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Integrated farming and biodiversity

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Introduction

The overall aim of the report is to provide English Nature with scientifically robust information to determine whether integrated farming systems have the capacity to deliver biodiversity benefits.

What was done

Eleven European studies were identified which compared the biodiversity under an Integrated Farm Management (IFM) system with a conventionally managed system. Nine studies were all arable and two were mixed. In addition to the eleven key studies, 60 peer reviewed papers and technical reports describing IFM and biodiversity were reviewed.

Results and conclusions

The IFM studies showed that IFM in arable and mixed farms could cause a statistically significant increase in the biodiversity of plants, soil microflora, non-target arthropods, earthworms, birds and small mammals. None of the studies showed that IFM reduced biodiversity. Plant, arthropod and earthworm biodiversity were increased with most consistency. Microflora, birds and mammals were only recorded in one or two studies. The majority of the improvements in biodiversity were achieved by increasing the populations of existing species, apart from the number of plant species in one study and earthworm species in another study. IFM increased weed numbers above the economic threshold in some studies, but other pests were not problematic.

It was impossible to attribute many of the biodiversity changes to specific management practices due to the confounding effects of other factors. This problem is inherent within system comparison studies. The few instances when specific management practices were tested directly with experiments and literature driven hypotheses indicate that minimum cultivations, reduced herbicides and reduced insecticides (particularly methiocarb slug pellets) have positive effects on biodiversity. Crop type also had important effects on biodiversity. For example, spring sown crops were associated with more weeds, but were often negatively associated with arthropods, potatoes reduced earthworms, and using a cover crop on set-aside or using break crops favoured birds.

Extrapolating these observations to a landscape scale is not straight forward due to flexibility concerning which management practices can be used within an 'IFM system'. The IFM practices that future IFM farms employ will be influenced by economics, soil type and climate. The Mid-Term Review may result in fewer spring crops - which would reduce biodiversity, but greater set-aside - which would improve biodiversity. Minimal cultivations could be employed on significant areas, although its use is restricted by soil type, climate and the need to control grass weeds. Reduced herbicide and pesticide practices are likely to be used to cut costs. New agri-environmental schemes will increase the likelihood that future IFM farms employ wild life friendly management. On balance, it seems likely that if IFM becomes widely employed in the future, then biodiversity benefits would be seen at the landscape scale.

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Gaps in knowledge include a lack of information about how IFM on grassland and horticultural farms affects biodiversity. The effect of specific management practices on biodiversity are not at all well understood. Specifically designed experiments are required to fill this gaps. Effects of IFM on small mammals and birds has also received little attention.

English Nature's viewpoint

English Nature recognises the interdependence of agriculture and nature conservation and we aim to work closely with farmers operating a variety of different agricultural systems to sustain biodiversity. The reform of the Common Agricultural Policy, which will be implemented from 2005, is commonly expected to initiate some of the biggest changes in agricultural land use for half a century. While some of the changes, such as wide availability of agri-environment schemes, might be expected to have a positive impact on farmland biodiversity the effect of others, such as an increased focus on markets, are more difficult to predict.

In determining its advice to others about how future policy should be developed English Nature needs to have a good, science based, understanding of the impacts of different farming practices so that policies can be developed to effectively encourage practices that bring biodiversity benefits.
In the light of these requirements this report brings together previous research to examine the impact of a suite of practices often bundled under the descriptors Integrated Crop Management or Integrated Farm Management. The findings of the study are not comprehensive as the existing research leaves large gaps in our understanding of the impact of Integrated Farm Management, particularly on grassland and horticultural farms. While comparison with equivalent conventional practice remains difficult as a consistent definition of 'Integrated' has not been adopted at the farm level and by researchers, there are some useful indications to come from this work:

Integrated practices generally reduce the amount of inputs (fertilisers and pesticides) used by farmers. While these studies did not measure if this reduction had any effect on the amount of these chemicals leaving the farm in ground and surface water flows (this issue could usefully be addressed by further research) it seems likely that the more considered application of reduced amounts of nutrients and chemicals will assist with natural resource protection both on and off the farm.

Integrated practices, in comparison with equivalent conventional practices, potentially do less damage to biodiversity and in many cases there is evidence that the abundance of common wildlife species already on the farm increases following the adoption of integrated management. These species can be important both in their own right and as resources for other species in the food web. However, this review has found scant evidence that Integrated practices increase either the diversity of wildlife species on the farms studied or assist the recovery of those species of farmland wildlife that are rare and / or declining.

This work is an initial indication that Integrated management may provide useful environmental benefits. English Nature will continue to monitor the development of these systems and the economic and other factors that influence their uptake to see if their performance can be further enhanced by, for example, the future development of agri-environment schemes.

Integrated systems have the advantage that many of their techniques are familiar to most farmers and the technological transfer and management changes needed to introduce them are generally small. On the basis of our present understanding Integrated systems could be adopted by the majority of farmers and should, perhaps, come to be regarded as the new baseline standard for UK agriculture. This report, however, provides no evidence to suggest that Integrated can be regarded as a best practice system for farmland biodiversity conservation.

Further information

For the full report or other publications on this subject, please contact the Enquiry Service on 01733 455100/101/102 or email enquiries@english-nature.org.uk

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