



# IMPACCT CASE STUDY No. 1

Integrated Management Options for Agricultural Climate Change mitigation

## Arbigland Estate, Kirkbean, Dumfries, Scotland

The Arbigland Estate has been home to the Blakett family and their forebears, the Stewarts, since 1852. The farm is a 397 ha arable and beef mixed farming operation located on the Solway Firth coast at Kirkbean, near Dumfries in south-west Scotland. The climate is wet and the soils are predominately clay and silty clay.

Arbigland was purely arable until 2006 when it diversified into beef. This diversification has required a significant financial outlay including the need to purchase a tractor and build a cowshed. However there have been many benefits for the environment as well spreading the business associated risks across the different ventures.



**Aberdeen Angus**

Each field has a long rotation which includes 4 years of grass, 3 years of cereals, a break in which oats (with peas and lupins) may be sown and then a further 2 years of cereals before the field is returned to grass. The 200+ beef herd includes Luining, Luining x, Aberdeen Angus x and Simmental x.

The farm is a member of two primary production quality assurance schemes – Quality Meat Scotland and Scottish Quality Crops. Arbigland also has one Rural Stewardship and two Scottish Rural Development Scheme plans in place that help manage and enhance the environmental areas for the benefit of biodiversity.

The Estate has a wide range of wildlife habitats and contains valuable archaeological areas (e.g. limekiln remains, forts, flint scatter) as well as being listed in the Inventory of Designed Landscapes. It is also within an SSSI/RAMSAR/SPA site.



**Grass margins**

Photo: FH Land Management 2009

Conservation work on the Estate has included the management of archaeological sites, woodlands, water margins, wetlands, wet grassland for waders and mown grassland for birds. Hedges and dykes have been extended and restored. Grass margins and conservation headlands have also been created. In addition, many standard trees and wild bird seed crops have been planted. Across the farm, this work has created a network of habitats that has delivered considerable benefits including those to local Biodiversity Action Plan (BAP) species such as the Red squirrel, Snipe, Skylark, Curlew, Hen Harrier, Barn owl, European otter and Pipistrelle bat.

- Attention has been given to the permanent grass margins around the estate. These have been increased in size which has increased wildlife populations.
- Improvements to the management of the wetland areas have also been adopted. This includes grazing restrictions, control of rushes to prevent them smothering other wetland plants. As a consequence increased numbers of wading birds have been recorded.
- There has been some conversion of arable fields to clover-rich grass leys.

Whilst much of this work has been primarily undertaken for wildlife conservation there are also significant benefits for climate change mitigation, particularly with respect to increased soil sequestration. The farm has also adopted many climate friendly changes to its practices which will also mitigate greenhouse gas emissions and increase soil carbon sequestration.



Red Squirrel

- In 2009 the Estate started to use precision farming techniques to optimise its use of fertilisers and pesticides. This decreased the costs of farm inputs and increased yields. This will reduce greenhouse gas (GHG) emissions on the farm and also reduce those emitted when energy is used to manufacture the fertilisers and pesticides.
- Integrated Farming techniques have been introduced. For example, more consideration has been given when selecting the crop variety and optimisation of crop rotations has been made to allow more efficient use of nitrogen. This has reduced fertiliser costs and emissions. Efforts have also been made to reduce the use of pesticides for the benefit of reducing costs and protecting wildlife, especially birds. However, these changes have required the advice of a paid specialist agronomist.
- Prior to the introduction of beef the farm was purely arable and did not use farmyard manure or slurries. With the introduction of beef cattle it can make full use of FYM produced on the farm. This has reduced the use of synthetic fertilisers which has reduced both costs and the associated GHG emissions. There are other benefits too. For example, it has noticeably improved soil structure and less storage space for fertilisers is now required. This means less fertiliser is wasted due to degradation in storage. However, there has been a slight increase in labour costs associated with mucking out barns and spreading the FYM.
- A new, multifunctional tractor has been purchased to replace an older less efficient machine. The new tractor uses less fuel, is more reliable, quicker and causes less soil compaction. Despite the initial capital cost this upgrade has reduced GHG emissions, saved money on contractors, fuel, maintenance and also slightly reduced labour.



Fenced watermargin

Photo: FH Land Management 2009

- General resource management on the farm has also been improved. For example, silage wraps used to be burnt (when it was legal in the UK to do so) but they are now recycled. This has reduced emissions from burning and those produced when the plastic is manufactured. It also means there is less stray plastic in the countryside. However, it does cost the farm to have the waste collected and disposed of.
- Water resource management has been improved. When a new barn was built to house the beef cattle a rooftop water tank was added to collect rain. This has reduced the use and costs of water and reduced disturbance of groundwork for piping.
- Crop storage is another area that has been carefully considered. Traditional harvesting methods have been replaced with whole crop silaging which is now stored in clamps. Barley is crimped and dried at ambient temperatures. Thus energy costs and the associated emissions have been reduced. Much of the feed is used on farm but some is sold on. This has also reduced the cost of buying feed and generated some income. Stubble is retained in the field before ploughing in and this has benefited wildlife by providing overwintering habitats.



Silage bales

<sup>#</sup>The Inventory of Gardens and Designed Landscapes is maintained by Historic Scotland. Inclusion of a site in the Inventory is a material consideration in the planning process and any planning proposal that would affect a site included in the Inventory must be referred to Scottish Ministers (through Historic Scotland) and Scottish Natural Heritage.

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