Light-Emitting Diode (LED) bulbs, or just changing energy provider are also important. Reported savings range from 10-33% on the annual bill. In one case this amounted to a saving of £12000 in a year.

- One large scale business reports being carbon neutral and another anticipates being so in 2017.
- 51% of participants report **generating renewable energy**, either electricity or heating. With electricity, the excess is sold into the national grid, creating an extra income, as well as lowering the businesses own bill. Heating is a direct saving to the business, with one larger business reporting annual savings of £12,000 and income from the RHI and a payment of £16,000 in one year from biomass grown on their land. One participant reports creating 600 tonnes of woodchip for their boiler from 60 hectares of woodland on the estate.
- In the use of vehicles, savings are being accrued through careful choice of appropriate machinery, careful attention to their operations and infield movements. One participant knew that not overlapping in-field operations saved them 1-2% of diesel usage over a year. Another that moving to a no-till system saved them 30% compared to their previous fuel bill.
- Incremental **savings in fossil fuel through greater efficiency** in operations and better matching of machinery can be considerable, with one report of a 46% saving per hectare cultivated as compared to nine years before. One participant knew exactly that these measures had saved them 6200 litres of petrol in a year, with two others reporting they had expanded the area farmed but had held their fuel consumption at the same level.

8.9 Water Management

Managing water is not just simply ensuring an adequate supply but also that water which leaves and enters the farm is of acceptable standards, as well as used prudently on the farm or in the greenhouses.

- 20% have access to reservoirs, 11% have their boreholes, and 14% access to large rivers.
- Treating water as a limited resource has resulted in a range of precision management options tailored to individual systems;
 - Only irrigating to start germination
 - Controlling humidity in greenhouses
 - Using Ultraviolet light to lower bacterial levels in the water for salad crops
 - Changing the pH of water for poultry production
 - Self-sufficiency for polytunnels through rainwater harvesting

8.10 Landscape and Nature Conservation

Being LEAF Marque certified was seen by participants in the research to have had noticeable impacts on the conservation values of the land they farm and the wider environment. Often this was through synergies between LEAF Marque and other agri-environmental schemes.

- 66% of participants who answered the question reported that **biodiversity on their land had improved because of LEAF Marque certification**^B.
 - Participants report bird species increases, including over 40 species on one farm, a tripling of the number of species on another and rises in the absolute number of all species on many.
 - Nine LEAF Marque certified businesses had been, or are part of, Higher Level agri-environmental schemes.

- 53% of participants who answered the question, reported LEAF Marque **improving the landscape values of the land that they farm.**
 - The reports of trees being planted per year ranged from 100 – 2000.
 - The length of hedges planted ranged from 3km – 4km.

8.11 Community Engagement

For all participants, the importance of better engagement with the wider community was very significant, providing not only chance to meet neighbours and promote understanding of the business but also a source of pride in being able to ‘show off’ their business. As well as engaging with local people through Open Farm Sunday, the participants in the research are inviting educational groups, children and students to their business and collaborating with leading researchers.

- 71% of participants who answered the question said that LEAF Marque had **improved their relationships with the public** ^E.
 - Reported benefits include better understanding by the community, resolution of complaints, sympathetic hearings of planning issues and improved sales from the farm.
 - Several participants pointed to the strategic importance of better relationships regarding recruiting new staff and understanding of policy support mechanisms.
- 47% of participants who answered the question said that LEAF Marque had **improved their engagement with the wider agricultural sector** ^F.
 - LEAF Marque certified businesses are collaborating with leading researchers to improve their operations and secure their intellectual property.

9. Narrative Analysis

In this section, we focus on the participants’ individual narratives of the benefits and impacts of LEAF Marque on their businesses and farming practices.

9.1 Financial Benefits

The role of LEAF Marque in improving incomes was a topic that many participants were hesitant to speak about in detail, as in part it related to access to supply chains rather than a question of premium. Grower 6, a fruit producer, saw the impact very directly and he was delighted, he received a premium for British grown pears and his income from this crop had immediately risen by 50%, with a smaller increase in the returns for his apple crop.

Farmers 1, 4, 14, 17, and 19 are all arable farmers who are supplying Unilever with OSR for 'Hellmann's mayonnaise for which they receive a premium of £15 per tonne as they have LEAF Marque. Farmers 7 & 20 are suppliers to Jordan's and receive a price for their oats which is set above a spot price in the autumn. All were reluctant to share the exact value to their business, but Farmer 20 in a quick mental calculation suggested it was in the low tens of thousands over the last five years. As noted above, many participants have taken up LEAF Marque to join the supply chains of multiple retailers, especially Waitrose. Farmers 8, 11, 15, 22 and Growers 16, 23, 24 all supply Waitrose and were reluctant to ascribe increased income directly to this but rather that has presented a significant extra opportunity.

Anthony Snell, of A J and C I Snell, was very clear that this question of access fitted in with the strategic focus of his business which has been to establish themselves as a quality producer, to "focus at the higher end of the market, with premium customers, premium varieties and a good name for quality and service."

9.2 Organisation and Planning

A constant theme through the research, as in the section above about the reasons for becoming LEAF Marque certified, is its role in strategic planning and review of a business. Detailed consideration of the research shows two themes about organisation and planning; synergies with paper work and relationships with staff.

About a third of those participating in the research are also involved in agri-environmental schemes, and they reported that there were catalytic impacts in each direction. For Farmer 2, LEAF Marque helped to persuade him of the benefits of such schemes:

“[LEAF Marque] did help us get past our initial scepticism and see that, improved our profitability by taking to the poorer parts, using it for something appropriate be that a crop or other uses.”

While for Farmer 3 the inspiration worked in the other direction:

“HLS was half the spade work with LEAF Marque, to begin with extra bit wasn't too bad, but it was pretty time consuming.”

For Farmer 10, “LEAF supplies the wish list and I use that for ELS”, and Grower 13 saw LEAF Marque paperwork as an entry point to the agri-environmental schemes, “we were LEAF, and then it was easy getting into ELS and HLS”.

Although only a minority of the farms in the report are also in agri-environmental schemes, they are all in a variety of assurance and audit regimes. Farmer 3 reports being part of six schemes, or as he described it “another badge to put on the shed”. Farmer 15 in a similar vein echoed the comment, “a very helpful badge to have, we don't have to trade on badges but is part of that picture.” Rather than the synergy of the agri-environmental schemes here the flow was very much of LEAF Marque benefitting preparedness for other assurance schemes. Grower 25 said that LEAF Marque “saves a LOT of time”, Grower 22 explained that this is because the “LEAF is the more in-depth one. The one that takes the longest”. Farmer 1 argued it helps with compliance because you demonstrate that you are “way over and above a typical farmer would be doing”. This sentiment was echoed by Farmer 2, who suggested that it helps relationships with inspectors and landlords;

“Having all our documentation up together puts you in a very good position for any inspection. There is recognition from an inspector they start to believe, their attitudes soften, puts them in right frame of mind. A certain amount of credit for being further down the road. making it easier for them, life is too short for everything to be a battle, don't lie awake at night worrying, working on other people's land they need to be reassured.”

Almost all the respondents were united in wishing that what they see as duplication and repetition of repeated inspections might be avoided (see section 19).

Many participants in the research did not directly address this topic, but their answers came through questions about other activities on the farm and in the business. Unsurprisingly fruit and vegetable growers had the greatest investment in their staff, as Grower 18 explained: “our staff are our biggest resource and our biggest expenditure.” Grower 13, a fruit grower, thought that this was one part of LEAF Marque that was influential in their business:

“[LEAF Marque] has changed the way we communicate with staff, staff environmental awareness has been raised, I really like that part of LEAF – and we are happy to go beyond that. Our workers are the most valuable thing on the farm, without our workers we won't have anything, they are right at the top of our agenda.”

Grower 18 explained that they promote the values of LEAF to their staff and what that means to them. Farmer 20 related it to involving his team with LEAF Open Farm Sunday, “so that they can see the changes we are making, [such as the] use of conservation tillage changes, why decisions are being made.” Grower 24 said that their staff have all read the guidelines and were aware of them, while Farmer 19 stated that the staff had been aware previously, but LEAF Marque “has formalised it, and they have signed a piece of paper saying they have read it.”

Grower 25, echoed many in saying that they had a regular team of staff, who although they were seasonally employed, they returned to them year after year and were central to the

success of the business. They also collected the data in the field, so it was vital they understood the plan; “they have to produce the information - they gather the water and chemicals data ... so, they have big impact”. Farmer 15, on a mixed farm, had booked the field team onto a bird identification course, so that they could monitor the biodiversity impacts of the plan, but this stretched beyond just conformity to the plan: “I want everyone keeping their eyes open and taking pride in what they are doing”.

Royalcress, who grow watercress in Spain placed a similar level of importance and investment on their staff. They explained this in relation to their situation that chemical controls are limited and crops are easily lost:

“It is not just a policy; there is a lot more discussion. This has an impact on staff training. Staff supervisors crop walk twice a week. Crop workers are trained to look for pests and diseases as well as deficiencies – it is about involving staff, the people working in the crop are the people seeing changes that could lead to a bigger problem. Luckily, we have a good group of core staff, we retain the same staff every year, who have built up expertise, and we have had a stable team for 10-15 years now.”

This is part of a broader focus on Integrated Pest Management (IPM), for more details see the Royalcress case study. Barfoots who operate in Senegal have taken on the widest range of responsibility for their staff, and this too is detailed in their case study, as they have assumed responsibilities of health and wider welfare of their staff as an integral part of their farm.

9.3 Soil Management and Fertility

Apart from one outlier (Farmer 8) all the farmers and growers saw working to improve the soil as important. For some of the Growers the relationship is not as direct as it is for other participants in the research, but many of them are working to improve the sustainability of the growing mediums they use. Farmer 1 had noted benefits to the work that they had already been conducting:

“Soil structures are much better, which is linked to plants through using nutrition better, holding more water, and soils are a lot easier to cultivate reducing time, labour, fuels and machinery wear.”

Farmer 10 argued that “as an industry, we have neglected the soil”, and over the past years he has used “thousands of tonnes” of farm manure, which has “naturally helped” the soil, as has adjusting his rotation, which means he no longer buys in nitrogen fertilizers, saving the cost of that input. Farmer 17 is following a similar strategy, growing more cover crops, using muck and straw from a local race yard as well as slurry and “incorporating a lot more straw”. Farmer 20 was very clear that LEAF Marque had directly prompted him to “increase the amount of organic manure we have used”, to boost soil organic matter (SOM) and that:

“We are taking organic matter samples more regularly, and moving to minimal tillage – it is a high priority, it is changing and we are seeing great benefits, we don't add potash now and general organic matter we are up to 5 and 6 [of 10 in our SOM scores].”

Farmer 15 saw it as an area that they needed to improve, “probably one of the areas we could be doing better; the themes remain the same and [LEAF] brings new ideas”.

For most Farmers and Growers measures of soil biodiversity are still a work in progress; many were reliant on what Farmer 10 called a “gut feeling” based on observations, particularly birds following the plough, or as Farmer 20 describes it “a farmer’s perspective”. Farmer 12 is monitoring levels:

“We put in grass leys, and we are monitoring earthworm counts before and after, to see if we can see any improvements - we would like to think we are trying to do it [improve soil biodiversity]. The figures are looking positive at the moment.”

Grower 23 had similarly made an investment in monitoring, comparing the soils they farm with those across the UK, and their crops have “more earthworms and these crops have more microbes [associated with them]”. Farmer 2 has also been monitoring but was sceptical of their own reported success; “[I] need a better test [I’m] not learning anything

from it. Four years of testing have seen an improvement but I'm sceptical". Several others were looking for a test or tests they believe are more robust and reliable.

