



# McDonald's Europe Flagship Farms Potato & Carrot – Elveden Estate, UK

## Introduction

The focus of this case study is to show how a large farming enterprise has positively embraced and increased the biodiversity on the farm, whilst increasing the profitability of the business by growing high quality produce and investing in carefully considered diversification opportunities.

The key initiatives undertaken by Elveden Estates can be summarised as follows:

- Visual guidance hoes are used to weed between crop rows; the computer-controlled guidance system allows cultivation and weed removal between the rows very close to crop without causing any damage. The practice has reduced herbicide use in carrot crops by over 50%.
- The potatoes and carrots grown on the farm are produced to strict quality standards to ensure that they meet the requirements of the farm itself (in terms of input and quality), and the specifications of the processor (quality and visual characteristics). The relationship between the farm and the processor is absolutely critical to the continued marketability and quality of the raw ingredients.
- Elveden has invested in and constructed two 400,000 cubic metre reservoirs on site which are winter-filled during November and December. To ensure the water quality is of the required standard, a monthly assessment is carried out (during irrigation periods), covering microbiological and nutrient levels (screening for pesticides and nitrogen is also undertaken throughout the season).
- Elveden uses soil moisture probes help to monitor moisture levels in potato fields, and an on-farm weather station predicts rainfall and soil evaporation rates. This information is then fed into a decision support system which helps calculate irrigation requirements for the potato crop; this reduces production costs and ensures the highest yields and quality.
- Elveden has calculated its 'Carbon Footprint' - the total greenhouse gas emissions caused directly and indirectly by the business – with a view to devising an action plan to reduce emissions and energy use.

'Here at Elveden our farming ethos is one driven by sustainability. Our business is based very much around the appliance of science to best practice, whilst maintaining our traditional landscape and enhancing the environment we work in. The honour of being selected as a Flagship Farm for McDonalds helps to underpin our belief that at Elveden we approach agricultural sustainability, and environmental management very seriously.

It is important for the future of food supply that we look to work as closely as possible with our end customer, to facilitate knowledge transfer in both directions. This portal also helps us demonstrate that our businesses consider all factors influencing the sustainability of food production and the enhancement of our environment.'

Andrew Francis, Elveden Estate



Andrew Francis – Senior Farms Manager

- Elveden has invested in more efficient equipment such as inverter pumps and fans. Energy spend is a significant farm cost, and inverter drives can reduce running costs by up to 30%. Regular servicing of machinery and equipment also ensures they are operating as efficiently as possible.
- The Estate has over 2,000 hectares (7,000 acres) of conservation area. There are now 50 pairs of Stone Curlew (almost 15% of the UK's summer population). The Estate has excellent conservation credentials which are seamlessly coupled with maximising the efficiency of the productive land.
- Elveden has initiated various diversification opportunities that have been an important venture for the business. They have improved the economic viability of the farm business, and reduced dependence on the profits generated by producing primary agricultural commodities.

The McDonald's Flagship Farms scheme has been developed in co-operation with the Food Animal Initiative (FAI) to showcase good agricultural practices which are environmentally sound, economically positive and ethically valuable. A limited number of 'flagship' farms have been selected to represent progressive practice in the agricultural sectors from within the McDonald's supply chain.

McDonald's has developed a matrix containing 17 key areas of good practice. Flagship farms have been identified that demonstrate best practice in a number of the 17 key areas in the matrix, whilst also operating to general high agricultural standards in all other areas. Please see Appendix for the Good Practice Matrix for Elveden Estate.



