Assessment of RDP impacts on Farmland Bird populations in England

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Outline

England RDP Priority 4 overview

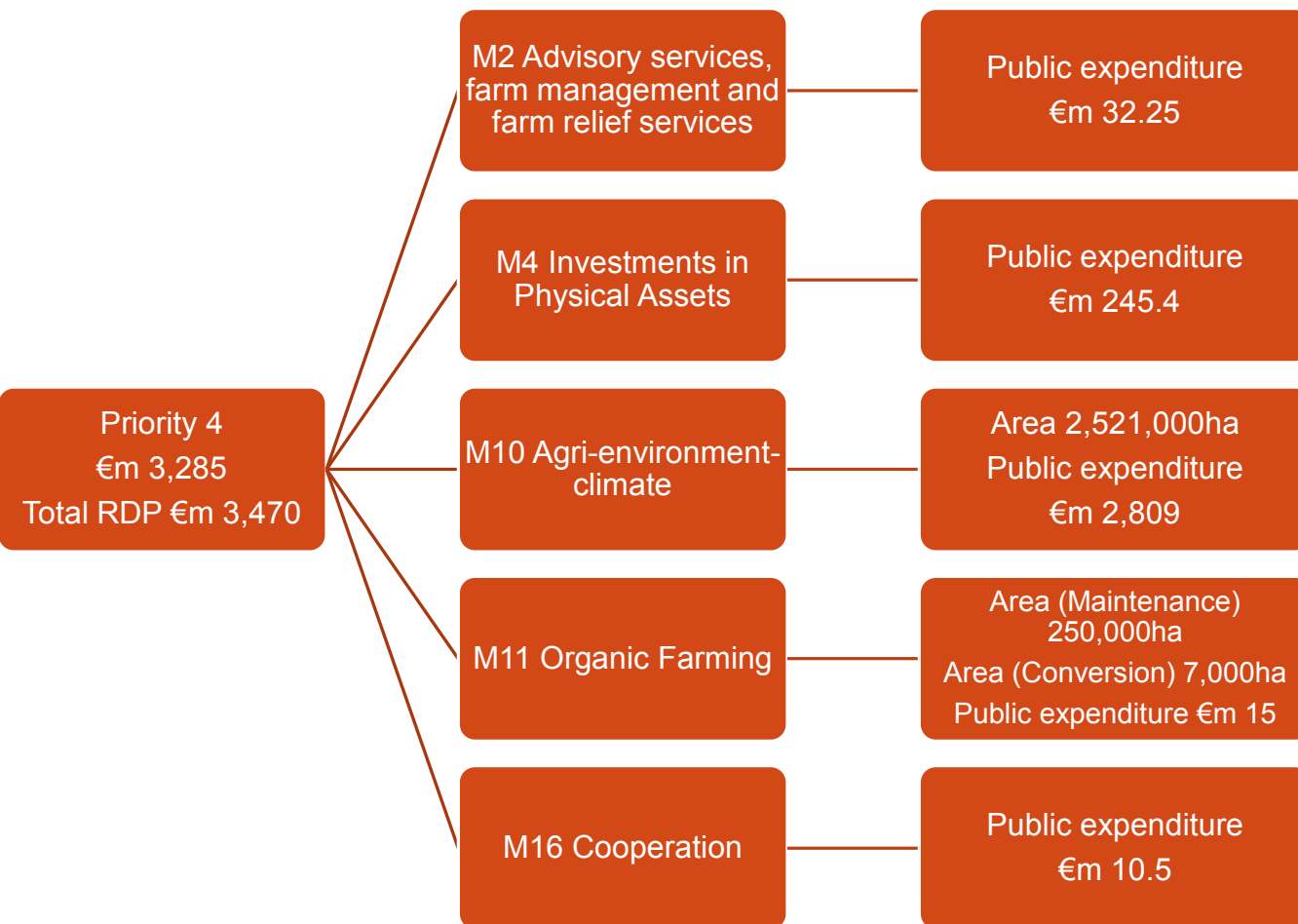Evaluation purpose and elements

Evaluation approach

Data

Key findings

Strengths and weaknesses of the approach

Lessons learnt and applicability

RDP Priority 4 Overview - England

Priority 4
€m 3,285
Total RDP €m 3,470

M2 Advisory services, farm management and farm relief services

Public expenditure
€m 32.25

M4 Investments in Physical Assets

Public expenditure
€m 245.4

M10 Agri-environment-climate

Area 2,521,000ha
Public expenditure
€m 2,809

M11 Organic Farming

Area (Maintenance) 250,000ha
Area (Conversion) 7,000ha
Public expenditure €m 15

M16 Cooperation

Public expenditure
€m 10.5

Priority 4

Restoring, preserving and enhancing ecosystems related to agriculture and forestry

Focus Area 4A

Restoring, preserving and enhancing biodiversity, including in Natura 2000 areas, and in areas facing natural or other specific constraints and high nature value farming, as well as the state of European landscapes

Common Impact Indicators

I.08 Farmland Bird Index
I.09 High Nature Value Farming

Evaluation Purpose

- To test whether agri-environment scheme (AES) management was associated with differential temporal changes in Farmland bird abundance relative to that in the wider farmed landscape in England

- Specifically, the study tested whether positive changes in priority bird species density observed on AES farms between 2008-11 were sustained

- Initial surveys were carried out in 2008-2011, with resurveys in 2014

- The evaluation was commissioned by Defra/Natural England

Evaluation Elements

Table 1: Evaluation elements used

Evaluation questions	Indicators
Common Evaluation Question N. 26: To what extent has the RDP contributed to improving the environment and to achieving the EU Biodiversity strategy target of halting the loss of biodiversity and the degradation of ecosystem services, and to restore them?	**Common:** I.08 Farmland Bird Index **Additional:** Number of farmland bird individuals

Evaluation Approach - Overview

Main approach: Spatial counterfactual analysis

- Study conducted across 3 English regions selected for their importance for farmland birds.

