



# Landscape differences between conventional and organic farms

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# Factors influencing biodiversity within organic and conventional systems of arable farming

- How do organic farms differ from conventional in terms of where they are and what they do?
- How does biodiversity differ between organic and conventional farms?

Norton, L., Johnson, P., Joys, A., Stuart, R., Chamberlain, D., Feber, R., Firbank, L., Manley, W., Wolfe, M., Fuller, R., (2009) Consequences of organic and non-organic farming practices for field, farm and landscape complexity. *Agriculture, Ecosystems & Environment* 129, 221-227.

Fuller, R..J., Norton, L.R., Feber, R.E., Johnson, P.J., Chamberlain, D.E., Joys, A.C., Mathews, F., Stuart, R.C., Townsend, M.C., Manley, W.J., Wolfe, M.S., Macdonald, D.W., & Firbank, L.G. (2005) Benefits of organic farming to biodiversity vary among taxa. *Biology Letters*, 1, 431-434.

Chamberlain, D.E., Joys, A., Johnson, P.J., Norton, L., Feber, R.E. and Fuller, R.J. (2009) Does Organic Farming benefit farmland birds in winter. *Biology Letters* 6, 82-84.

## *Do cereal growing organic farms tend to be located in typical wheat growing areas of England?*

- km squares in England where wheat is likely to be grown were identified.
- Estimates of mean Broad Habitat coverage's for 1,000 random samples of 89 km squares were compared with means for the 89 km squares in which organic target fields were located (target squares).

**More** improved grass in organic target squares

**Less** 'other grass' & non-crop habitats in organic target squares.

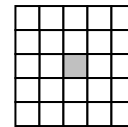
Target squares were distributed to the south of the mean of all wheat growing squares in England



*On a local scale (within a 2.5km radius) do the areas which organic farms are located differ from those of their conventional counterparts?*

- Estimates of mean Broad Habitat coverage's for all target squares were derived.
- Estimates were then made for Broad Habitat extents;

in each of the  
9 km squares  
surrounding  
that square




and the 16 km  
squares  
surrounding them



# Results

- Organic target squares contained **more** grass than conventional target squares.

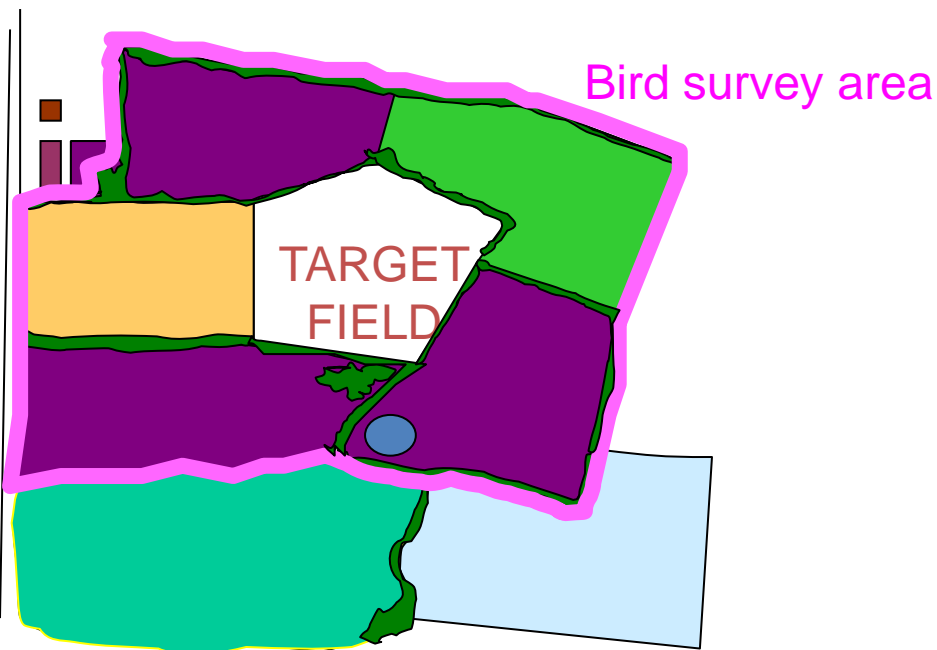
 Organic area **more** non-crop habitat than for the conventional target squares.

 Organic area **less** arable land than for conventional target squares (target & adjacent squares).