The potatoes and carrots grown on the farm are produced to strict quality standards

## Summary of actions

The table below summarises the key areas of good practice displayed by Elveden Estate, and the benefits (EN environmental/EC economic/ET ethical) that arise from taking these actions.

| Action   | Benefits  |
|--|---|
| <b>Crop Initiatives</b> Vision guidance hoes used in row crops                 | <ul style="list-style-type: none"> <li>EN Reduced use of chemicals</li> <li>EC Hoes have reduced herbicide use, and costs within carrots crops by 50%</li> </ul>  |
|  | <ul style="list-style-type: none"> <li>EN Carrots are over-wintered in field with soil covering</li> <li>EC Cheaper alternative to covering with straw or polythene</li> </ul>  |
| <b>Product Quality</b> Monitoring potato and carrot quality with the processor | <ul style="list-style-type: none"> <li>EC Communication and feedback between the farm and processor ensures continuing quality of raw materials and strong business relationship</li> <li>ET This relationship ensures consumer requirements are met and value for money is achieved</li> </ul>   |
| <b>Water</b> Green cover planted after potatoes                                | <ul style="list-style-type: none"> <li>EN Available soil nitrogen is captured by the growing crop, preventing run-off into water courses</li> <li>EC Reduces subsequent crop nitrogen requirements and costs</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>EN Irrigation scheduling for potato crops</li> <li>EN Water is used accurately and in line with potato requirements without being wasted</li> </ul>  |
| <b>Soil Health</b> Monitoring and improving soil health                        | <ul style="list-style-type: none"> <li>EN Healthy soils requires fewer inputs</li> <li>EC Healthy soil provides the basis for vigorous crop growth and improved yield</li> </ul>  |
| <b>Assurance/Certification</b> LEAF Marque and LEAF Accreditation              | <ul style="list-style-type: none"> <li>ET School visits and open days help to inform the general public about where their food comes from, and improve community relations</li> <li>EN EN Working within LEAF's principles has helped to reduce inputs while maintaining yield and quality</li> </ul>   |
| <b>Staff</b> High quality accommodation for estate staff                       | <ul style="list-style-type: none"> <li>EC Staff retention and loyalty are improved which reduces recruitment costs and ensures key staff are retained</li> <li>ET High quality accommodation benefits the staff's quality of life and personal time</li> </ul>  |
|  | <ul style="list-style-type: none"> <li>EN Staff training</li> <li>EC Well-briefed team aware of the environmental impact of agriculture and ensure side effects are limited</li> <li>EC Good training ensures staff carry out their roles efficiently and effectively</li> <li>ET Staff receive training to help them in their roles and improve their knowledge</li> </ul> |
|  | <ul style="list-style-type: none"> <li>EN Equal Opportunities Employer</li> <li>ET Business more representative of the community and promotes good public image</li> </ul>  |
| <b>Environment</b> Carbon footprinting   | <ul style="list-style-type: none"> <li>EN Reduction of carbon emissions is vital to limit global warming</li> <li>EC By measuring the carbon footprint farming activities, Elveden has identified efficiency savings</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>EN Investment in energy-efficient equipment</li> <li>EC Inverter pumps reduce energy consumption and regular servicing keeps machinery operating efficiently</li> </ul>  |
|  | <ul style="list-style-type: none"> <li>EN Waste recycling</li> <li>EN Green waste from the Estate's houses is composted off-site and returned to the farm as a soil conditioner</li> <li>EC Organic matter levels in soils increased, which improves fertility and crop productivity</li> </ul>   |
| <b>Biodiversity</b> 7,000 acres of conservation area                           | <ul style="list-style-type: none"> <li>EN The estate has 50 breeding pairs of Stone Curlew, which is almost 15% of the UK's summer population</li> <li>EC The Estate has joined the Higher Level Stewardship scheme which provides funds for undertaking specific environmental work</li> </ul>   |
| <b>Management</b> Diversification projects                                     | <ul style="list-style-type: none"> <li>EC The farm has diversified into other business ventures to capitalise on the Estate's assets and improve its financial security</li> </ul>  |

## Background

The UK has approximately 18.7 million hectares of farmland; around half this area is cropped and the remaining area is planted to various types of grassland. Agriculture accounts for only 0.9% of the UK's GDP.

The Elveden Estate is set in the heart of East Anglia on the Norfolk-Suffolk border and is one of the largest single farm units in lowland Britain. The Estate comprises of 22,500 acres of land of which 50% is farmed and 30% is devoted to conservation.

