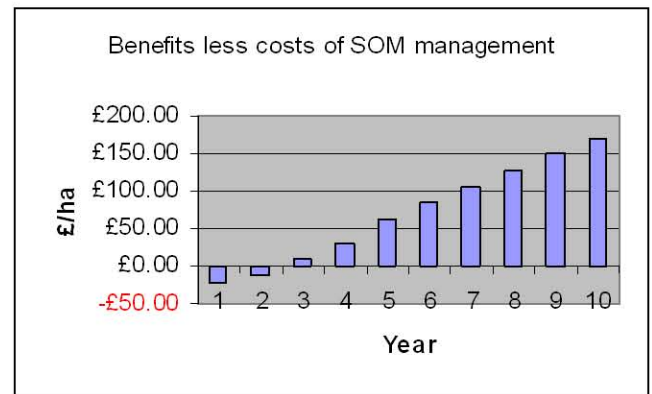


Case study 29

Arable soils benefit from manures and rotational grass in a mixed dairy and pig farm

Managing organic matter over a period of 10 years resulted in a net annual benefit of £170/hectare because of yield gains in grass and wheat, together with savings in inorganic fertiliser costs.

Benefits have grown over the period and have been greater than costs from year 3.





Background

This case study concerns a mixed farm of 300 hectares, made up of 180 ha owned and 120 ha in a farm business tenancy agreement since 1996. The home farm has a 200-cow dairy unit plus followers, a 40-head beef herd, and a pig unit producing 2,600 weaners annually. The FBT land is all arable. The home farm has historically received input of organic manures from the livestock units and has rotational grass leys, while the farm business tenancy land has neither of these features.

Grassland on the home farm is managed within the arable rotation, with 5-year leys for grazing and 2-year leys for silage.

Rotations followed are:

- Home farm: winter wheat (40 ha) / winter barley (10 ha) / oilseed rape (14 ha) / maize (36 ha) / grass (80 ha).
- Farm business tenancy: oilseed rape (42 ha) / winter wheat (40 ha) / winter barley (38 ha).

In 1998 the cultivation regime was changed from inversion tillage to non-inversion tillage.

Soils are described as varying from heavy to sandy, but the majority are clay loams. Soils on the home farm are much heavier than the FBT land. Rainfall is moderate. However, despite good grass growth, the high stocking rates of the combined herds require buffer feeding in the summer.

Soil organic matter management

On the home farm the following soil organic matter management occurs:

- The pig enterprise is totally straw based, so it generates FYM, which is applied on the 36-ha maize area at the rate of 50 tonnes/ha. The beef and dairy units produce a minor amount of FYM with any surplus spread on wheat land.
- Slurry from the dairy and beef herds is applied on the grassland (80 ha) via an umbilical system
- Rotational grass leys are sprayed off with glyphosate herbicide and then disced.

The FBT land does not receive organic manures. All crop residues are utilised on the farm or sold off. Due to the high local cost of straw, oilseed rape straw is utilised in the pig units.

What difference has organic matter management made?

Benefits to the arable business on the home farm versus the farm business tenancy land:

- Better soil structure is particularly noticeable, especially comparing heavier soils on both areas. Soils on the home farm have reduced soil compaction, a longer autumn workability window, and better moisture retention.
- The average winter wheat yield over the past 10 years has increased from 10 to 11 t/ha while staying stable on the FBT land.
- Better moisture retention results in an average grass yield increase of 10% on rotational leys.
- Improved soil structure has enabled non-inversion tillage to be undertaken on the home farm as well as the lighter FBT land, despite soils being generally heavier on the home farm. The reduction in cultivation costs is approximately £25/ha.
- Reduced N fertiliser rates on grass leys getting slurry, saving on average 100 units N/ha/yr on 80 ha (saving approximately £46/ha).
- No application of P and K is required on any of the land on the home farm, an average saving of £52/ha compared with the farm business tenancy land.

Additional costs on the home farm:

- FYM application costs: £50/ha.
- Slurry application cost: £42/ha (contractor costs).

Comment

Following the farmer's participation in this case study, he is undertaking a review with the owner of the FBT land to discuss ways of actively managing organic matter. As an immediate step, oilseed rape residue will be incorporated.

Managing organic matter from 1996-2006 has resulted a net annual benefit of £170/ha on average on the home farm after 10 years, based on yield gains, reduced cultivation costs and fertiliser savings on the home farm compared with average costs on the farm business tenancy land.

These benefits have grown over the period and have been greater than costs from year 3. The largest benefits have been the yield increases in grass and wheat together with savings in fertiliser costs. The internal rate of return to managing organic matter on the home farm is estimated at 76% over a 20-year period.