## *On a farm scale how do organic and conventional farms differ in terms of landscape characteristics?*

- The survey area was marked on a photocopied OS pathfinder map together with any alterations or new features



- Habitat patches were identified as discrete areas in accordance with specific criteria and coded.
- Bird surveyors visited sites 5 times across the winter and recorded any changes in habitat over those visits (e.g. crop).

- **Higher** total boundary length on conventional farms
- Stubble coverage as a proportion of total habitat present **higher** on conventional farms.
- Cropped area as a proportion of total habitat present and total coverage of cropped area **greater** on conventional farms.
- Density of boundaries and hedges (Km per Ha) **higher** on organic farms, hedges as a proportion of total boundary coverage **higher** on organic farms.
- Grassland as a proportion of total habitat present and total coverage of grassland **greater** on organic farms. Grazed grass also higher as a percentage of total coverage.



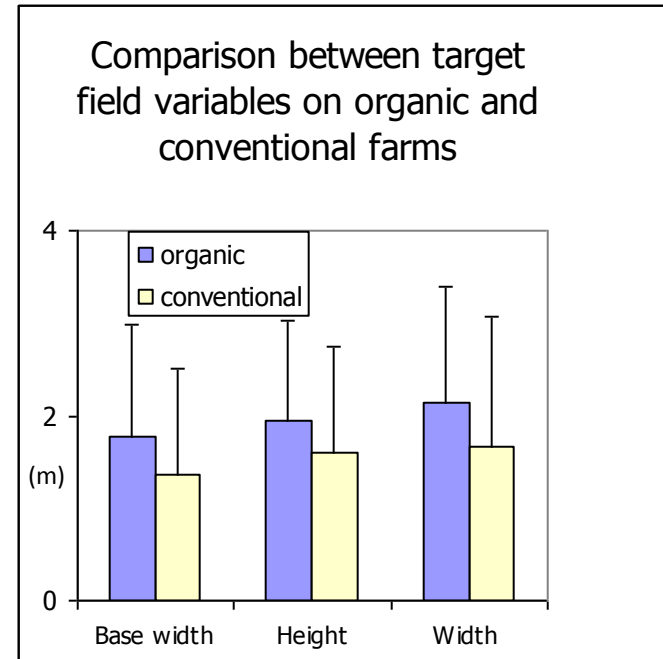
*At the field level, are there differences between the field boundaries on organic and conventional farms?*

- Surveyors recorded detailed hedgerow characteristics on the target field.
- Target field surveys recorded structural attributes and species compositions of hedgerows surrounding target cereal fields.



# Results

- Hedgerow height, width and base width were all higher on organic farms, and there was a non-significant trend towards higher number of trees and woody shrubs.
- There were higher numbers of breaks and gaps in hedges on conventional farms.