The Elveden Estate has been in the ownership of the Iveagh family since 1894. The second Earl of Iveagh, a keen and highly innovative farmer, established the agricultural reputation of Elveden as a prime milk and livestock producer. At its peak as a livestock business in the 1970s the farm supported four beef herds, two sheep flocks, three pig herds and 2,000 dairy cows over nine herds, in addition to the arable crops. The Estate sold the dairy cows in the early 1980s due to the falling profitability of the milk sector and moved further into arable cropping.

The farm also grew sugar beet until the 1990s when the threat of soil borne disease led to the sugar beet crop becoming unsustainable. Elveden now concentrates on field vegetables (potatoes, carrots, parsnips and onions) and cereal crop production.

Currently 25,000 tonnes of potatoes are grown annually. Of this, 7,000 tonnes of Shepody and Russet Burbank are grown on contract to McCain's for McDonald's. The farm also produces 20,000 tonnes of carrots (supplying 70% of McDonald's UK's requirements) and 20,000 tonnes of onions, with wheat, rye and parsnips also being grown as part of the farm's rotation.

The Estate is operated as a stand alone business, with the farm team consisting of two management level personnel, 16 fully employed skilled operators, and two agricultural students.

At peak times, drivers and tractors are contracted from local farmers, and during the summer period the farm team can number up to 40 operators plus casual staff.

### History of Potato Farming

The potato arrived in England during the Elizabethan times towards the end of the 16th century. However, the potato did not become widely popular until the Industrial Revolution, when demand increased for cheap, energy-rich, non-cereal foods. By 1948, production in England and Wales was peaking with almost 400,000 hectares being grown. In 2010, English farmers planted 126,900 hectares, which is estimated to have produced 5.8 million tonnes of potatoes (with an average yield of 45.8 tonnes/hectare). The UK ranks number 11 among world potato-producing countries and has an annual per capita potato consumption of 102 kg.

## Crop Initiatives

### Visual Guidance hoes in row crops

Farming sustainably has produced several innovations and new practices, whilst other innovations come from historic and traditional agricultural practices. The horse drawn hoe was invented by Jethro Tull and was first used in 1709 to clear weeds growing on cultivated land. The modern equivalent are manually guided hoes which are mounted on tractors. However, manually guided hoes are extremely difficult and stressful to operate due to the high concentration levels required to maintain acceptable tolerances (typically  $\pm 25$  mm).

The development of guidance systems based on computer vision has meant that the required accuracy can be achieved, leading to better quality work that can be maintained for long periods and at higher speeds than was previously possible with manually guided systems (although this system is limited to crops which are grown in rows).



Visual guidance hoes have reduced herbicide use on carrot crop by 50%

Elveden very quickly saw the commercial benefit of using a vision guided hoe in row crops (carrots). The good working speeds and the accuracy afforded by the computer guidance system permit the tractor drivers to achieve respectable work rates throughout the day. This has allowed the Estate to reduce herbicide use on their carrot crop by 50%, with no effect on the quality or yield of the crop.

### Carrots are over-wintered in field with soil covering

The storage of carrots over winter can be done either in-field (by covering with soil, straw or straw and polythene) or in cool storage (only short term). In-field methods help maintain carrot quality but the main risk is associated with frosts and freezing of the carrots, which can cause splitting of the root, a water-soaked appearance or a watery breakdown (and therefore crop losses).



Earthing is the lowest cost technique for frost protection.

Elveden is using the technique of earthing (covering the crop with soil) to protect against freezing. It is the lowest cost technique (although it is not totally secure against frosting). Straw covering offers good frost protection but is an expensive option, and the amount of energy used is substantial – even the disposal of the straw is energy intense as it requires chopping and incorporating into the soil and extra nitrogen to help it break down.