Farmer 17 noted a practical benefit from his work on the soil in growing cover crops and incorporating farm yard manure, with soil infiltration the fields drain more quickly but are also more drought resistant, "you can certainly get on the fields much sooner than before you were doing it, it holds more water in droughty times". While Farmer 2 took a similarly holistic view, linking it to his Father's advice about becoming over-reliant on 'sprays':

"[It has been a] long-term change over 5 or 6 years, [the LEAF] principles have helped us, but the documentation has not made a lot of difference, but without a shadow of doubt [improved soil management] has made a difference - our soils are in better shape – we don't leave a mark. [In contrast] when contracting for others, I'm amazed about the improvements on our land. We use the same tramlines every year because of precision farming, there are simply no ruts in our fields."

9.4 Crop Health and Protection

In the answers to these questions, the growers and farmers demonstrated the integration of their farming systems, as answers began to intertwine as biodiversity benefits had consequences for crop protection decisions and in turn changed in-field operations. The climatic conditions and soil types being discussed stretch from Scotland to Senegal by way of Spain and a wide span of England. Amongst such diversity, there are those who do the minimum, but the substantial majority have embraced the chance to innovative, and draw great pride from that decision.

Grower 6 was the most vocal about the linkages between the increased biodiversity in his orchards and the impacts on crop protection, indeed on his ability to produce a crop:

“Wonders for pest control, by having the nettles on the edge of the fields, and in the orchards, we have cut down on pear sucker control. Anthocoris that control the pear sucker use nettles as an alternative host. With a little help, you can get away with one or two sprays rather than ad infinitum. Without it I don't know [if] we could grow them, [they appeared] only 3 or 4 years [ago], ten years ago it was not a problem. A lot more lacewings and hoverflies than before, observational but very noticeable, as we head towards modified IPM this is making the difference, the days of throwing OPs [organo-phosphates] out there and killing everything are now gone.”

Farmer 1 had noted the impact of monitoring levels of birds on the farm:

“A lot [of change] - we have an external monitor who films them to capture the number and diversity - we've got a lot of diversity rather than just baseline increase.”

Grower M, a fruit producer noted that “these creatures have to be there” and that they were prepared to accept some loss of production, as they stepped up their biological controls and that over the years he had learnt that, “sometimes nature sorts things out as long as you are patient”.

Other farmers reported a drive to minimise the use of slug pellets Farmers 7, 15 and Brixworth were working to prevent metaldehyde, an ingredient in the pellets, from entering the water course. Charles Matts, Brixworth Farming explained, in his view this is a strategic question:

“We have lost a lot of chemistry because it has been found in the water, and if we lose it what are we going to do? Will we be able to produce crops effectively? Glyphosate - rather than wait for that ban to happen we are talking to our merchants, and through them, their customers in a bid to understand each other's requirements.”

When asked how they dealt with the question about pollution control, the response from participants was broadly “but of course”, they explained that they were highly trained and surrounded by equally skilled colleagues. Farmer 1 patiently explained:

“We have a Biobed for filling the sprayer up, all things LEAF encourages - and we are doing. Recycling schemes, chemical containers, plastics, etc.”

Farmer 7 had just introduced some new bunding around his chemical storage area, as part of the process of continuous improvement, he had:

“Draw[n] a map of all the areas that might be at risk of pollution event; risks for chemical storage and a structure of response, so you are not at risk, here I could do a bit better.”

Following this theme of integration operations and reflecting on the strategy of the farm, the discussion of crop protection revealed where LEAF Marque has had impacts. Farmer 11 has a very pithy summary of this, “you don't want to spend money where you don't have to”, but Farmer 2 explained this at greater length:

“We are adhering to the principles - probably already there, so not a great gain. Our technical manager and agronomists are constantly looking at this holistically, thinking about crop choice and variety, being precautionary, we try not to use insecticides and then if we do we use them selectively. The LEAF Marque is formalising this process; the only extra is work going through the paperwork and making sure that is in place.”

Farmer 2 linked this through to changes in cultivations as well:

“We are always very mindful of all aspects, far more cultural control methods, reducing chemical bill and integrating a lot of traditional practices - timings of drilling, cultivation, spring cropping, selecting varieties to resist problematic diseases individually, select varieties resistant to rust for example.”

Royalcress saw it in the context of a reduction in access to chemicals and a move to biological controls:

“Where LEAF Marque strengthened our focus, it demands you look at IPM of your pests in a more detailed manner. LEAF sets thresholds and methods of control, EU measures have taken away registered chemicals so has pushed us towards bio-pests for control, which has pushed us into monitoring of pest and diseases.”

Farmer 9 found that for his operation there was little direct benefit of LEAF Marque in this area but saw it as a form of insurance:

“LEAF have very good connections with different stakeholders, and that is advantageous to us as a business but could I give you a direct link? No. But I wouldn't want to lose the invitation to the party - bringing people together is very, very important, those connections should not be underestimated - if you have some challenges they will assist.”

These strategic imperatives and plans resolve into practical consequences, as Farmer 10 noted “we don't use slug pellets, not bought them for three years” and Farmer 20 remarked on savings:

“[LEAF Marque] has certainly given us a greater awareness of why we are using [products],. We would have been driven by chemical companies in the past, and now we are encouraged to ask exactly why. Over the last five years we have reduced our chemical inputs considerably - 8% in the last few years.”

Grower 18 observed that they were experimenting with the pest management, as part of the broader attempt to manage resistance:

“A single clove of garlic in all of our growbags, [has resulted in] a 15-20% reduction in our use of pesticides. We don't know how it works, but it works for us; when you are faced with a dwindling armoury of product, it's great.”

Grower 22 was the only participant to link these savings to the quality of the product; “we still do spraying but a lot less, saving about 10% on costs”, the overall emphasis on their non-organic farm was on biological and organic controls, which results in “a sweeter berry, a more natural tasting fruit, rather than those grown hard and fast, [you should] bring fruit on naturally”. Grower 24, growing both organic and non-organic crops, noted that often cheap, biological controls, like companion planting were very efficient, and because other

controls in organics are expensive, if you can “nail it in that system, you have nailed it”, and the costs can be saved across the farm.

While those growing leaves, leafy crops and fruits are wrestling with the management of resistance, as protection options taper and push them towards biological controls, a similar concern is appearing in the question of blackgrass for arable farmers. Farmer 10 saw the minimal presence of the weed on his farm as part of the impact of LEAF Marque:

“LEAF Marque teaches you to be up to date; [our]cultivation techniques, [our] rotation has changed, preventing [creating some of the problems] ... we’ve not really got blackgrass, and that is probably because of LEAF, there is a straight financial benefit and [benefits] in planning for the future, because you are more environmentally focused, so we have less blackgrass.”

Farmer 14 viewed blackgrass as the “biggest single threat”. Farmer 17 had put some of his land down to grass for a few years to break the cycle of blackgrass, and Farmer 19 had moved to minimum tillage to combat it, although Farmer 3 said that he continued to plough. Farmer 2 reported a 5% loss of yield but had moved to delayed drilling to help with managing the weed.

The management of resistance through biological controls and changes to cultivation practices was a theme that united the farmers and growers in the participating in the research, with the added awareness of making sure that these biological controls, in turn, did not become pests.

9.5 Pollution Control and By-Product Management

With so many colleagues trained in the safe use and disposal of chemicals, participants reported that pollution control was a strategic question, as discussed above, of managing less immediate risks. Rather their attention in this section was focused on food that might become waste, and ensuring that their produce was used purposefully.

On the question of food waste, or food that was in danger of being wasted, most enterprises had a range of strategies. Grower 18, growing fragile top fruit, was keen to

emphasise their overall efficiency and ways in which what might become an economic loss is mitigated, “more than 8% waste we are disappointed, some goes to farm gates sales, some goes to processing - jam and frozen”. Many growers of vegetables, salads and fruits report the importance of secondary markets, for produce that does not conform to the rigours of the supermarket's specifications. Processors, especially for fruit growers can be important, but for some products, such as fruit juice, margins can be tight, questioning whether it is economical to harvest the fruit. For salad producers to meet fluctuations in demand, they can be forced to plough a crop back in, saving the cost of harvesting and returning the plant material to the soil. Wholesale markets become an important destination for some produce, although there can be seasonal and there are geographical limits to how useful these are, without “fixed standards” they ensure otherwise good produce is eaten. For many growers, in root crops, for example, the packing and grading is conducted off-site, but they know that outgrades “goes to the cattle and is used that way” (Farmer 9), Farmer 11 and Farmer 12 know that the outgrades of their crop are composted in AD plants. Royalcress reports that their surplus food has two destinations:

“Excess crop? It is either sent to a local food bank or the local zoo, we are members of the local zoo, and apparently, it is a favourite of the hippos.”

In this way, the participants report that they seek to minimise the loss of otherwise marketable product, ensuring that it reaches as many consumers as possible, or at the very least return as compost to the soil.

9.6 Animal Husbandry

Five of the case studies have livestock as part of their portfolio of enterprises. At Packington Freerange, pigs and poultry were reared, poultry at Frogmary Green Farm, dairy cows at the Leckford Estate, and sheep at Ragley Estate and Overbury Enterprises. All were advocates for very high levels of animal welfare - see the individual case studies for more detail. As Alec Mercer of Packington Freerange explained, “people care about the welfare of animals, that is a given”, and as Hamish Stewart, Ragley Estate viewed it:

“In order to maximise the output of your flock, you can't have animals that are sick or who are lame, keeping animals to the highest standards and profitability are pretty tightly linked as far as I'm concerned.”

Jake Freestone, Overbury Enterprises, was integrating his flock into his arable production. This achieved benefits in parasite management, and maintained his high levels of animal welfare:

“In terms of sheep husbandry, it has focused our minds on resistance to worms and how we can manage that, hence getting involved with the faecal egg count, so we can monitor the health stages of the sheep ourselves and has led to about a 30% reduction in the worming products we use, as a result of not blanket treating.”

LEAF Marque was part of a drive by these farmers on maximising the welfare of their animals, three in combination with the Royal Society for the Protection of Animals' (RSPCA) Freedom Foods, as they sought to bring high ethical standards together with sustainability and their own brands.

9.7 Energy Efficiency

With the research participants spread across such a diversity of sectors, business premises and locations the ways in which energy can be saved, and latterly produced is very broad. Farmer 15 summed up the approach he sees as part of LEAF Marque:

“It is easy to talk florally about the environment, but the crux of it is that you cause environmental damage if your system is inefficient and if it is inefficient it is suboptimal. Even if you don't have the environment directly in mind, you will enhance it indirectly.”

In saving fuel on farm operations every action is being scrutinised, or already has been, as Joe Rolfe of TaylorGrown, explains “if you don't need to take it into a field you don't” (see TaylorGrown case study). Farmer 6 reflected that none of the other accreditation schemes require you focus upon this topic but it is a “key part” of LEAF Marque. Farmer 5 said that the focus on monitoring had been very useful:

“We are monitoring and watching year on year, not achieved a massive reduction, but no increase and we are looking to stop an increase while increasing production.”

For many participants’ part of the challenge of identifying the savings in energy is unpicking the integrated parts of their integrated system. Farmer 7 said that LEAF Marque matched his idea of “good housekeeping”, which had started before becoming certified but extended his ideas and embedded the savings. Before LEAF Marque, he had begun to use GPS to control machine movements, meaning that it “saves us 1-2% of diesel per year, through such things as not having overlaps” and he had complemented by moving to larger, more efficient machinery. Charles Matts from Brixworth noted that before becoming LEAF Marque certified they had bought a more efficient cultivator which had saved £17,000 on fuel, and that continuous improvement was something that they would continue to focus on:

“We realised there was significant effect - still not very good at measuring fuel use per operation we are getting there, with the advent of telematics.”

Farmer 2 had been able to work out their fuel use had improved from 77 litres per hectare in 2008, to 59.49 litres per hectare in 2014 and that “the LEAF review made us do it, and marginal savings help”. He also reported that his cultivation practice was moving away from using the plough to minimum tillage, they have measured their fuel usage, and it is half what it was in 2002, and they now farm more land.