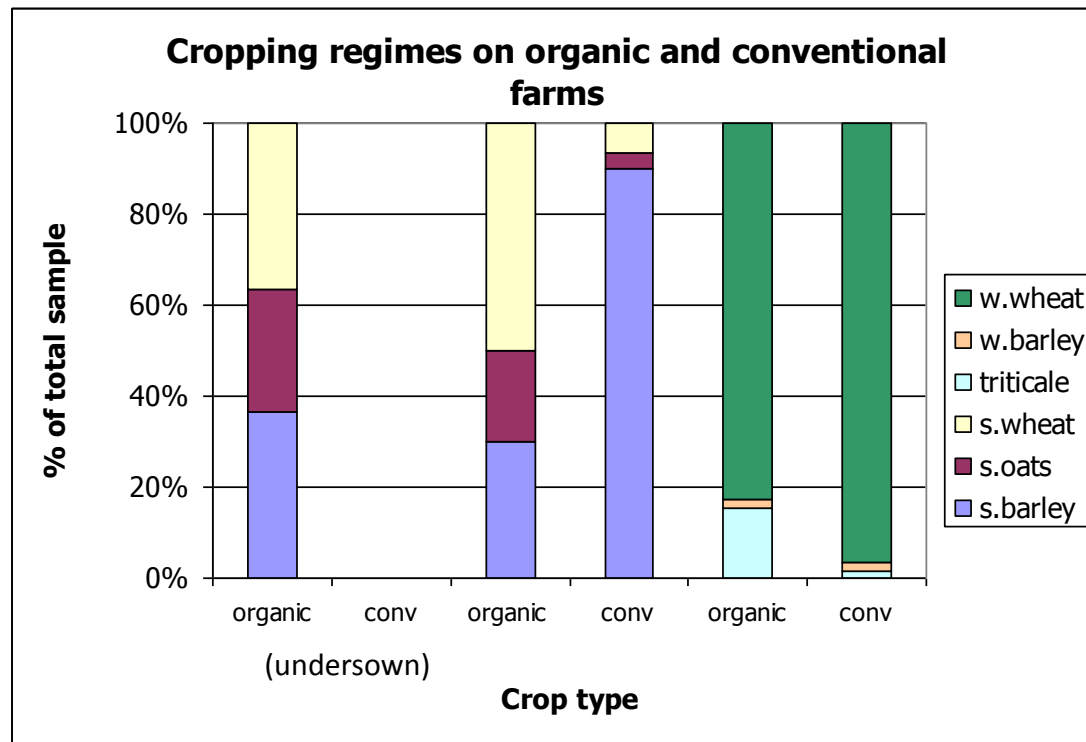


# Detailed field and farm management questionnaire

40 questions to provide detailed information about the target field and the farm and the way in which they are managed.