## Product Quality

### Monitoring potato and carrot quality with the processor

Elveden works closely with McCain's and AG Pearce, to whom it supplies potatoes and carrots respectively. These close relationships ensure raw materials meet all the necessary specifications of quality and food safety, providing mutual commercial benefit.

Ultimately the businesses have a common objective of producing a raw material that meets the consumers' expectations and demands. Communication is key in developing transparency, confidence and trust, as well as creating awareness of market conditions, which ultimately affects the long term sustainability of the businesses (see box on right).



Close relationships ensure raw materials meet all the necessary specifications of quality and food safety

### Improving relationships and communication in UK agri-food supply chains

UK research has identified several success factors for sustainable supply chain relationships and communication:

- Businesses need to have common or strongly compatible objectives/interests.
- Businesses need to be important to each other as valuable suppliers or customers. In building a relationship, efforts should be made to understand each other's business and what is important to them.
- Commercial benefits - such as value creation, cost savings, enhanced business flexibility, or improved risk management - are evident in sustainable relationships, whether they are created by improved practices or investment. In addition, these commercial benefits need to be shared equitably amongst those responsible for their creation, if the relationships are to be enhanced.
- Common investments can enhance relationships but they also need trust and commitment from all.
- A high level of professional / technical competence amongst the participants serves to reinforce the levels of trust and personal bonds amongst those involved.
- Good quality communication is required, both in relation to technical and logistical issues, as well as creating awareness of market conditions. Good quality communication builds chain transparency, confidence and trust, and helps to resolve conflict.

*(Source: Business Relationships and Communication in Agri-food Chains, Philip Leat and Cesar Revoredo-Giha, June 2008)*

## Water

### Green cover crop planted after potatoes

The EU's Water Framework Directive lays down specific requirements in respect of water quality, and sets maximum permissible nitrates levels within drinking water. It is the responsibility of every farmer to carefully manage soil nitrogen levels and avoid losses via runoff and leaching.

The sector is required to be a conscientious consumer of nitrogen and not the cause of a problem.

The Estate is acutely aware that nitrogen can be a major source of water pollution, which is why the Estate plants Perennial Ryegrass after potatoes during the autumn. These crops reduce nitrate losses from the soil, as it is taken up and used by the growing plants. This established crop also reduces the risk of soil erosion, as it covers the soil, and the root system helps bind the soil particles together, avoiding windblown erosion.

#### Potential benefits of cover crops

- 1) Reducing the impact of wind and water passing over the soil surface can reduce erosion.
- 2) Competing for light, water and nutrients may suppress weeds.
- 3) Crops growing late in the season can capture and 'recycle' soluble nutrients otherwise lost.
- 4) Providing cropping system diversity may create habitats for beneficial insects.

*(Source: Cover Crops and Green Manures by Vern Grubinger)*

### Irrigation scheduling for potato crops

Agriculture is a significant consumer of water and the sustainable use of water within the sector is an escalating global issue. Water is required in order to produce profitable, high-quality potatoes. The quality of potatoes is highly dependent on timing, uniformity and volume of water applied.

The profitability of potato production is also heavily influenced by irrigation management, and correct irrigation applications during tuber initiation is vital. If water stress occurs during initiation, fewer tubers are set per plant thus reducing total yield.

Water stress during the potato bulking stage reduces tuber size and results in mis-shapen potatoes. Dry matter and specific gravity can be reduced whilst other aspects such as common scab and hollow heart can be attributed to poor water management during potato sizing. The sugar content in the stem-end may also be increased, affecting processing quality.

To ensure that soil moisture levels are maintained at optimum levels throughout the potato growing season, the Estate uses Neutron soil moisture probes. These are placed in the potato fields and take measurements from three depths (in the region of 20, 40 and 60cm) to assess soil moisture levels, allowing the farm to monitor and adjust irrigation levels to match soil conditions and crop requirements.



### Irrigation scheduling maximises irrigation efficiencies

A weather station on the farm also predicts likely rainfall events and is used to calculate field and crop evaporation rates which is also used in the calculation of irrigation scheduling. This weather station also feeds data into disease prediction models to help with fungicide timings.