Others reported a range of areas where they had been able to shave costs from energy usage, by integrating operations and being more precise. Farmer 2 said that they had, “integrated lower wattage bulbs, and not blowing fans endlessly- direct financial costs [are a] win, and the environment wins”. Grower 5 introduced variable speed control on pumps and a “1/3 reduction in consumption”, Grower 22 had saved 10% on energy costs through voltage optimisation across their operation (see also Frogmary Green). Farmer 17 had just purchased a sprayer with “auto shut-off and self-guidance”, and he would “like to do the same with the fertilizer”, he also noted that with newer, more efficient equipment it was more reliable, in turn, saving time and money. Farmer 3 reported that they were much “sharper” in switching energy providers than they had been previously. Grower 13 said:

“We recently built a new community hall for our temporary workers, and everything done on that building was energy efficient - cool in the summer, warmer in the winter, and maintenance free.”

Grower 18 noted that had just installed LEDs throughout the glasshouses, bought new vehicles up to European standards every three years and kept to maintenance schedules, resulting in less breakdowns. While Grower 22 said that “we now match the machinery to the tractor in a way that we never did before”. Farmer 19 in a variation on this theme noted that they purchased machinery for maximum efficiency, but they were now buying second-hand machines to make “best use of capital”.

Farmer 2 made a point that was widely repeated, that “we [farmers] all know what we ought to be on top of” but LEAF Marque provides “a structure and a timeline through which these savings can be realised” and Farmer 7, described it as a “wonderful frame from which to make incremental savings”. Others had gone much further in seeking savings through energy and operational efficiency. In energy efficiency and generation, many LEAF Marque farmers had gone much further in calculating their energy costs, as well as generating power. Farmer 15 said of his energy audit:

“From the bottom, up. A bottom up audit of every item in the dairy, which put a price per item and it got to within 1% of our actual bill. In the space of a day, I could say we understand our energy bill - and that allows you to prioritise - replacing lights with LED, soft starts on pump motors, heat recovery in tank rooms, looking at the water heater.”

Brixworth Farming had worked with a carbon footprinting tool to augment the focus on energy:

“Carbon footprints provide a useful footprint to benchmark - it won't be completely accurate but providing you are making the same assumptions and measuring the same way you can make improvements and that is helpful. 6 or 7 years ago, we decided that we would measure our carbon footprint but we got bogged down in the detail. But it helps us understand what difference some of our management practices are making.”

Grower 23 had tried a similar approach but found that the tool was inaccurate and complicated but felt it signalled an important aspiration for the industry.

Many of the participants in the research are producing renewable energy, often by making use of the RHI, and resources on their farm. Farmer 17 was making use of the 60 hectares of woodland on the estate to produce 600 tonnes of woodchip a year, firing five biomass boilers and making the farm self-sufficient. Farmer 20 was making use of a similar technology in a joint venture with neighbours, and Grower 18 is planning a boiler in their next round of investment. Farmer 6 has an extensive system, covering diversifications and rental properties on the estate:

“All of it is for our own consumption. Woodchip for central heating, we have 9 properties - some commercial - and we have put the whole lot onto one system. Money saving total? Savings £12,000 on fuel purchases, plus £15,000-16,000 of RHI payments, plus some extra rent.”

Farmer 2 has invested in Photovoltaic (PV) solar energy producing 49 kW from a ground array:

“We get paid for selling back into the grid; it has made a huge difference in the summer. Our own electricity bill fallen by 20% which doesn't include the income from the feed-in-tariff.”

Farmer 12's investment was into an AD plant for the farm, which he described as a “glorious solution”, making the two sites of the business self-sufficient. Powering the plant through using out of specification vegetables, maize, rye and triticale grown as part of the rotation and then using the digestate back on their fields for fertility. Two of the case studies, Packington Freerange and Frogmary Green Farm are either carbon neutral or on the edge of being carbon neutral, through investments in energy production. In each case, they signal different ways in which animal production and low carbon strategies might be combined. In contrast Farmer 4 found that local councillors thwarted his plans with “an agenda” turning down his plans, rejecting wind turbines and even small-scale PV, other participants also reported planning limitations thwarting their plans.

9.8 Water Management

Whilst most participants did not report water limiting their operations, the use of water was another area where integration and precision are working together. Water flows are commonly monitored, with drip irrigation where appropriate, and water quality is being frequently assessed partly because of food safety requirements, but also about wider impacts on the environment. LEAF Marque has led to strategic thinking about the use of water and its broader impacts. Farmer 11 explained:

“We have a bore hole on the farm, [and] we have these monitors that tell us what the water deficit is and that tell us when [we should irrigate] - we do monitor per tonne of onions – just [for] onions... and potatoes, if we have spare capacity we might irrigate sugar beet – [it is] just not cost effective to do cereals now. [We have] just to keep them going in a drought until the rain arrives.”

Farmer 10 saw this as the farm’s weakest area and one that LEAF Marque was helping them address:

“This is our weakest area, we have a river through the farm and we are working to improve [it], by fencing it out and protecting the banks – doing more for wildlife - this comes directly from [becoming] LEAF [Marque certified]. We do have a reservoir for irrigation, but we almost always stumble [on water management] – [it is] a lot easier said than done. For example, testing water quality in the reservoir, we don't know how to do it, and what to test it for.”

For Grower 18, this was part of a broader process, as they have invested in two large reservoirs as a “large safety net for a business of our scale”. Grower 23 saw little limitation from water supply for their business, but the impact of LEAF Marque on their operation was important in maximising their return:

“Water has little impact, you could say; but driven by LEAF and economics, our crops are cheap to grow – and are high-value crops, and we use a heap of water, but we monitor water use and forecast it, as part of our crop sequencing, trying to control weeds and maximize our production.”

9.9 Landscape and Nature Conservation

Most participants in the research were very clear that this was an area where LEAF Marque has had a pronounced impact on biodiversity levels and the landscape of the holding. The initial focus of discussion was on bird populations, often the most visible aspect of biodiversity, but that focus quickly spread to other species and other aspects of the farmed environment. Farmer 2 was delighted by recent discoveries:

“Dormice have been found and are now linking up habitats, we weren't aware of them, and the Wildlife Trust found them. We rather homed-in on what we thought were the important parts we couldn't see the wood for the trees.”

Royalcross, based in Spain noted improvements in the field margins around their operation:

“We see a fair number of bats and have set up bat boxes on the office, but no bats are residents yet. In terms of field margins, we see signs of beneficial insects in the margins, the diversity of plants increased over the years - snakes generally in areas where there is little activity, and we leave those alone as they are predating on rodents.”

Farmer 2 who sees LEAF Marque as matching the ethos of their farming spoke of the long-term impact of Integrated Farm Management:

“Bird surveys carried out, for over 30 years, but we don't record mammal activity. There has been a massive uplift in birds of prey. We integrated with management of biodiversity with that of the farm, for example, we buy anti-deer guards for feeders.”

Farmer 19 reflected on a long career in farming. The local Wildlife Trust conducted monitoring on his farm and had helped with certain species. After a cull of mink on the farm they now have a population of water voles but he admitted a tension in himself, wanting to cut hedges due to a "temptation to be too tidy, but the rules tell me I can't".

Most of the farmers saw themselves and their teams as having responsibility for protecting and enhancing the wildlife on the farm, that has practical and immediate benefits, such as crop protection, but also as part of a wider stewardship of the land. The improvement in

biodiversity, and fostering it in-depth was an intersection of LEAF Marque, various other certification schemes and state-run agri-environmental initiatives. For Farmer 2, the role in management of biodiversity had whetted his appetite for finding out more about precision agriculture; he had become:

“A lot more interested in it and I would like to be better, you find out things you didn't really know, and what you believed you know you find out is not quite right.”

9.10 Community Engagement

Participants were unanimous in their support for the way in which LEAF promotes engagement with the public, but more divided on relations with other farmers and growers. Several farmers, mostly those who are within the LEAF Demonstration Farm network reported considerable benefits from the opportunities to meet and learn from other farmers but also the value of meeting business people from outside of agriculture.

There was also evidence that LEAF Marque made collaboration between farmers and growers within supply chains easier, as Grower 24 explained they were helping another LEAF Marque grower as “their principles are great, but their paperwork is not”. Farmer 19 saw LEAF Marque as a way of meeting like-minded people with whom they could collaborate:

“Our conservation outlook helps to get the contracts that we like, with customers we would like, who would like what we are doing - which comes from LEAF.”

Grower 18 reported that most members of their producer organisation “are LEAF” and therefore participation “ties in so closely it is a no brainer “. Grower 13 is an enthusiastic participant:

“We try to attend every event that LEAF holds if it applies to us, an opportunity to see other farmers, talk to them, and what they have to offer, what can be implemented on our farm.”

Grower 18 continued, as to the direct benefits of discussion with your peers:

“To be honest, it helps me on a personal level, for example, the Speak Out event – I met a whole raft of growers and producers I would have never have met, start a conversation that doesn't seem related to your area, you'd be surprised at what you learn...”

Farmer 12 appreciated the chance to meet farmers who were not his neighbours: “not many LEAF farmers around our way and confidentiality makes a difference”.

Others did not take part in these opportunities; Farmer 21 said that he had always been involved in the industry and with other farmers so felt no need to use opportunities through LEAF. Farmers 2, 3 and 7 were focused on their neighbours regarding this question. Farmer 7 said his neighbours “were blissfully unaware of it [LEAF Marque]”, which was taken further by Farmer 2, “Neighbours don't know, some of our neighbours are our clients” and according to Farmer 3, “not especially, we rent spud ground off all the neighbours, no one has joined LEAF Marque because of me”. Grower 23 took a wider perspective, arguing that the National Farmers Union and the Country Land and Business Association were the more obvious forums for contacting other farmers because they have “bigger member bases & more uniform appeal”. Those participants who had used the opportunities for networking, as visitors and host, said that LEAF is useful in gathering information pertinent to their businesses and in supporting their personal development.

9.10 a. LEAF Open Farm Sunday

“Our biggest sense of achievement is how we interact with the public and the most rewarding and the biggest change.” (Farmer 1)

“Farmers generally miss a trick on this; they get their blood pressure high, 98% of people are absolutely fine.” (Farmer 10)

The role of LEAF in encouraging and supporting farmers to reach out to the wider public was unanimous as a vital to the future of the industry, the reasons for its importance to varied between participants but they were unshakeable in viewing it as an important intervention.

Grower 23 had been sceptical about many of the elements of the Marque, considered the work around encouraging interaction between the public and farmers as of “strategic importance” to the agricultural industry. Farmer 7 sees it as “an absolute triumph to getting LEAF Open Farm Sunday as an established part of the calendar” and many of those who do not take part promote the industry in other ways.

Some participants felt unable to host an event because of health and safety concerns but brought to public engagement a variety of creative ways of engaging with the wider public. Ironically, Farmer 20 made health and safety a focus on his contribution to the LEAF Open Farm Sunday process. He invited the Health and Safety Executive to the event to spread the message, so the next story people hear about farming “isn’t another tragedy”. Farmer 7 specifically invites anyone who has made a complaint about the farm in the previous year, as well as local councillors:

“By letting people come on the farm and speak to us, we can deal with complaints in person and then they tend not to complain, [we now get] far fewer complaints than we used to.”

On fruit farms, the official Open Farm Sunday coincided with a busy time in the orchards, so Farmer 6 took local people on guided tours at other periods of the year. Others used their farms as a base for neighbours on Open Farm Sunday so that one farm hosted a wider collection of machines, as well as a range of animals and stands by suppliers and processors.

The reported benefits of Open Farm Sunday were varied but for many respondents were important, Farmer G on the edge of a large town encourages people onto the farm:

“We live on the urban fringe, lots of people wandering around and we put in extra footpaths [which are] permissive routes, which have helped a lot. [They are] not a free for all but we have given people more access, and they act as my policemen. I’m more worried about false alarms than the opposite! More people phone to say do you know that you have a lame sheep or lamb stuck in the brook.”

Grower 22 stated that Open Farm Sunday had helped by improving understanding in the local community:

“It lets everyone know what we are about, makes us more visible, stopped [people] complaining about the vehicles and our pickers vans.”

Farmer 1 spoke about the pleasure of being recognised because of Open Farm Sunday:

“I drive into the village to the petrol station, and I see a child with their mum, and they say, “hey there is the farmer”. When we drive a combine down the road, they appreciate us a bit more.”