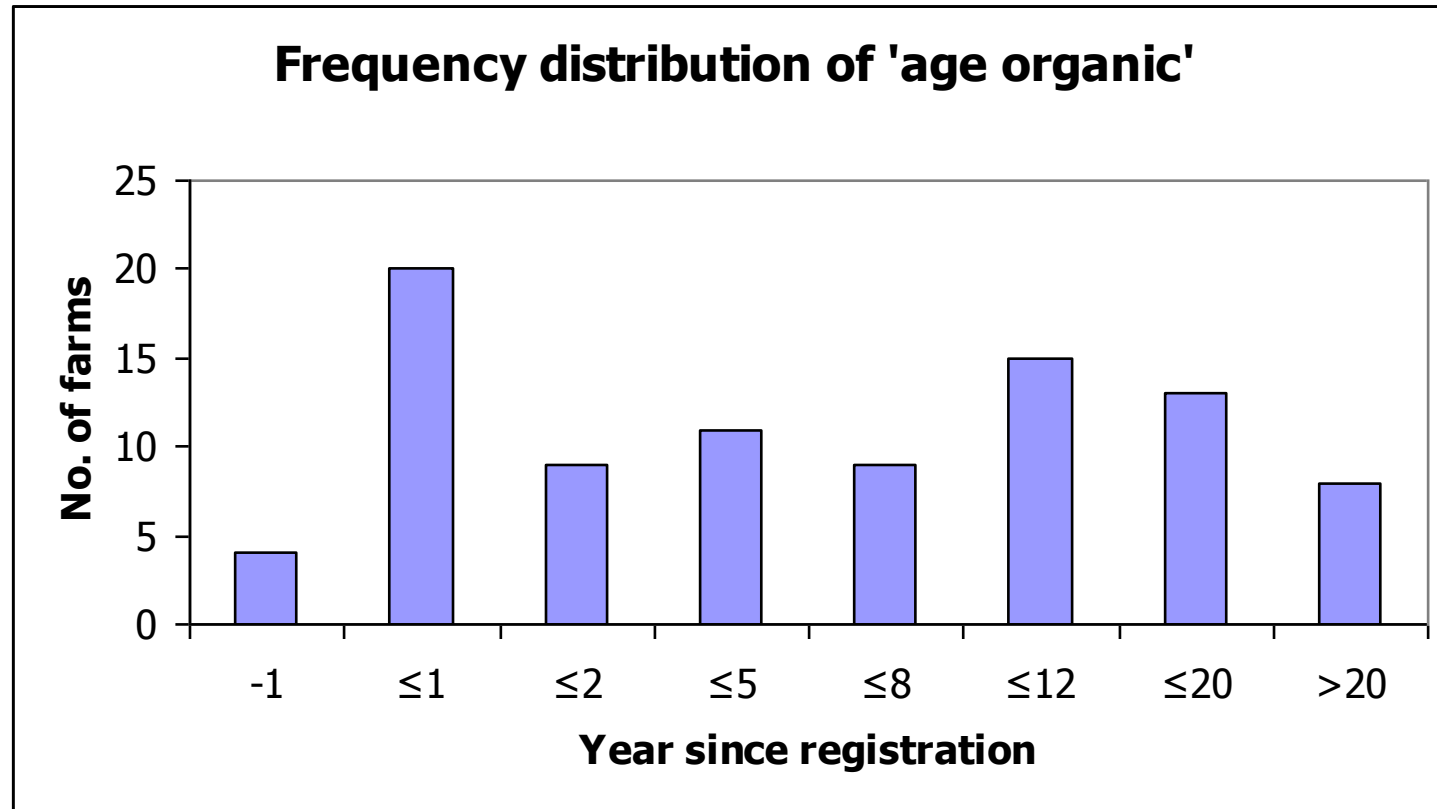
# Cropping

Organic and conventional farms differed greatly in terms of spring cropping but were more similar for winter crops





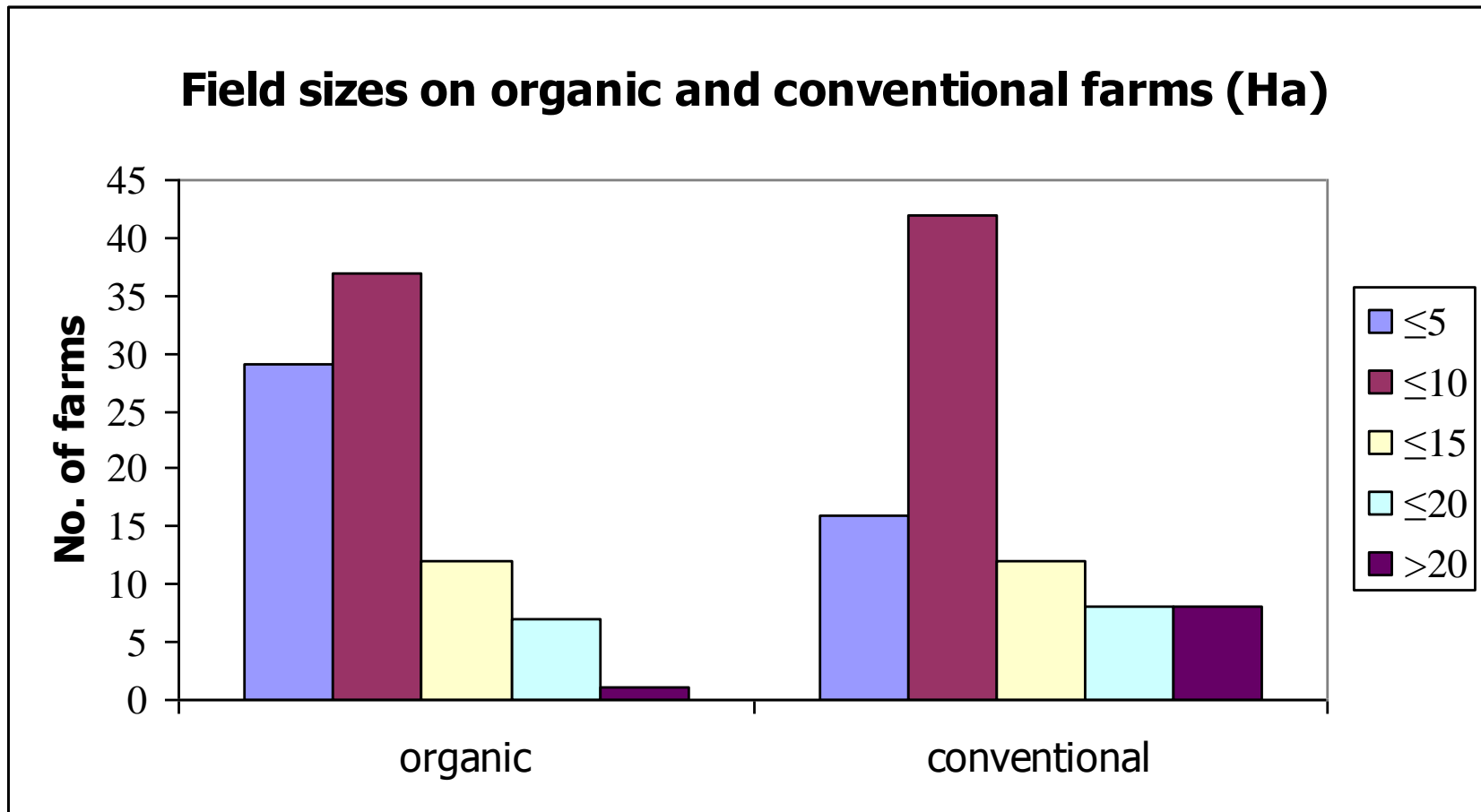
Duration of organic practice on farms (based on registration dates). Negative dates indicate farms in conversion.