Irrigation scheduling maximises the irrigation efficiencies by applying the exact amount of water required to replenish the soil moisture levels to a determined point. This system enables both water and energy to be saved through careful attention to detail. The business has invested substantial capital to provide an unrivalled infrastructure for a comprehensive and functional irrigation system by laying 130 miles of pipe work, and associated pumps, valves and pressure regulators.



“Currently, significant proportions of irrigators do not use scientific methods for irrigation scheduling but rely on personal experience and judgment; significant water savings could be made by improving the uptake of existing technology.”

*(Source: DEFRA Science and Research Opportunities for reducing water use in agriculture (WU0101))*

“Total yield generally is unaffected by one brief episode of water stress, but reduced tuber quality can render the crop unprofitable”

*(Source: Eldredge et al, 1992)*

Irrigators in use at elveden

## Soil Health

### Monitoring and improving soil health

Maintaining soil fertility is critical to ensure sustainable crop production. There are complex interactions between the biological, chemical and physical properties of soil, and good farm management should aim to optimise these and increase yields in the most sustainable way.

Soil organic matter, soil structure, and the maintenance of a flourishing soil microbial population are some of the key elements to maintaining good fertile soils. Good soil structure is down to skilled soil management and cultivation techniques; incorporating crop residues and waste can improve the organic matter within the soil which in turn increases humus levels. Humus is the main by-product of the microbial breakdown of organic matter in the soil and is important in maintaining soil structure. It increases the soil's water-holding capacity and stores nitrogen, phosphorus and sulphur in their organic forms.



Well-structured soil allows roots to grow easily

The Estate holds quarterly soil meetings to discuss how to maintain and improve the soil characteristics and the condition of the land. Soil pits are regularly excavated throughout the year to identify any potential issues relating to compaction or structure.

Understanding the physical properties of the Estate's soils is crucial because the water and nutrients utilised by plants are for the most part obtained from the soil. The Estate's well-structured soil allows roots to grow easily and use a larger area in search of nutrients and water, which in turn provides the ideal growing medium for crops.



Understanding the physical properties of the Estate's soils is crucial

## Assurance/Certification



### LEAF Marque and LEAF Accreditation

The farming sector can play an important public relations role by engaging the community with simple facts and truths about how their food is produced and how they are the guardians of the countryside and environment.

The Estate is a member of LEAF (Linking Environment and Farming) and promotes environmentally responsible farming. LEAF brings together farmers, consumers and food businesses with activities and initiatives that build knowledge, understanding, trust and opportunities. Working within LEAF's principles has helped to reduce inputs while maintaining yield and quality.

The Estate is also LEAF Marque approved, which demonstrates that they have been inspected and approved against a carefully selected set of criteria. The Estate strongly believes in the philosophy of Integrated Farm Management (IFM)<sup>1</sup> which is also one of the key principles of LEAF. The possibility of being a LEAF demonstration farm is being considered.

The Estate holds open days for the general public and also hosts regular school visits. This gives the Estate the opportunity to promote and communicate the positive steps that they (and other farmers) are taking to look after the environment while producing wholesome and affordable food.

This work is crucial as it showcases the hard work and commitment that goes into growing the best crops and produce and it also educates children and adults alike in how their food is grown.



LEAF certification showcases the hard work and commitment put in by the farm.

“Looking after our countryside is vital: to feed our growing population; protect and enhance our wonderful biodiversity and landscape, and support the recreation and pleasure rural areas deliver.

Thus we need systems that maximise resource use efficiency, producing a high output of quality food whilst protecting nature. LEAF does just this, through Integrated Farm Management out on farm and engaging the public through farm visits, Open Farm Sunday and LEAF Marque, exchanging new ideas and building trust and understanding.

At Elveden Estate we see LEAF's work come alive through the passion and commitment of the working ethos and management of a successful business designed for farming in the future.”