Rob and Alec Mercer of Packington Free Range welcome over 6,000 school children onto their farm every year. They also host LEAF Open Farm Sunday; Rob reflects about Open Farm Sunday:

“I think that farmers often have a view that the general public and don’t know what happens on farms, but in our example, we have had 3,500 people come [to our LEAF Open Farm Sunday event] and want to learn what happens on the farm. I think that people would like to know more but don’t have the opportunity to learn.”

9.10 b. Educational visits

Alongside the public, many participants report encouraging visits by children through schools and young people in colleges and universities. Most of this was described as “giving a bit back”, and some participants also went to schools to give talks about farming. Others report very significant engagement with education, Overbury Enterprises has a partnership with an inner-city school (see case study for more), Grower 9 reports children visiting who have never seen a tractor. Nick and Claire Bragg of Frogmary Green Farm, have started to work with the local authority and public health officials, as they have formed a new diversification to link food to healthy lifestyles. They planted on the farm, “small half acres of different crops are being grown” which is important “so we can discuss where food actually comes from.” Growers 5 and 23 both highlighted the importance of engaging with young people so that they might start to consider a career in agriculture, otherwise in the competition for the talented and educated the industry will lose out.

9.10 c. Representing the industry

A theme that appeared throughout the interviews, but was not directly asked about, was the role of LEAF in helping farmers represent themselves and the industry. Many of the participants had websites for their businesses but are also enthusiastic users of Twitter (see case studies). Farmer 9 reflected on learning how to speak in public from a 'Speak Out' course and the contribution that makes:

"[The] experience in dealing with people - you can always learn something else, it helps you speak to a large group of people and a diversity of people."

Farmer 20 saw Open Farm Sunday as a bigger change in his attitude towards representing the industry, taking control of the narrative about agriculture:

"I wouldn't have considered it ten years ago, but now we are taking control of the messages, not letting the negativity dominate, not just taking it all the time."

This was reflected in moves to champion the benefits of eating vegetables and fruit, rather than only particular brands or companies, contributing newspaper articles and representing the industry in other forums. This is most thoroughly described in the case studies, where we have included links to websites, Twitter handles and YouTube channels (see Overbury Enterprises, Frogmary Green Farm, Ragley Estate and Brixworth Farming for example). With others such as Intercrop, Barfoots Senegal and A J & C I Snell making considerable investments into developing their sectors and representing the industry more widely.

10. Further Considerations

As is evident in this report amongst the participants there was consistent and sustained support for LEAF Marque. Matched with an appreciation of its contribution that it makes to their businesses and often detailed knowledge of that impact, but this is not to suggest that there were not criticism or suggestions of where LEAF might focus in the future. Farmer 7, a mixed farmer, summarises points that many others made, first was that LEAF Marque is "not as strong over livestock" being focused on crops – arable, vegetable or fruits. Further,

while many do benefit from the 'OSR contract', they would like to see more opportunities such as this, reflecting the breadth of produce from the farm, a particular question for mixed farms. Then there is the question of whether the end consumer is aware of LEAF Marque. Farmer 6, who was not a Marks and Spencer (M&S) supplier, used them as an example, "The M&S brand is the dominant one, they don't mention any other thing", coupled with that is more of LEAF Marque being an essential qualification for supply or "more of the LEAF Marque as a gateway into food chains".

Another common refrain was a reduction in the multiplicity of audits and schemes, which frequently replicate or even duplicate requirements. Farmer 21 explained this in the following way:

"LEAF need to remember that theirs is one scheme, they may not think it is onerous, but in combination, it is quite stressful."

Many farmers and growers emphasised the way agricultural businesses had become knowledge-intensive businesses. Many of the participants are experimenting on their land, own their intellectual property, work in partnership with universities in trials and monitoring – from soil testing, to plant varieties, by way of machinery through to ecological surveys and crop protection techniques. As Farmer 15 summarised this, "we love data and the objectivity of it". But this theme often ended with an emphasis on the importance of actionable data, with a preparedness to experiment but acknowledging a surfeit of information in some areas much of which was not strategically useful. Grower 23, who had conducted audits in the past, had the most sophisticated critique of the approach, noting that in some areas such as CO₂ measurement and soil biodiversity, where the tools are not always precise, the audit is a documentary one and the audit is a "sense check". Grower 23 argued that the multitude of schemes leads to customer confusion and a "dilution" of the intent, when the strategic aim should be assuring customers that produce is grown to uniformly high British standards.

Significantly even those who viewed LEAF Marque, particularly at the beginning of the interview, as transactional in their comments at the end wanted to see an extension and deepening of LEAF Marque to embrace new opportunities.

11. Conclusions

Many of essential benefits that the participants in this research found in LEAF Marque are specific to their businesses and circumstances. The main advantages of LEAF Marque arising from the experiences of the farmers and growers who took part in this research are:

- LEAF Marque allows the managers of the business to engage in **a critical reflection on the strategic direction of their activities**; this is particularly important where management capacity is limited.
- LEAF Marque provides participants with **valuable market opportunities**; this may be in the form of a premium or access to higher value supply chains. In turn, it lowers the costs of collaborating with other businesses who are in LEAF Marque, and there is evidence of networks developing.
- The focus on Integrated Farm Management and close attention to the details of farming operations **results in incremental savings**, making operations more efficient and resulting in significant savings for members.
- The focus of LEAF Marque on biodiversity and conservation management results in **marked improvements in farmland birds, insects and mammals**, often working in synergy with other programmes and schemes. These have wider benefits to the farming system, such as in pest management, as well as inherent value.
- LEAF Marque, working with other pressures, has **changed the emphasis on crop protection towards integrated pest management** on members' farms and crops, with a steady reduction in the use of fossil fuels and potentially polluting chemicals.
- The **integration of farming operations realises synergies**, which can be seen in the management of resistance in weeds and pests by farmers and growers focusing on biological controls and ecosystem management.

- LEAF Marque requirements **build confidence in dealing with other compliance schemes**; this can be practical in preparing paperwork, or in making members more confident in approaching audits.
- LEAF Marque provides **opportunities for farmers and growers to network** with their peers, to exchange relevant expertise and information, as well as opportunities for personal growth. For those who take up these opportunities, this is seen as a critical benefit.
- LEAF Open Farm Sunday enables LEAF Marque certified businesses to showcase their activities, **establishing and enhancing good-will and understanding in the local community**, as well as building pride in the farm team.
- Empowered by the training around LEAF Marque; members are increasingly representing their businesses and the industry more broadly in **a bottom-up effort to control the narrative about food and farming**.

12. Case Studies

A - Barfoots Senegal – Fresh Thinking

The drive for a continuous supply of vegetables throughout the year has seen British growers look for solutions that are both economic and sustainable. In 2006 Barfoots formed a company in Senegal ‘Société de Cultures Légumières’ (SCL) to make use of the significant opportunities that the country presents. The land in northern Senegal, Diama, is a 4-5 hour drive from the deep-water port in Dakar, and from there it is a 6-day ‘reefer’ journey to the UK. Barfoots lease 2500 hectares from the government of Senegal, converting scrubland and bush into cultivated land. Close to the River Senegal fresh water is plentiful, with warm and sunny winters, excellent conditions for the crops produced. Sweetcorn (corn on the cob), Green Beans, Butternut Squash, Sweet Potato and Chillies are being grown for export with Peanuts, Onion and Niebe (a local legume) grown for local consumption. This approach reports Harry Wilder, Technical Manager, is in line with the strategy of the business overall:

“Our chairman, Peter Barfoots’ philosophy has always been to back what have been relatively niche crops; invest in them, in terms of sustainable farming, supply chain and marketing with a view to successfully growing the overall market place through improved quality and consistency.”

Over 2000 local people are employed by Barfoots in Senegal, and in response to an assessment of their needs a clinic has been established with a full-time nurse and weekly visits by a doctor; all staff and their families all receive health care from the farm. Also, fresh potable water supplies to local villages has been improved, workers receive meals from an onsite canteen, while investments have been made in local schools and classrooms. Workers have also been trained in contemporary horticultural techniques, something which is now on the curriculum in the village schools near to the farms. This education and training has benefited the farm and also the local small holders who have seen improvements on their land. As a further part of the “social contract” between local villages and tribes in the area, local people are being trained and

appointed into management and supervisory positions in all aspects of the farm's operation.

Managing the farmed environment in West Africa has placed an onus on Barfoots to build an understanding of what is appropriate, and in this, they have made significant knowledge investments:

“We have had to teach ourselves and pool knowledge from across the world; for example, for the IPM side of things we take a lot of expertise from the USA, South Africa and Southern Europe but then have to adapt it to work locally.”

Barfoots conducted trials with Cranfield University which enabled them to reduce water consumption for their sweetcorn crop by 32%. This resulted in a 12% Nitrogen saving and highlights the potential efficiency improvements that can be achieved. Such savings can sometimes be difficult however, as “everything is so integrated”. Soil fertility has also been improved via the introduction green beans and other crops, which adjusts their rotation practices:

“Peanut is a good example when you lift the peanut crop out it helps break the nematode life cycle, which improves the yields on export crops with less use of nematicides.”

In the context of soil; building organic matter is a challenge in Senegal:

“Soil Organic Matter (SOM) is very difficult to increase given the high temperatures and the sandy soils. We build soil health through minimum tillage, better crop rotations, the use of summer cover crops in order to make a long-term difference to the soil health, fertility and structure.”

Similarly, the importance of soil biodiversity is apparent but requires more research to understand its impact on crop health:

“We are involved in an Innovate UK project with James Hutton Institute to try to create a measure of soil biological health. This is a [measurement] system where we are monitoring beneficial nematode populations to correlate soil management practices with certain nematode species, this will help quantify the benefits of certain improvement strategies.”

Gaston Berger University in Saint-Louis, Senegal plays a role in helping establish biodiversity levels and understanding what are the beneficial local plants for biodiversity areas and in monitoring flora and fauna levels on the farm:

“We collaborate with the university for wildlife surveys; they visit every year and make recommendations for improvements that can be made, which will be within the interests of local wildlife and our farming system as well.”

The role that LEAF Marque plays in this package of innovation and experience is to provide a framework under which the requirements of customers can be organised:

“Historically, environmental concerns were often changing and we have since found that LEAF Marque has given us a framework to manage the complete sustainability agenda across a very complicated international supply base. If we say this farm is LEAF Marque certified, then we know that it is working to improve energy efficiency, reduce fertiliser use, improve soil structure and working with IPM strategies – it just captures everything that a farm needs to do.”

This push for efficiency and integration has required effort and investment on the part of Barfoots:

“GLOBALG.A.P., for example, means that you have tackled the basics with food safety, whereas to achieve LEAF Marque requires much more effort and understanding across the supply base – so Barfoots have had to support and train our overseas growers in Integrated Farm Management.”

Among the benefits are that it provides customers with the confidence that these issues are being addressed, and provides a platform for co-operating with other suppliers:

“LEAF encourages us to cooperate and help other growers too. We have held demonstration days for other growers in Senegal and Peru to help them understand the requirements and practicalities of achieving LEAF Marque.”

Harry Wilder describes the process of staff training as one wherein everyone plays an important role. By ensuring that all staff feel empowered and are directly responsible for their actions, they also feel that they are responsible for success of the business:

“That awareness and culture is ingrained partly because of LEAF Marque, employing such a large number of staff in Senegal, over 2000 people at peak season; it can make a very big difference if you can get your staff understanding the message.”

- www.barfoots.com/about-barfoots/barfoots-senegal
- @Grownwithlove

B - Frogmary Green Farm – Food for Thought

Many travellers will be familiar with Frogmary Green Farm, as the domes of its AD plant can be seen from the A303 near South Petherton and those within the agricultural industry will be familiar with Nick and Claire Bragg who farm 325 hectares in Somerset.

Frogmary Green Farm combines the production of energy from crops, the production of chickens, contracting for other farmers, conference facilities and a cookery school, in a highly dynamic business. Part of the LEAF Demonstration Farm Network, Nick and Claire are the recipients of many awards from within the farming industry and beyond for their work in linking environmental management to low carbon livestock production. They have taken up LEAF Marque as part of their environmental commitment:

“We don’t get any premium value for it, and I don’t think it is even marked on the packs when they go out, to either processor or the consumers, so it is about our values.”