4 farms had only ever been organically managed (2 others had only had very low inputs pre-conversion).

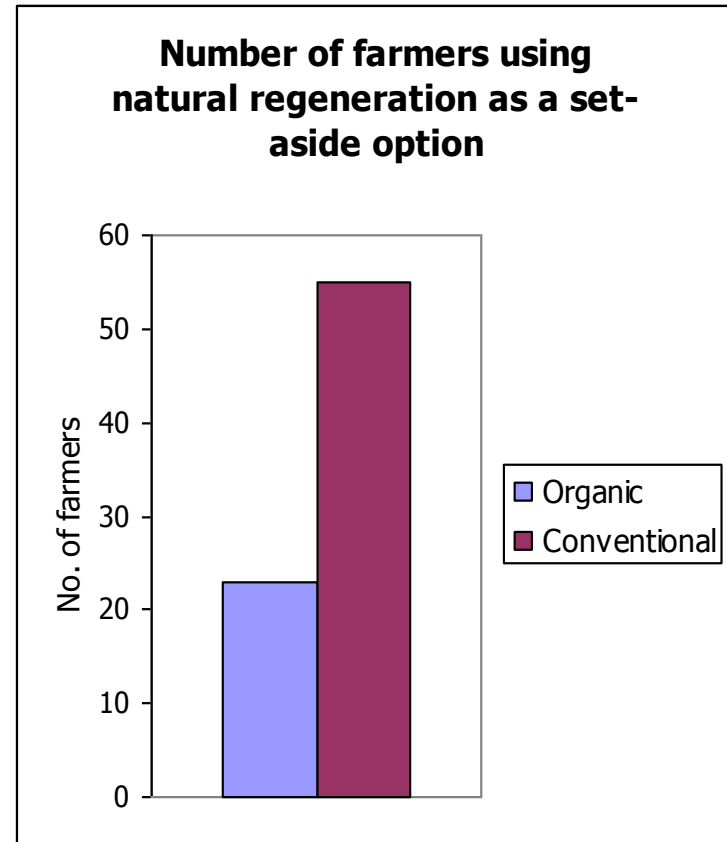
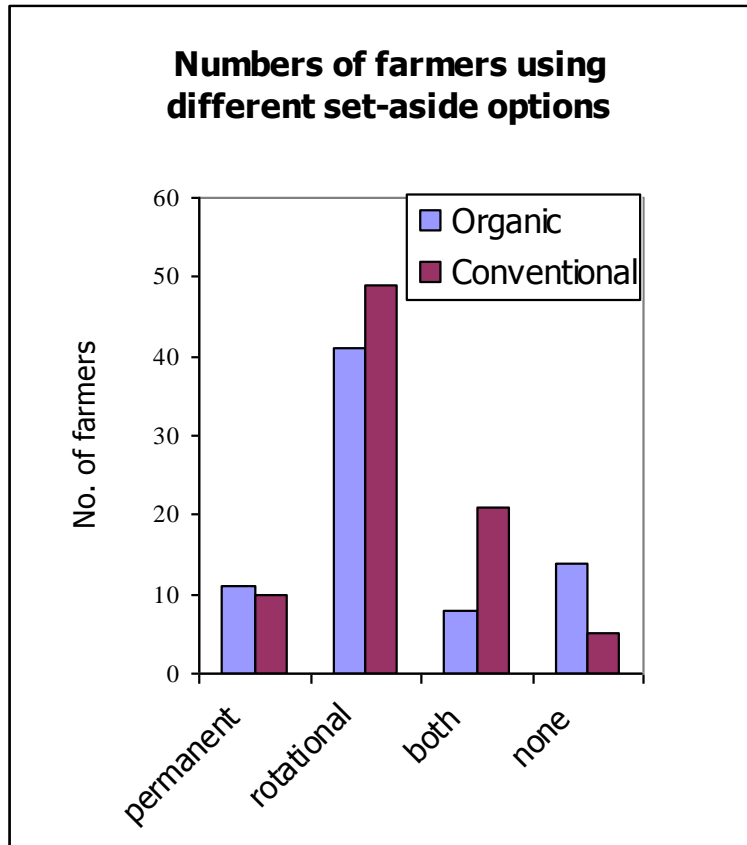


Organic fields were significantly smaller



- Organic farmers always sowed crops later
- Rotations differed between farm types, organic rotations included a ley, conventional rotations had a break crop, veg or set-aside in a cereal rotation.
- Most conventional farmers did not crop continuously (78%), NO organic farmers cropped continuously.