*Caroline Drummond, Chief Executive of LEAF*



Elveden has always considered environmental responsibility as a high priority

1. IFM is the process of integrating traditional farming practices and the beneficial natural processes occurring within the environment and combining them with modern farming techniques.

## Staff

### High quality accommodation for estate staff

The majority of businesses do not need to supply accommodation to their staff; however, farming is different in this respect as having staff available on-site at short notice is essential. Also, to secure the best quality staff, housing is one of the benefits offered to potential employees, and it can be a determining factor in retaining key staff.

The Elveden Estate prides itself on the high quality accommodation that it provides to its workers, and recognises the importance of ensuring that members of staff are able to enjoy their personal time.

### Staff training

Staff training and development is a significant aspect of personnel management. A well-trained workforce is crucial in ensuring high quality products and raw materials, and any business that ignores the importance of staff training risks its chances of growing and developing in today's competitive market place.

Elveden has established a training regime for all staff in order to encourage individuals to improve their knowledge and understanding of all aspects of their roles and responsibilities.

Training also covers the wider context of the food production chain. Both internal and external training courses are provided, all fully funded by the business.

### Equal Opportunities

The Estate is an Equal Opportunities Employer, which widens the pool of employment candidates, and has enabled the business to employ a diverse workforce. This in turn helps to attract a more diverse range of clients. It has made the business more representative of the community and promotes a good public image as a fair and inclusive business/employer.



Good staff morale improves retention rates

#### The importance of training to the business:

- Helps develop workforce skills, abilities and knowledge
- Improves staff performance
- Reduces staff turnover, and therefore recruitment costs
- Can help reduce production costs, improve raw material quality and minimise wastage
- Maintains a sufficient range of skills within the workforce
- Health and safety training helps to reduce workplace accidents and injuries

#### The importance of training to the individual:

- Prepares staff for future promotions
- Excellent for morale (with low morale comes high absenteeism and poor performance)
- Improves employees' earning potential and their position on the labour market

## Environment

The UK adopted the Climate Change Act in November 2008, which sets a target for the UK to reduce carbon emissions to 80% of 1990 levels by 2050. It also set an interim target of a 34% reduction by 2020. Current scientific research estimates that agriculture makes up about 8% of total UK emissions. Agriculture has the resources and innovation to have a considerable positive effect in reducing greenhouse gas emissions, whilst still being able to feed a growing population.

### Carbon footprinting

The Estate has undertaken a comprehensive carbon audit of its farming operations and associated businesses to establish exactly what emissions there are and where they come from.

Generally the emissions at farm level arise from the use of fossil fuels (diesel, electricity, gas) and manufactured inputs (fertilisers, chemicals), and the cultivation of soils.

The Estate has calculated it can improve efficiency by lowering operating costs and better managing its resources; it has therefore set a programme of targets to reduce emissions and help prepare for meeting any future regulations and legislation. This proactive approach shows the Estate's commitment to responsible farming to the local community. This in turn can be marketed to consumers and retailers to identify the Estate as a responsible and suitable supplier.



Carbon reduction improves efficiency by lowering operating costs

“Climate change is commonly accepted to be the greatest threat to our environment. It will result in us all experiencing more extreme weather – with wetter winters and drier summers. This has been caused by the levels of greenhouse gases, including carbon dioxide (CO<sub>2</sub>), which have been released into our atmosphere.”

*(Source: Carbon Trust, 2010)*



Nesting stone curlew

### Investment in energy-efficient equipment

One of the important factors of any business is to reduce their energy consumption, there are several ways this can be achieved and this area of cost reduction efficiency should not be ignored. Research by the Carbon Trust shows that by monitoring energy efficiency in the workplace businesses could save on average over 12% on their energy bills. The likelihood is that energy prices will continue to rise in the future, and simply doing nothing is not an option for businesses looking for cost savings and improving efficiency.