Nick links this to their experience of developing the farm, and how LEAF appealed to him:

“I really like their ethics and what they stood for, the environment in particular, and when we started here, there were no redeeming features. FWAG and countryside management have helped us, and we’ve really got a lot of enjoyment out of it, all that we have put in; hedges, trees and more recently we have been lucky enough to win several prizes about this.”

The AD plant is fed with grass, maize, cereals and fodder beet grown on the farm, with the land being in both Entry Level Scheme (116 hectares) and the Higher Level Scheme (72 hectares), so that an emphasis is placed on in-field conservation practices and wildlife improvements. The biogas produced from the AD plant is fed directly into the national grid, and the digestate used back on the farm. Across the farm, 13 hectares of stewardship margins, ponds, archaeological site and wildflower strips have been either created or protected. The Braggs have planted four kilometres of new hedges, 1600 trees, a one hectare arboretum with 230 trees and renovated a one-and-a-half hectare apple orchard.

The poultry production is only one of four broiler production units to hold LEAF Marque presently, a recognition of the Bragg’s commitment to conservation and the environment, as well as the welfare of the birds. All the poultry sheds on the farm are heated from

biomass woodchip boilers, a total of 840 kW of capacity, that also allows staff accommodation, workshops and meeting rooms to be heated sustainably. The birds are kept to RSPCA 'Freedom Food' standards, and one of the sheds includes a viewing platform to allow visitors to see for themselves the conditions the chickens are kept in, while ensuring the biosecurity of the facility. The commitment to renewables continues, with PV solar panels on buildings which contribute electricity, continually lowering the carbon footprint of the farm's enterprises, "within the next 12 months we'll be 100% reliant on green energy". Nick has the aspiration to take this further, "we would like to run our two lorries on gas within five years, using methane from the AD unit" and that in the wider agricultural industry "there is interest in our being carbon neutral." Although LEAF Marque did not spark Nick's interest in energy generation and self-sufficiency, "they had a part to play in my thought process".

The attention to detail about renewables is interlinked with the welfare of the birds, which is increasingly data driven:

"A lot more data driven, capturing the data – all of the heating, ventilation, humidity and CO₂, and we are seeing if that could be put onto an app for a handheld device, and then looking at that information historically to see how that can help us. How does that compare to things a year ago, what could we do differently now?"

Another change concerns treatment of mains water, with the aim of gaining the best balance of welfare, environmental efficiency and business return:

"We are always gearing ourselves towards the optimum and then it is about how things are managed, ventilation is a crucial part, we are using mains water, and we are measuring pH levels, treating it ourselves to control that to control variation."

Growing crops for the AD plant requires a similar focus on efficiency, and has cut down the farm's fuel bills. All the tractors now have GPS and satellite guidance, which he has "very roughly worked out that this is £8-10,000 per year in fossil fuels" and as that "fossil fuels are only going one way in terms of price" this will be a sustained saving for the farm.

The latest venture by Claire and Nick is 'Cook it @Frogmary Green'. Based in a re-purposed potato shed it offers cookery classes, meeting facilities and function space with catering based on a network of local suppliers. This business builds on a strong ethos of education and participation that the Braggs have developed through events such as Open Farm Sunday and education visits from local school children. As part of this, the Braggs have started to work with Somerset County Council and Somerset Public Health Authority to encourage healthy eating. To help the visitors' understanding, the farm has created "small ½ acres of different crops so you can see crops being grown in a commercial environment" which is important "so we can discuss where food actually comes from."

As part of the engagement with the wider community and local villages, which have recently supported several large planning applications on the farm, Nick is reaching out to local councils:

"We have got a lot of vehicle movements, and we are engaging with three local parish councils and villages, and we are supporting them financially, and we are helping them with flowers to show care for their village, to say we are using your village by moving our vehicles through your village."

Throughout this, Nick has found LEAF to be very helpful in providing training on how to communicate more effectively with people but also concerning information, an area that he believes is a key need for his enterprises:

"LEAF have been very, very helpful in giving information; I would say that they have been faultless in that."

- www.frogmarygreenfarm.co.uk
- www.cookitatfrogmary.co.uk
- @frogmarygreen

C - TaylorGrown

TaylorGrown is typical of many contemporary start-up businesses, a small capital base, entering an expanding market, with some strong ideas about how it can grow and a social media profile, it is just that this model of business is not seen very often in agriculture. TaylorGrown growing organic vegetables, owns no land, it receives no subsidy, and its general manager Joe Rolfe is not shy about telling people this:

"I like to think we are constantly pushing the boundaries as we strive to become completely sustainable from a business point of view as well as environmental. We're just as innovative as non-organic farmers – if not more so because we have to be."

Founded in 2005 in Perthshire, TaylorGrown was bought 10 years later by Produce World. This has enabled it to make longer-term investments and it now supplies some of the largest multiple retailers with organic carrots, potatoes and onions:

"We are producing about 4500 packed tonnes of carrots, about 500 tonnes of onions and potatoes are a new venture this year – and those are supplied via Produce World through a dedicated organic supply chain to the supermarkets."

TaylorGrown works with four landlords, all of whom are organic. The largest and where they are based, is Houghton Hall with 600 hectares of arable and grazing land. Some of the enterprises on the estate are managed in-house such as the livestock and cereals, whereas others such as the vegetable production are taken in hand by other companies such as TaylorGrown, "we fit into their rotation, and we are in a long-term relationship". This innovative approach to field-scale vegetable production places relationships at the centre of the business model, from landlord through to customers. Joe Rolfe says:

"I quite often tell people when talking about the farm, for me, it is the ultimate form of farming, all of the enterprises are complementary of one another. We benefit from the fertility building due to the grass and livestock and as dedicated contractors working on the cereal production for the estate we benefit on the weed control which as a business is our biggest cost."

Understanding the needs of all of those involved requires a focus on details. Customers look for innovation in vegetable products but landlords seek an assurance that you share the same ethos about land management.

TaylorGrown is LEAF Marque certified as it was a request from customers, although they are using the Marque more widely:

“We do some secondary sales into London, and we put the LEAF Marque onto the packaging, and I would like to think that makes a difference, that there is some brand recognition.”

As an organic farmer, Joe feels that LEAF Marque is complementary to their overall approach:

“While LEAF isn’t specifically aimed at organic systems; I think that organic farms fit into the LEAF mantra perfectly as we are sustainable farming systems, so everything that is required to be LEAF Marque is our base level.”

There are gains to be made from the scheme but that “if you are going to do it properly and be true to yourself” it has got to be more than a tick box exercise and “that every action needs to be thought about thoroughly”. With a plethora of accreditation schemes, “80% of all them are the same, LEAF to be fair is the more outside of that, a 60/40 balance” and there is considerable value in those extra questions

As part of that careful consideration TaylorGrown has focused on improving efficiency around fossil fuels, “it makes you think more about those specific aspects, which is only a good thing, we are maybe guilty of getting big diesel guzzling tractors.” One area that TaylorGrown has focused on is the movement of equipment:

“Things that you would think what has that got to do with LEAF? But when you work out how much diesel you use moving heavy implements from the farm yard to the field and moving them back and forth, we now take them off and leave them in the field. Just coming back to the yard with the tractor, you take the parts and tools with you to the field. That doesn’t sound like it has anything to do with LEAF, but they all have an impact, not only on the environment but also your costs and time, you know that is more efficient.”

This attention to detail is being carried over to the soil, “we soil sample every field, every year” and soil health is a priority. Already this focus on the soil and building its qualities has had noticeable effects:

“Visiting agronomists have commented on how the carrots crops, in particular, have withstood the dry months and the wet months better than their conventional counterparts; I’m quite sure that is down to our soil organic matter and soil health.”

Joe is a keen user of social media, and as a Waitrose demonstration farm has a YouTube video of Alan Titchmarsh visiting the farm, as well as drone and GoPro footage of farming operations. For Joe, this extends the reach of TaylorGrown, and:

“I think it gives everybody a feel-good factor, there is a lot of negativity out there I don’t use social media in that way, I try to give people a snapshot of the innovation and forward thinking things that are being done in organic systems.”

- www.taylorgrown.co.uk
- @Taylorgrown
- @rolfejo

D - A J and C I Snell

Nestled in the hills of Herefordshire, the berry farm of Anthony and Christine Snell is responsible for 1300 tonnes of strawberries, raspberries, blackberries and blueberries. They also grow 700 tonnes of blackcurrants, both conventional and organic. These berries arrive for consumers in fresh and frozen formats, with extensive freezing, packing and processing facilities on the site. Anthony and Christine were finalists in the 'Farmers Weekly' 'Specialist Crop Producer' category in 2016, with the judges being particularly impressed by the "technical innovations and crop performance". The farm covers over 450 hectares of land now, a ten-fold increase from when Anthony and Christine started the business. They now employ 30 full-time staff and up to 300 seasonal staff, who pick fruit across the fields and in the poly tunnels which have extended the growing season through to November.

Anthony was very clear that the strategic focus has been to establish themselves as a quality producer, to "focus at the higher end of the market, with premium customers, premium varieties and a good name for quality and service." As part of that of that, they supply Marks and Spencer, Ribena, and Yeo Valley. While there is a focus on fresh produce, the role of frozen products is important as it allows a high-quality British product to be available all year round and balances the farm's production, it is "same quality fruit, but we also use it in times when we are in overproduction". Although supplying processors, particularly for blackcurrants Anthony is clear that British production is underpinned by very high standards and is distinct from, "just another volume producer, we focus on quality and have a very good team of people working here."

Anthony's late Father was on the founding board of LEAF, and so he feels that the ethos of LEAF is deeply embedded in his approach to farming:

"We haven't fundamentally changed anything because we are part of LEAF Marque, it is something that as a grower you understand - that you don't want to cause soil compaction, you don't want soil runoff, a lot of these are fundamental basic things that you as a responsible producer you do without being told."

With the farm being involved in seven different audits, this is taking up a considerable amount of time and effort, which Anthony views have mixed results:

“We would be doing these things but having to go through proving that you are doing it is a lot of work and a lot of costs, but it is a requirement that most of our customers are wanting.”

But in a competitive global market there are upsides to the focus on accreditation and auditing:

“All of these audits are good in a way because they raise standards and raising standards is good, it does put our business in the UK above many competitors abroad.”

With a proud record of investments that have led to both greater efficiency and environmental improvements, such as PV solar on the packhouse roof, extensive use of rainfall to irrigate crops, and high levels of bird species present on the farm. The Snell’s look to combine a commercial orientation and environmental awareness and Anthony champions the greater efficiencies that can be found in larger enterprises:

“This is sometimes it is a bit of a misconception, people are critical of larger businesses, but you’ll find that a business that has reached a certain critical size which is a lot more efficient than a smaller business.”

Many of these businesses have been able to achievement the important twin goals of “providing affordable food and environmental improvements”. With berries increasing in popularity and part of a balanced diet, Anthony is pleased to be able to “promote something that is good for you.” In a context of audits and complexity he thinks that LEAF Marque might fulfil an important future role:

“What we would like in a perfect world is one audit, and if that was LEAF that would be great, the nice thing about LEAF compared to the others is that it is a practical audit and it is very, very environmentally focused.”

- www.ajandcisnell.co.uk
- @AntSnell

E - Royalcress SA

Positioned south west of the Grazalema National Park, Spain making use of a combination of light, abundant clean spring water and a cool Atlantic breeze, provides a perfect microclimate for watercress production. The Grazalema area sees the highest rainfall in Spain; water that eventually flows through impermeable gravel lined beds at Royalcress allowing production to continue almost all year.

Since its start in 1986, sustained increases in demand for watercress has meant that Royalcress expanded both in 1994 with the purchase of the Finca Fui site (which is now the Spanish logistics hub) and Rocio in 2001. This increased production to 20 hectares with capacity at their peak of up to 40 tonnes of watercress a week. In 2016 Royalcress celebrated its 30 year anniversary. As well as producing watercress and other salad leaves, it also provides seed for the sister companies of the Watercress Company based in the US and the UK, in this way linking production in Dorset, Hampshire and Florida.