# Farm management



- NO significant differences between organic and conventional farms in terms of; farm size, the amount of permanent pasture and the way it was managed, area of woodland, no ponds, no. non-crop habitats.
- Conventional farms contained more arable land (70%) compared to 58% on organic farms.

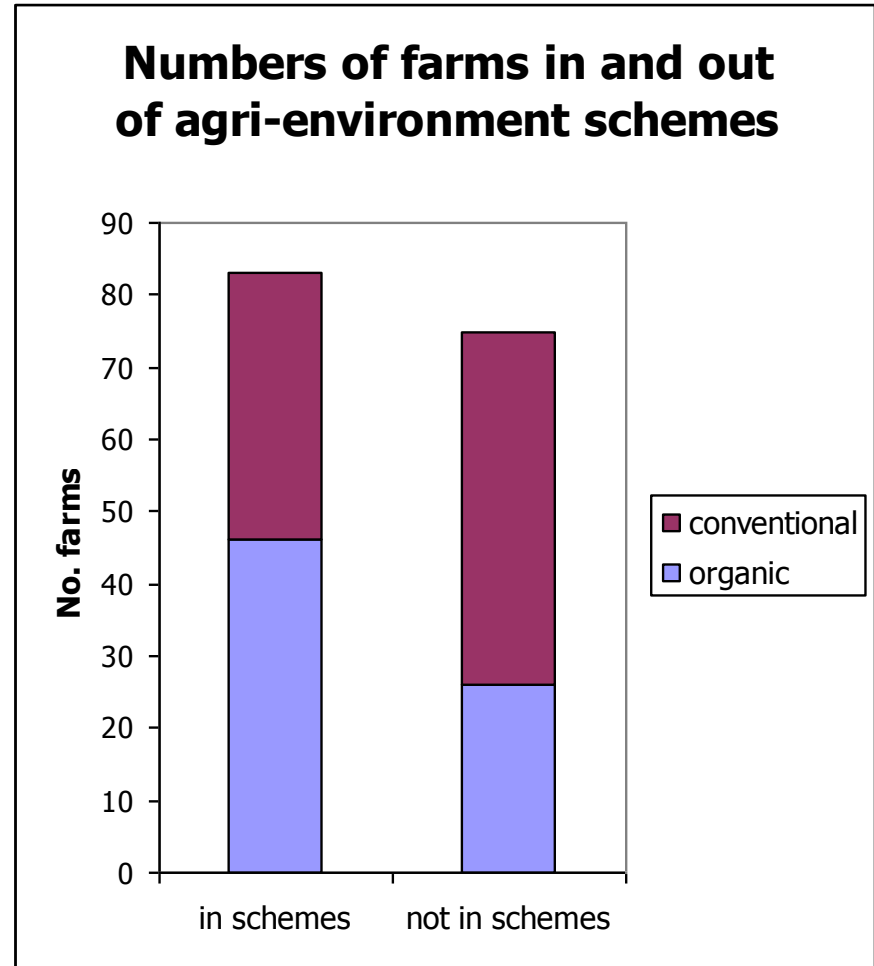
# Farm management

- Organic farms were more likely to include livestock, particularly sheep, and were more likely to use livestock on arable land. Overall organic farms contained a wider variety of livestock.
- Both organic (77%) and conventional (71%) farmers in the study specifically manage or don't manage part of their farms for the benefit of wildlife.
- Organic farmers cut their hedges less often and are more likely to lay them than conventional farmers



# Farm management

- More organic farms had agri-environment agreements (in addition to Organic Farming Scheme) than conventional.
- 77% of farms with agreements were in Countryside stewardship



# Summary – Landscape differences between organic and conventional farms

- Location (south)
- More grass & livestock, less cropped land
- Higher density of bigger more continuous hedges which are less managed
- More non-crop habitat at the 3x3km scale
- More likely to be in stewardship
- Different rotations and cropping practices (weed management, fertility building, crop use, etc)