Elveden has invested in inverter technology to reduce energy requirements. Variable-frequency drives are used on pumps and fans, regulating the pump speed such that the pump no longer needs to run at 100% in order to meet a smaller demand. This can considerably lower energy costs, and significantly reduce pump wear. The initial financial investment is higher than for a standard fixed-speed pump, but the payback period is relatively quick due to the savings in energy costs, and these benefits are ongoing.



Efficient equipment lowers energy spend

The Estate's machinery is regularly serviced to ensure it is maintained in optimum condition. This ensures that all equipment is working efficiently, reducing breakdowns and the associated downtime. It also means that repairs can be undertaken before an expensive major failure occurs.



The Estate's machinery is regularly serviced to ensure it is maintained in optimum condition

## Waste recycling

Several scientific trials have revealed that incorporating compost into farm soils brings major commercial and environmental benefits. The improvement in soil structure and fertility benefits a wide range of agricultural crops, improving yields and reducing input costs.

Elveden has an ethos of re-use and recycle and all the compostable waste produced on the Estate (including that of the Estate's employees) is sent to a recycling centre some three miles away for composting. The Estate receives over 8,000 tonnes of compost back, which is spread onto the farmland. The compost has become a valuable commodity, as it increases the organic matter in the soils, which is extremely beneficial to the Estate's Breckland sands.

### Benefits of Compost

According to guidance compiled by ADAS, the typical fertiliser replacement value from 30t/ha of compost in the first year is at least £90/ha.

The nutrient content of compost will vary according to the feedstock so users should obtain details from their compost supplier. Typically, however, one tonne of compost can contain 8 Kg/t Nitrogen (N), 6 Kg/t Potassium (K), and 3 Kg/t Phosphorus (P).

The rate at which Nitrogen is released from compost can vary depending on soil and climate conditions. Typically the Nitrogen provided by compost is released slowly through the process of mineralisation, which reduces the possibility of it leaching away. Between 5% and 10% of the total nitrogen provided by compost is released in the first year of application, which means that when applied at a rate of 250kg/ha total N, approximately 15kg/ha of N will be released in year one.

Repeated applications of compost can increase the level of Potassium in the soil over the long-term. Potassium is an essential nutrient as it controls the water content of cells, can help crops retain moisture for longer periods and supports increased crop growth.

*(Source: ADAS, Making the most of Compost in Agriculture and Field Horticulture)*

## Biodiversity

### 7,000 acres of conservation area

Farmers in England are responsible for managing around nine million hectares of farmland and maintaining the many features which make up the English countryside, be they hedges, ditches, woodland or meadows. Most of these features have evolved over centuries of agricultural activity and have become integrated into England's farming practices.

During the 1970s and 1980s, government policy incentivised the production of food over the protection of the environment and this led to a loss of some habitats and features. The 1990s saw a reversal of this policy and environmental care was once again prioritised.

Elveden has always considered environmental responsibility as a high priority in how the Estate is managed. Elveden has 1,400 hectares (3,500 acres) of natural breckland which hosts many rare plants, such as Perennial Knawell, Spanish Catchfly and Fingered Speedwell.

These have miniaturised through evolution to be able to withstand weather extremes and nutrient-poor soils. Of the bird species the most notable is the stone curlew and Elveden is proud to host over fifty pairs of these very rare summer visitors. Other prominent birds found on the Estate include the woodlark and the nightjar.



Elveden has become a Site of Special Scientific Interest.



Curlew chicks at the Elveden Estate

Stone curlew numbers in the UK fell by over 85% between 1940 and 1985. There were several reasons for the decline which included a reduction in areas of semi-natural short grassland and changes in farming practices. Despite an increase in numbers since 1985, the status of the UK population is still critical and without the hard work and commitment of the Elveden Estate (which hosts 15% of the UK's breeding pairs) this unique and rare bird would be under severe threat in the UK.

This commitment even extends to the staff at Elveden who have received specialist training and are the only people other than RSPB (Royal Society for the Protection of Birds) staff who are legally permitted to handle the Stone Curlew and their eggs within the Breckland area.