Royalcress is accredited by GLOBALG.A.P., Tesco Nurture, Marks and Spencer Field to Fork and LEAF Marque. In 2001 Royalcress became Spain's first producer of certified organic watercress. Recognised by their peers in the Spanish Watercress Growers Association for their work in pioneering new bio-controls, they are committed to the long-term development of measures to protect the crop.

Royalcress first became LEAF Marque certified in 2005 and quickly found that LEAF Marque was complementary to the company's general drive for efficiency. Damien Lascelles, the Technical and Production Manager, said:

"With the introduction of variable speed control on our recirculation pumps (which keeps water recirculating through our beds), we have managed to make large savings on electrical consumption."

As LEAF Marque became embedded, it became part of two focal points for the production – IPM and biodiversity.

Part of the integration in pest management was a move away from “just pushing chemicals” to a greater focus on detail and communication:

“LEAF Marque has strengthened our focus on Integrated Pest Management involving sound crop monitoring methods from the use of pheromone traps to crop inspections, pest and disease thresholds. EU review of activities has reduced the number of PPP’s [Plant Protection Products] available on minor crops such as watercress whilst more bio-pesticides are becoming available.”

This focus on IPM, in turn, has changed staff training and levels of engagement:

“It is not just a policy; there is a lot more discussion. This has an impact on staff training. Staff supervisors crop walk twice a week. Crop workers are trained to look for pests and diseases as well as deficiencies – it is about involving staff, the people working in the crop are the people seeing changes that could lead to a bigger problem. Luckily, we have a good group of core staff, we retain the same staff every year, who have built up expertise, and we have had a stable team for 10-15 years now.”

Another part of this integrated focus is recognising the importance of biodiversity. Royalcress have left 5% of the farm uncultivated and also incorporated field margin strips:

“We see a fair number of bats and have set up bat boxes on the office, but no bats are residents yet. In terms of field margins, we see signs of beneficial insects in the margins, the diversity of plants increased over the years - snakes generally in areas where there is little activity, and we leave those alone as they are predating on rodents.”

The Open Farm Sunday initiative has attracted local people to the farm. Drawn by the opportunity to walk the farm, a BBQ and Flamenco band, Damien says that has been helpful as “there isn’t much vegetable production in this part of Spain and locals find it very interesting to see what we are achieving”. This initiative has improved local understanding of what the business is doing and general goodwill. One group of residents are particularly pleased:

"Excess crop? It is either sent to local food bank or the local zoo, we are members of the local zoo, and apparently, it is a favourite of the hippos."

- www.royalcress.com
- www.royalcress.es
- www.thewatercresscompany.com

F - Mercer Farming – Packington Freerange

The brothers Robert and Alec Mercer, are highly motivated to demonstrate that a viable business, animal welfare and sustainability lead to a better product for the end consumer. Drawing inspiration from their great-grandfather Percy, they combine traditional farming methods that respect both the livestock and land with an approach to business that sees them value the long term for themselves and their customers. Alec sees one of the advantages of being a family farm is the confidence it brings to customers, “you can make those longer-term decisions, which gives customers the confidence that you are not just there for quick gain”. Their whole approach is driven by an ethos of combining the best in farming, innovative use of technologies such as solar power, that sees an integrated approach to the farm reflected in the product, Alec continued:

“Does someone buy pork from us because of our carbon [neutral] status? Do they buy from us because of the high welfare standards? No, they want to buy a tasty, ethically sourced product that doesn’t mean just the high animal welfare, it means everything that goes with it, it is not just one element.”

The brothers’ approach to agriculture has been shaped by numerous experiences. Both spent time studying agriculture at Newcastle University and are also Nuffield scholars. This academic background has also been combined with insights into the importance of low density, high welfare as the future of pig and poultry production. The focus of the industry has changed over time, as Rob reflected, “myself and Alec have focused the business on high welfare and environmental aspects, whereas when Dad was farming, he was focused on low cost of production.” As well as supplying multiple retailers they also supply local butchers and direct sales to customers. Their approach has seen industry awards, recognition in the ‘Great Taste’ awards of their pork and regular visits by celebrity chefs. In line with the family ethos of the brand, Pip and Sally (Alec’s and Rob’s wives) have a section on the website dedicated to providing recipes and inspiration of what to cook with Packington Pork and Poultry.

Animal welfare is central to the Mercer’s approach, and they are part of the RSPCA’s ‘Freedom Food’ scheme to ensure high standards throughout the life of the animal. Their

commitment has been acknowledged in industry awards as well as by Compassion in World Farming. The pigs are born and raised in small outdoor paddocks, with appropriate shelter and access to the sow. Once weaned they are moved to more protective enclosures and finally into when hardy enough they move to larger paddocks. They spend their entire lives outside, with freedom to move around and express their natural behaviours. The poultry spends the first three weeks of their lives indoors, as they are prepared for the outdoors by a gradual lowering of temperature. They are then given access to go outdoors and graze on established pasture, with enhancements such as shade shelters, perches, as well as food and water. All the birds are returned to the shed at night to protect them from predators. Alongside this Rob has stopped using antibiotics in the pigs' rations, sourcing all the soya for it from sustainable sources and adding selenium for pig and consumer welfare. This is a combination of ethos and pragmatic business for Rob:

"A lot of this is driven by ethos and how we want to do things, the antibiotics thing, I think we should stop feeding pigs antibiotics altogether, but if in the meantime, I can use that to my market advantage, well happy days. But it is fundamentally driven by how we want to do things as opposed to are we going to get any direct reward."

Through extensive use of PV solar the farm is carbon neutral, and through being involved in agri-environment schemes for more than twenty years the biodiversity has been significantly enhanced, with over 80,000 trees planted and a tripling of the number of bird species observed. Alec explains that they see this as part of the role of LEAF Marque, providing independent verification of the impacts their approach is having:

"There are a lot of companies out there with these statements about their high ethical standards but there is nothing behind it, but if we can demonstrate that we are going to these levels with the environmental and the renewables you don't do that unless you genuinely believe that."

As Rob adds, “it is important to us that we do what we say we are doing” and LEAF Marque provides that opportunity. Both Alec and Rob argue that customers view the product in an integrated way, which is mirrored in their approach, Alec explains:

“People care about the welfare of animals that is a given, but if you can demonstrate that you are being proactive in other areas, carbon credits what have you, it adds more weight.”

Alec continues, that after four years of LEAF Marque certification, “we have never had the discussion that LEAF needs us to do this, so we’ve got to do it” rather the LEAF Marque reflects and accredits initiatives that they want to take. Although with so many enterprises:

“We are quite diverse, so we can be a little bit sporadic in what we are doing, and it does help tie it in a little bit better, to give a us a more whole understanding of what we are doing.”

In this way, LEAF Marque forms an important part of the portfolio of schemes and initiatives that are helping take the Brothers’ vision for the farm forward.

The farm receives over 90 school visits a year, involving over 6000 children, highlighting the significant commitment to education made by the Mercers. During Open Farm Sunday, they host some of their farming neighbours on the Packington Pork site, and Rob notes the pride it engenders in his team “the guys really enjoy getting the farm looking absolutely bang on for the big day and that has a positive effect”. For Rob, this is part of their wider commitment to education:

“I think that farmers often have a view that the general public don’t know what happens on farms, but in our example, we have had 3500 people come and want to learn what happens on the farm, I think that people would like to know more but don’t have the opportunity to learn.”

As Alec reflects this openness to the public and transparency is part of their approach to business and is central to building their approach to agriculture, he notes that many other business are:

“Wanting true continuity of supply from a credible source who is not just giving you good healthy pigs but is doing everything else and who they can align with. On each of our farms we have the attitude that we would like people to come and see it, it is always open because we will stand by our product any day of the week, which gives people a lot of confidence.”

- www.packingtonfreerange.co.uk

G - Ragley Home Farms

The Ragley Home Farms are part of the wider Ragley Estate. In addition to over 40,000 annual visitors to the historic hall, it has a sawmill, a range of properties and a butchery. Farm Manager, Hamish Stewart argues that it is important to understand that, “we are a profit-making business, if we don’t make a profit then none of the rest of it will happen”. Farming over 1400 hectares the farm focuses on arable crops and sheep. Although an early adopter of LEAF Marque its status had lapsed, and in the last 18 months Hamish has “re-ignited it”.

The opportunity to supply Jordan's with oats was the impetus to renew LEAF Marque, but equally the synergies became apparent as in areas such as biodiversity “we were already doing it, and LEAF Marque gives us the recognition that we were doing it”. Although there are “sideline” benefits as well, as it encourages “looking at parts of the business that we would otherwise have overlooked.” Initial quick wins such as looking at improving continual usage of electricity in lighting and grain conditioning to improve efficiency has evolved into a more integrated review of this mixed farm. It became apparent that one aspect of the farm was close to the other and improvements would come in unison:

“In terms of fuel of usage ideally, I would like to reduce our cultivation intensity, we need to get our soils in a better state to make that work properly. Cultivation are done on a field by field basis rather than a broad brush across the whole estate; I actively avoid what I call recreational cultivation.”

To improve the soils, Hamish and his team:

“Have started to use a lot more organic fertilisers, and we are trying to kick-start the soil biology a bit more, almost feeding the soils to get them to perform better. I think that by taking that approach I would like to think we will increase our yields without increasing our input, so the efficiency will improve, diluting our carbon footprint as well.”

This integrated approach carries over into questions of crop protection:

“We take our advice from independent sources, doing our agronomy in-house gives me more of an informed outlook on the whole input side of things, and we probably take more of a critical approach as to how we are doing our pest and disease control.”

In part, this perspective stems from a change in the rotation of the crops on the farm:

“We are going to extend our rotation with longer gaps between crops and a wider range of crops, during the winter there will be less applications and oats are a low-intensity crop. with regards to LEAF Marque it is a bit of a chicken and egg situation, which came first?”

About 30% of the lambs produced on the farm go to the Butchery on the estate, although at present LEAF Marque is not displayed. The rest are sold through a co-operative group. Central to their production is high welfare standards:

“We have a full-time shepherd who looks after the stock. In order to maximise the output of your flock, you can't have animals that are sick or who are lame, keeping animals to the highest standards and profitability are pretty tightly linked as far as I'm concerned.”

The long-term commitment of the Farm to the improvement the environment means that there are sixty miles of field margins which have been established for between ten and fifteen years. In recent years, these have been enhanced with flowers and a broad range of birds are now thriving. Hamish notes that part of the success is that, “For LEAF Marque, like all of these things to really work, you have to be enthusiastic about it.” Part of being on the estate means that there are often members of the public passing, and that “The wider estate makes us quite conscious of what we do”. To balance that scrutiny is the opportunity to show to visitors what the farm is achieving, and “if you get them right, it is quite pleasing to show those features off.”

As the manager of a LEAF Demonstration Farm, Hamish feels he benefits from the opportunity to network with his peers, "as part of being a LEAF Demonstration Farm there are regular events, so I have more contact with other farmers, and so you are probably more specifically discussing ideas with others who share the same goals." Recent training from LEAF has reinforced to him the support LEAF provides, “there is more support in

speaking to people beyond farming, help in singing the song of what we do.” In using Twitter and plans to communicate with visitors to the Estate in new ways, Hamish argues that:

“The countryside looks how it looks because of agriculture, how agriculture goes on and the environmental schemes for example, what we do has a huge impact on how these things look.”

- www.ragley.co.uk
- @hamishws

H - Brixworth Farming

Charles Matts, Managing Director of Brixworth Farming, was one of the farmers featured in the recent BBC radio series about the future of agriculture; his contribution highlighted the importance of innovation in preparing for changes to the industry. This commitment to innovation is evident in the structure and stance of Brixworth Farming. Bringing together five farms, the company focuses on the long-term stewardship of the land, achieving economies of scale and the sharing of risk by pooling crops, wherever possible growing for specific markets and opportunities. Brixworth Farming's strategy is underpinned by an experienced and qualified team, who receive the full support of the company directors and shareholders.