The importance of the Elveden heaths is recognised by numerous designations. The heaths are also protected by the Wildlife and Countryside Act as Sites of Special Scientific Interest.

#### **The Stone Curlew**

The stone curlew is listed on Schedule 1 of the Wildlife & Countryside Act 1981, which affords special protection at all times. In addition, it is listed on Annex 1 of the EU Birds Directive.

In the UK there are 347 breeding pairs of Stone Curlew.

*(Source RSPB)*

## Management

### Diversification projects

Agriculture is often an essential part of the economy within many rural communities. However, the economics of agriculture have been affected by large fluctuations in commodity and input prices. It has therefore become necessary for farming businesses to seek income streams outside of those generated by conventional farming activities. Diversification is widely acknowledged as beneficial for improving the economic viability of farming businesses.

Elveden has become a highly diversified business, starting almost 40 years ago when they began growing Christmas trees.

Elveden is currently the number one supplier of corporate and town centre display trees across Great Britain. The Estate also pioneered the concept of 'instant hedging', whereby hedges are pregrown to 2 metres in height by 10 metres in length before being put on sale.

The Estate also has a number of consumer-facing businesses, including a selection of shops, a café restaurant, two pubs and bed & breakfast accommodation. It also produces a range of own brand chutneys, sauces, jams and marmalades in an on-site development kitchen. These are produced from the crops grown on the Estate whenever possible and are sold through Elveden's own shops and through supermarkets throughout the East of England.

With the vast array of experience that has been gained at Elveden, the Estate is now acting as a 'food hub', where other local food and drink producers are able to obtain advice and assistance in marketing their own products into the region's supermarkets. This collaborative approach is typical of the ethos and attitude of Elveden, which does not perceive other producers as a threat to business, but rather sees these relationships as an opportunity to promote great British agriculture and food.



Diversification has been extremely beneficial economically



The Elveden Estate pioneered the concept of 'instant hedging', whereby hedges are pregrown to 2 metres in height by 10 metres in length before being put on sale



## Appendix

The following matrix has been developed by McDonald's to help assess the sustainability of the agricultural production within the supply chain. Flagship farms have been identified that demonstrate best practice in one or more of the 17 key areas in the matrix, whilst also operating to general high agricultural standards in all other areas.

A ✓ in the matrix below indicates good practices demonstrated in this case study.

### Ethical (Acceptable Practices)

**Human health & welfare** ✓  
 i Employee health & welfare ✓  
 ii Food safety

**Animal health & welfare**  
 i Nutrition  
 ii Medication & growth promoters  
 iii Genetic selection  
 iv Animal cloning  
 v Husbandry  
 vi Transport  
 vii Slaughter

**Business ethics & supplier relationships** ✓  
**Rural landscape preservation** ✓

### Environment (protecting the planet)

**Climate change** ✓  
 i Greenhouse gas emissions ✓  
 ii Energy efficiency & renewables ✓

**Natural resources – water** ✓  
 i Water pollution  
 ii Water usage efficiency ✓

**Ecosystem protection** ✓  
 i High conservation Value Land (HCVL) ✓  
 ii Habitat & species preservation ✓

**Natural resources – soil** ✓  
 i Soil fertility & health ✓  
 ii Soil erosion, desertification & salinisation  
 iii Soil contamination

**Natural resources – air** ✓  
 i Air emissions ✓  
**Agrotechnology** ✓  
 i Agrochemical usage ✓  
 ii Bioconcentration & persistent organic pollutants  
 iii Genetically modified organisms

**Waste** ✓  
 i Production waste  
 ii Hazardous waste  
 iii Waste to landfill ✓

### Economics (long-term economic viability)

**Sufficient high quality production** ✓  
 i Producer income security & access to market ✓  
 ii Agricultural input costs ✓  
 iii Crop & livestock disease ✓

**Community investment** ✓  
 i Local employment & sourcing ✓  
 ii Support for community programmes ✓