The central insight that sparked the formation of Brixworth Farming was gaining access to economies of scale without individual farmers losing control of the autonomy of their own business and assets. Founded in 2000 by three family farms coming together to collaborate, and since joined by another farm and an Estate, Brixworth Farming farms over 2000 hectares of land and provides contracting for others. The benefits of this approach were seen between 2000 to 2001, when the horsepower required to farm the land was more than halved, as larger and more efficient machinery was introduced. Similar benefits have been found in creating a crop pool, so that risks can be mitigated and the work of marketing can be conducted by specialists on Brixworth Farming's behalf. The governance structure of Brixworth is overseen by an independent chair and operations are supported by a small administrative team. This approach allows shareholders considerable flexibility, as they can continue with other enterprises on or off their farm, while reducing capital and staffing costs, with improved marketing.

Brixworth Farming is a LEAF Marque certified business, with the shareholders taking their land into different levels of agri-environmental agreement, until recently three were in Entry Level Schemes and two in Higher Level Schemes, reflecting their individual businesses and land. LEAF offers a common framework for conservation, efficiency and community engagement that ensures a consistency of operations across the different farms within the collaboration. They were approached by ADM to take up a premium contract to grow OSR

for Hellman's Mayonnaise, but a precondition was being LEAF Marque certified. The premium available was £15 per tonne, which for Brixworth Farming was worth £30000 per year. Although the initial appeal was financial and transactional, Charles Matts began to see the benefits as being broader for the business:

"I think I get it now, although it could be seen as a bore writing these things down, and then going back and reviewing it with the whole team, making annual improvements, thinking about it once a year does sharpen us up, it does nudge us in the greener direction we want to go, I'm not saying we are the greenest business, but I have confidence that we are making improvement."

Much of the cost of becoming LEAF Marque certified had been off-set because the stewardship, and the two now "work very well together".

A focus on energy efficiency had developed before entering the LEAF Marque system. A saving of £17000 had been achieved through a simple change of machinery:

"We realised there was significant effect - still not very good at measuring fuel use per operation we are getting there, with the advent of telematics."

Further savings have been identified, although a carbon footprinting tool was not as helpful as it might have been:

"Carbon footprints provide a useful footprint to benchmark - it won't be completely accurate but providing you are making the same assumptions, measuring the same way you can make improvements and that is helpful. 6-7 years ago, we decided that we would measure our carbon footprint, but we got bogged down in the detail. But it helps us understand what difference some of our management practices are making."

The approach of combining sound business with the environment is part of a wider strategy: “we are not making maximum profit, but profit with due regard to the environment and our people.”

“We are not making maximum profit, but profit with due regard to the environment and our people.”

As part of this regard for the environment a precautionary approach had been taken to stopping using crop protection chemicals, looking to the longer term:

“We have lost a lot of chemistry because it has been found in the water, and if we lose it what are we going to do? Will we be able to produce crops effectively? Glyphosate - rather than wait for that ban to happen we are talking to our merchants, and through them, their customers in a bid to understand each other’s requirements.”

As part of the process of understanding risks on the farm there has been a consideration of them with regard to water pollution:

“As part of risk register on the farm we consider pollution, we are taking part in voluntary ban on metaldehyde. Further to that we have been talking to Anglia Water about testing internal ditches so that we have a better understanding of how we can avoid contaminating water.”

In this way Brixworth Farming continues a pattern of innovation by anticipating changes in the industry as part of its remit of long term stewardship of the land.

- www.brixworthfarming.co.uk/
- www.bbc.co.uk/programmes/b08bz198
- @BFC_Farming
- @Charles_Matts

I - Intercrop

“It is a bit like a fashion industry, things move and change quite rapidly, we spend a lot of time on trials and development because we are always looking to improve our offer.”

Thane Goodrich's description of the parallels between the business of producing salad leaves and that of looking on trend at first seems surprising but as he explains the aesthetic demands, the need for quality and innovation it begins to make sense. Intercrop Ltd, at which Thane is the Innovation and Development Director, is celebrating 25 years of growing in 2017, and over 20 of being able to offer customers year-round production with their farms in Spain. With over 850 hectares in production, 400 in the UK and 450 in Spain, Intercrop are supplying over 40 varieties of leafy crops. After the rapid growth of bagged salads in the 1990s the focus has shifted to new production systems and varieties to improve quality and maintain value:

“In recent history, value has been a big driver, and with investment in specialised harvesting equipment, we have managed to improve quality and maintain value in spinach.”

Such is the demand that Intercrop are now producing 100 tonnes per week, to meet the demand for spinach from consumers who see it as a good value leaf.

Intercrop are always a step away from the retailer, as their produce needs to be washed and packed before being ready for the shelves. Encouraged to become LEAF Marque certified by customers, Thane recalls:

“We looked at it, and we didn’t think it was too onerous we were already doing a lot of it, ... LEAF Marque brought it all together into one format.”

Much of what was being asked for in the LEAF Marque Standard was already happening on the farm but, “LEAF gave us an independent label that demonstrated what we were doing as a farm.” Over the years, the LEAF Marque has become woven into the management of the farm:

"It sits alongside what we do; it becomes part of what we do, it is like you don't actually think about it."

The demands of leaf production, for not only a perfect leaf but one that is safe and uncontaminated means particular challenges and solutions when it comes to Integrated Farm Management. The salad beds are based on, "controlled wheelings, to minimise compaction to known areas, and we don't plough between crops now, it is all with GPS so we can lift a crop and place the next one onto exactly the same place."

The soil is a big focus, with continued use of barley as a winter cover crop, and green cover crops to help ensure there is no nitrogen leaching but also to protect the soil. Soil organic matter is a special focus as to control microbial contamination risks there are limits to grazing animals on the land and the use of animal manures. Intercrop has invested in regular monitoring, "we routinely analyse all our soils every year, I would say that we have been doing it in greater detail, we are doing more in-depth analysis of the micro-nutrients." There is also an interest in micro-flora, but here Thane thinks that they butt up against the limits of our present knowledge, "one of the things we struggle with as an industry is having those benchmarks of what to measure in soils". This absence means that the Intercrop team "still do a lot of work by spade" using their experience to make judgements.

While encouraging biodiversity takes place by leaving headlands and other areas that cannot be cropped efficiently, but primarily the focus is making sure that wildlife is "on the edge of the field rather than in the field". To reduce pesticide use, Intercrop is using floating barrier netting to exclude insects from the crop. The primary problem is the presence of the larvae of predatory insects being found by consumers in their salad, "Consumer won't say I can see that you are doing all those great things for the environment if it is sat on your plate". The focus is making sure that insects do not get into the crop.

Thane explains how being LEAF Marque certified helps them balance these demands to maintain value, produce an aesthetically perfect product, to ensure that it is safe and keeps up with changing demands. He sums this up as a commitment to quality:

“A lot of what we do is making sure that quality is right, and if we don’t get that right we can forget everything else we do.”

J - Overbury Enterprises

On the border of Worcestershire and Gloucestershire, Overbury Enterprises surrounds the Cotswold villages of Overbury and Conderton. A mainly arable farm with a flock of 1200 ewes, and a farm contracting business, the Farm is part of the wider portfolio of Overbury Enterprises. The 1590 hectares of land is on the slope of Bredon Hill, which at over 300 metres offers a range of gradients, and a diversity of soil types from heavy clays to Cotswold brash. Overbury Enterprises is LEAF Marque certified and since 2012 has been a LEAF Demonstration Farm; reflecting the ethos of the business in blending traditional values, such as the appearance of walls and hedges, and modern technologies, including the latest developments in agri-tech.

Jake Freestone, the Farm Manager, is a familiar face to many in the agricultural industry, having spoken at Farming Conferences, and as an enthusiastic social media user, he explained:

“LEAF Membership came first in 2004 and LEAF Marque certification in 2007, we did LEAF Marque because we were direct selling lamb at that point and we thought that for a forward-thinking business, not just for the marketing side of things, that it gives us a positive commitment, to the work that we are trying to do in terms of environmental sustainability, the work we do with the community, using the latest technologies and LEAF Marque cemented all of that together.”

With a mixed farming operation, combining “winter wheat for milling and biscuits, OSR for ADM and that goes as LEAF Marque, winter and spring malting barley and that all goes to Burton upon Trent, we grow human consumption peas, a bit of linseed.” The search for greater sustainability has started to integrate the various enterprises in new ways.

The starting point for the changes is a concern to improve the soil, based on work that Jake did as a Nuffield Scholar in 2013, looking at the plateauing of crop productivity:

“The conclusion was that we have been mistreating our soils through over-cultivation and as a result of that we experimented with some zero-till, and now the bulk of the farm is in zero-till. The other thing I discovered was a wider rotation and the use of cover crops, to try and keep the soil covered at all times with something that is living, and then get the livestock to integrate into the arable unit but having them graze those cover crops.”

This opportunity of integrating the livestock has led to a reconsideration of their management:

“We what are trying to do is grow enough cover crops so that we can keep the sheep out for more of the year, rather than housing them and plying them with expensive bought in feed or home grown feeds, haymaking is not a cheap operation in a tricky English climate. It is early days to put quantitative values against it, but the theory is sound.”

This process has been driven by an intersection of schemes and research, but Jake is aware that “in turn that ticks lots of LEAF Marque boxes in terms of precision farming, input minimization, pollution control it all comes back into that.”

LEAF Marque has encouraged a greater focus on management of resistance in the livestock:

“In terms of sheep husbandry, it has focused our minds on resistance to worms and how we can manage that, hence getting involved with the faecal egg count, so we can monitor the health stages of the sheep ourselves and has led to about a 30% reduction in the worming products we use, as a result of not blanket treating.”

Regarding animal welfare, LEAF Marque has not made changes to the farm's practices, but, “it does make us monitor what we are actually using, it is a good annual reference, partly for LEAF Marque and partly for focus on sustainability”.

The work on the soil is beginning to make a difference, after an extended period of monitoring:

“We have been monitoring organic matter in certain fields for about ten years, we are counting worm populations as a key indicator of soil health, and hopefully in February we are going to start doing some experiments to measure water infiltration.”

The differences are becoming noticeable as the land is being worked:

“The soils are restructuring themselves; they are becoming more friable and workable; the team are noticing – they are saying that they are up a kilometre or half a kilometre an hour when drilling.”

This monitoring is now being coupled with scrutiny of earthworms, “we are getting down to counting the number of earthworms, weighing them and seeing what is actually going on”.

Although Overbury Enterprise hosts a quiet Open Farm Sunday, the main educational event is on a lambing day earlier in the year, where the focus is on the link between food production and conservation:

“We tend to put most of our effort into our lambing day which can have anywhere between 600 – 1000 people, so it is all hands-on decks, the staff get involved, and the village tenants all come in to do teas and cake.”

The link is made explicit by the food served:

“We [used to] serve hot food, lamb burgers, lamb casserole so we can make that conscious link, they can see the fluffy side, but the only reason the fluffy side is there is because we are meat producers.”

The outreach is backed up by extensive contacts with a school in central Birmingham, as well as local colleges and universities, to share the lessons learnt on the farm as widely as possible. The LEAF Marque in turn “feeds into our philosophy of improving the whole environment.”

- www.overburyfarms.co.uk
- www.overburyenterprises.co.uk
- @OverburyEnt
- @No1FarmerJake
- www.youtube.com/user/No1FarmerJake

K - The Leckford Estate

The Leckford Estate is also known as The Waitrose Farm, which signals the blend of opportunity and responsibility that this LEAF Demonstration Farm carries. With 1600 hectares in the Test Valley, bisected by the River Test, one of the world's premier fisheries. The farmed environment of the Leckford Estate is of vital importance to a wide range of stakeholders.

The farm has a herd of 550 Holstein/Friesian cows producing over 5 million litres of milk a year, 12 hectares of apple and pear orchards, free range eggs, and over 650 hectares of wheat, barley, oats and oilseed rape. In line with all Waitrose dairy farms the cows have access to grazing for at least 120 days a year, and they grow their own forage crops to ensure they have the very best quality feed. The newest addition to the farm is a vineyard, planted in 2009 which grows three different varieties of grape. There are beef cattle and sheep conservation grazing in the River Test water meadows and on the chalk grassland banks during the winter and summer months. As well as the farming enterprises, over 27 tonnes of chestnut mushrooms are grown per week, and the farm presses its oilseed rape to produce 'Leckford Estate Cold Pressed Rapeseed Oil'. There are 16 Leckford Estate products available through the Waitrose stores nationally.

With the farm nested within a wider parent company and in such a highly valued environment, Farm Manager Andy Ferguson stresses that the LEAF credentials are relevant, although they will not always be on the product packaging. A key feature of the wider Waitrose brand is that 'we understand farming because we are farmers'. This means issues, such as animal welfare, are given paramount importance. Within this the role of LEAF Marque is:

"I remember the original LEAF Audit tagline was 'it makes you think'. LEAF is helpful in that it holds you to account, it makes you focus."

As part of this discussion is that LEAF Marque helps to organise strategic thoughts in a complex business environment:

“It is easy in business management to get distracted from all sorts of things, and the LEAF Marque keeps you honest, it helps you keep your head up and gives you a structure as what to focus on.”

Examples of this focus on the details can be seen in the savings that investments into renewable energy have made. In 2013, a 50kW PV solar array was installed on the dairy roof, and in 2015 a second 186kW array installed on the grain store roof. Most of this energy is used on the farm with a small amount sold into the national grid. Regarding pollution management, LEAF Marque has indirect impacts, as part of the risk register for the farm the decision has been made not to move manures from one side of the farm to the other, to ensure no manures could accidentally enter the River Test. While many outside of the farm point to the benefits of being part of a larger business, LEAF Marque allows the farm to demonstrate continual improvement as verified by an external body. Andy Ferguson is convinced that sustainability is going to “take on a more front of mind importance”, and attention to questions such as fuel efficiency improve the resilience of the farm, as he explains:

“With things such as ‘Brexit’, there are many things that are outside of our control, so we need to take control of what we can do.”

- www.leckfordestate.co.uk

J – G's Espana S.L.

G's Espana S.L. is part of the wider G's group, which established its first presence in Spain during the 1980s, celebrating 30 years of operation in 2015. It now operates as 120 farms covering almost 6000 ha supplying a broad range of vegetables and fruit. The farms in G's Espana supply a wide range of multiple retailers as well as operating several brands such as 'Pascual' and 'G's Fresh'. With the advantages of sunlight and temperature in Spain their season runs 52 weeks per year. Growing takes place at these locations: Campo de Cartagena, Aguilas-Almería, Jumilla and Baza, which are at different heights and temperature zones to provide produce for other parts of Europe consistently across the whole year.

G's Espana have been LEAF Marque certified since 2007, partly in response to two customers in the UK, but as Rosalia Alcobendas, Technical Manager for Environmental Projects, says:

"Only two of our many customers requires us to have LEAF Marque [certification] but for most of our customers in Europe and the UK it is a very desirable sign of our commitment to the environment."

Although initially set up to supply the UK, G's Espana now provides fruit and vegetables to customers throughout Europe.

As an early part of their commitment to reducing pesticide use on the farm and developing Integrated Pest Management on their farms they have been working on a companion planting project with Syngenta. The project started in 2005 with 5 farms and this year will cover near 6000 m² across 12 farms. The results of this project have shown a substantial increase in the number of beneficial insects and pollinator species.

G's Espana have been revising their use of fossil fuels. This year, investments have been made in solar powered irrigation equipment that will save at least 0.01% of the total fuel consumption of the agronomic machinery. Using GPS technology to guide pesticide application equipment to avoid overlaps, G's have also been able to ensure efficient dosage

and to save fuel. Most of the tractors are also equipped with GPS technology to improve the efficiency of tillage operations, again saving fuel and maximising field operation effectiveness. In addition, all recent machinery purchases have included AdBlue and SCR technology to reduce Nitrogen oxide emissions, a particularly potent greenhouse gas. G's HR department have been working with all drivers to ensure that they are up-skilled to take full advantage of all the advantages the new technologies and techniques offer.

In the Aguilas area, a Heliosecc system has been installed underneath the machinery washing area which collects any agrochemical effluent as they are washed off the machinery. The water is allowed to evaporate by the action of the wind and the heat, leaving solid wastes behind which are then removed to be stored and managed by an authorized company.

As G's Espana production area is mainly located in the South West of Spain where water scarcity is an important issue, therefore another important goal for the company is saving water. Under each greenhouse there are drainage collection systems and there are water collection systems in irrigation systems – these actions make sure that water is captured and can be used again. To optimise water management, and target its use, Enviroscan probes are used. In these ways G's are using water wisely and focusing on optimizing its use in the fields and on the protected crops.

G's are also working to preserve and increase biodiversity in their farms, creating two ponds in areas of Campo de Cartagena and Jumilla that are unsuitable for production. In these areas they have also placed shelters for birds of prey and created new habitats for reptiles.

For G's Espana the soil is a big focus and managing the soil between rotations can have a big influence on its short and long-term health. Controlled traffic farming is being employed to restrict compaction to known 'compaction zones'. Diligent monitoring of compaction using soil pits and penetrometers on a field by field allow G's to maximise the benefits of this and help to carry out sub-soiling at the right time and at the right depth. Alongside this form of management, cover crops are used to improve soil fertility, increasing the presence of trace

elements, lessen soil erosion and improve soil structure. This year one of G's objectives was to increase the cover crops surface by at least 3%.

One of the most exciting aspects of the LEAF Marque for G's Espana has been inviting people onto the farm, with over 50 young people visiting the school this season. Rosalia Alcobendas said:

“Some of these young people were thinking about a career in agriculture, but they didn’t have much information about it before their visit. This means that by showing them some of our farms they have a lot more information and they seem enthusiastic about the change to work in the industry.”

13. Appendices

13 a. Frequency Tables

Question	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree	Total
A – LEAF Marque has improved the landscape?	4	7	8	3	0	22
B – LEAF Marque improved biodiversity on your farm?	4	15	9	1	0	29
C – LEAF Marque improved energy efficiency in your business?	2	12	12	0	0	26
D – LEAF Marque improved the condition of the soil on your farm?	1	13	8	0	0	22
E - LEAF Marque has improved links to the local community	7	8	10	1	0	26
F – LEAF Marque has increased my involvement on the political front (representing the sector)	3	6	9	1	0	19
G - LEAF Marque has improved you farm income	5	6	18	2	0	31
H – LEAF Marque has improved the quality of your product	1	8	10	1	1	21

13 b. Questionnaire

LEAF2016-7

Page 1:Details

1. Name of Farmer
2. Date of interview
3. Interview type

Page 2: Farm Details

4. Are you
 - 4a. Working status
 - 4b. What is the total area of land you farm as a single business? (Hectares)
5. How much of the holding is owner-occupied and how much rented?
6. Which enterprise is covered by LEAF Marque, and will be the subject of today's interview
7. How long have you been a member of LEAF?.....
8. How long have you been a member of LEAF Marque?
9. Why did you decide to join LEAF?.....

10. The LEAF MARQUE and IFM practices have.....

	1- Strongly agree	2- Agree	3-Neither agree or disagree	4- Disagree	5- Strongly disagree
Increased my income	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved biodiversity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased efficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased capital values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved landscape	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved stock quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved cereal quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved Energy Efficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved soil condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved understanding among the local	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved my business performance – e.g.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
changed the way I communicate with staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
and others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased my					

involvement with others on a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
political front	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Page 3: Financial Benefits

11. Can you put a (£) value on any savings and improvements in your business because of managing it on a whole farm basis?

11a. Have there been any benefits because of changes to staff engagement, treating staff well etc.

12. Have you made any changes with regard to **energy efficiency** and can you put a (£) value on those changes?

12a. Have you been able to use less **fossil fuel** because of changes in cultivation techniques, tillage practices, or to other business practices?

12b. What are the benefits that have come from the adoption of precision farming techniques?

12c. Have you increased your production of, and/or use of renewable energy?
(If yes could you give this a £ value?)

12d. Can you describe any further benefits resulting from increased energy efficiency?

Page 4: Environmental Benefits

13. Can you describe any benefits from how you now manage the Soil and its fertility?
(Has this resulted in any savings/costs in £)

13a. Have there been any increases in soil organic matter?

13b. Have there been any increases in soil flora and fauna such as worms or beneficial fungi? (and how do you know?)

13c. Have you done anything to combat soil erosion, and what have been the benefits of this (£ if applicable)?

14. Have there been any benefits to Crop Health and Protection (can you put a £ value to those)?

14a. Have any of those (benefits) come from the adoption of precision farming techniques?

14b. Can you describe any improvements to crop quality and health through IPM techniques, such as soil management techniques etc.

15. Can you describe any benefits that have come from pollution control and by-product management?

15a. How do these (benefits) come from the adoption of precision farming techniques?

15b. How have you reduced the risks of point source pollution from plant protection products?

16. We would now like to discuss Water Management changes with you and the benefits that may have come from changes you have made.

16a. Have there been any benefits that have come from the adoption of precision farming techniques with regards to water management,

16b. Have there been any other improvements in water management including improved efficiency of use (e.g. drip irrigation) (Could you quantify those benefits in terms of £)?

16c. Have you noticed any improvements in water infiltration hence ability to cope with changes in frequency and intensity of rainfall events?

16d. If you use irrigation, have you changed where the is sourced from?

16e. Have you taken any action to reduce nitrate leaching into water courses?

17. The following are a set of questions about Landscape and Nature Conservation.

17. Have you noticed any increases in wildlife diversity or in numbers of e.g. Birds, Butterflies, other pollinating insects etc. and can you quantify them?

17b. Have you noticed any increases in habitat provision through woodland?

hedgerows, field margins, nest boxes etc. Do you provide food sources for wildlife around the year?

17c. Can you describe how these benefits come from the adoption of precision farming techniques?

17d. Can you describe any benefits that derive from LEAF Marque for Animal Welfare?

17e. Can you give any example of these benefits have an impact on your business?

18. Has being a LEAF member helped you get into an agri-environment scheme?

18a. Please give details

19. Does being a member of LEAF MARQUE provide any benefit in relation to your regulatory/legal requirements? Explain your answer Eg cross-compliance, NVZs. Leraps (prompt: peace of mind, fewer inspections)

20. What do you do about food waste minimisation?

20a. Do you donate food waste?

Page 5: Social Benefits

21. As a result of the LEAF MARQUE, have you had more contact with neighbouring farmers? - how does that happen

21a. Has this increased contact resulted in any economic benefits? If yes, what has been the impact on annual farm turnover (£ or %)?

21b. Has it resulted in any social benefits? If yes, please provide details (prompt social networks, friendships, more support)

22. As a result of LEAF MARQUE, have you had more contact with farmers in general.

22a. Has this increased contact resulted in any economic benefits? If yes, what has been the impact on annual farm turnover (£ or %)?

22b. Has it resulted in any social benefits? If yes, please provide details (prompt social networks, friendships, more support)

23. As a result, the LEAF MARQUE have you have had more contact with the general public? - how did this come about

23a. Has this increased contact resulted in any economic benefits? If yes, what has been the impact on annual farm turnover (£ or %)?

23b. Has it resulted in any social benefits? If yes, please provide details (prompt social networks, friendships, more support)

24. As a result of the LEAF MARQUE have you developed more 'good will/better relations with the local community?

24a. Has this increased contact resulted in any economic benefits? If yes, what has been the impact on annual farm turnover (£ or %)?

24b. Has it resulted in any social benefits? If yes, please provide details (prompt social networks, friendships, more support)

Page 6: And Finally

25. Of all the benefits that we have discussed, what would you say was the main benefit of the LEAF MARQUE to you and your farm business?

26. Are there any further comments or observations that you would like to make about the LEAF MARQUE?

Page 7: Thanks