- Study focused on bird species of conservation concern and the Farmland Bird Index (FBI).

- Changes in bird abundance on AES farms were compared with those across the wider farmed landscape → Data from Breeding Bird Survey (BBS) was used as a non-AES control stratum.

- AES farms were selected according to the provision of 'bird-friendly measures' and the presence of at least one AES target bird species.

- Generalised Linear Mixed Models (GLMMs) were used to test whether changes in bird abundance between 2008 and 2014 differed between the sample of AES farms and the wider sample of farmland BBS squares

Figure 1: Location of AES farms and Breeding Bird Survey squares

Evaluation Approach – Sample and Field Methods

Sample

- BBS squares were surveyed in at least two of the three study years (n = 291)
- AES farms surveyed in at least two survey years were included in analyses (n = 68; 96% surveyed in all 3 years)
- AES agreements were 7–8 years into their 10-year duration when surveyed in 2014

Field Methods

- A tetrad (2 km x 2 km square) was placed over each selected AES farm and all of the land falling within this tetrad was surveyed
- Each farm was visited twice in each survey year, once during April–May and once during June-July
- A whole area search method was used to count adult birds with observers walking all field boundaries and along parallel cross-field transects spaced 50–70 m apart

Evaluation Approach – Steps

- **Preparing the database**
  - A database was created to hold data on variables including year, sample location and species abundance
  - The data were entered and cleaned
  - A year specific index of relative abundance for each of FBI species was created
- **Building a counterfactual**
  - BBS data were used to build comparison groups which provided measures of change in abundance on farmland in the same study regions and years. The comparison group was matched on average values.
- **Data analyses**
  - The GLMM were run using the variables AES status (i.e. AES or BBS), YEAR and REGION
  - The model was constructed with the maximum annual adult count of each species as the dependent variable and AES status declared as a random factor
  - Changes in average relative abundance were calculated based on the maximum annual counts (expressed relative to a value of 1 in 2008)

Data

Table 2: Data situation for I.08 FBI

Data description	Sample/Control Group
Data required	AES bird data - abundance of selected species Control bird data - abundance of selected species Geographic location of AES
Data source	Bird data for AES sites – primary data via bespoke field survey Bird data for control sites - BBS Data on AES location – Managing Authority
Unit of analysis	Farm level
Time series/frequency	2008-2011 and 2014
Accessibility for evaluators	Bird data for AES sites provided under contract Bird data for control sites - BBS data AES agreement data available via Managing Authority

Key Findings

- 12 out of 17 priority species showed more positive changes in abundance on AES farms compared to the surrounding wider countryside, in at least one region

- 8 species exhibited sustained responses between 2008 and 2014 to AES management in at least one region

- 8 species exhibited a temporary enhancement in abundance on AES farms in at least one region (i.e. numbers rose between 2008 and 2011, but this was lost or diminished by 2014)

- The Farmland Bird Index increased by between 31% and 97% during 2008-14. This compares to declines of -14% and -21%, respectively, in the surrounding countryside in those regions shown by the BBS

- This data can be extrapolated for use by the Managing Authority to address a key policy question - how much AES intervention might be needed across a landscape to halt ongoing population declines?
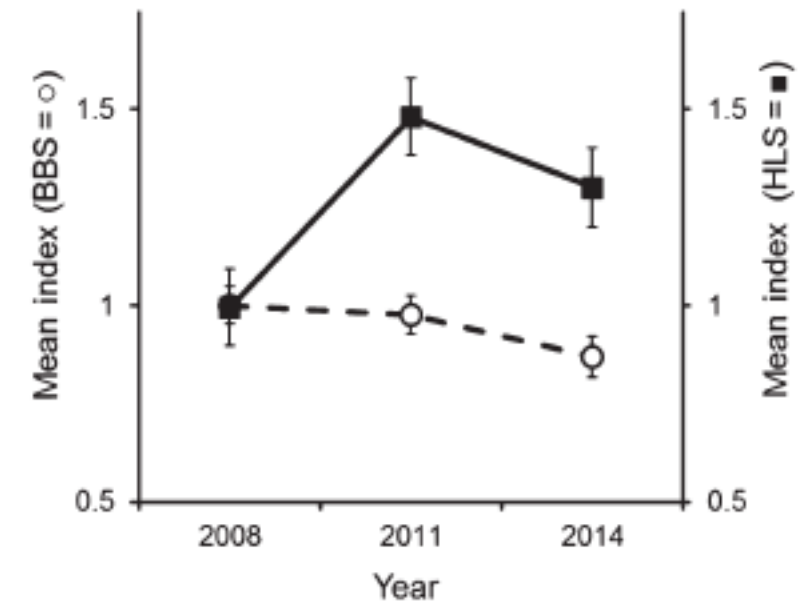

Figure 2: Mean indices of abundance for FBI species (relative to a value of 1 in 2008), and error bars are Standard Error.

Strengths and Weaknesses

Table 3: Strengths and weaknesses of methodology

Strengths	Weaknesses
• Provides both temporal and spatial assessment • England study based on a robust counterfactual • Widely recoginsed survey methodologies – adequate pool of surveyors • Methodologies are scalable • Provides statistically robust results	• Large sample size required to achieve statistical significance • Primary data collection - field methodology is time intensive and therefore costly • Geographically restricted • Applicability of methodology dependent on ability to identify relevant counterfactual • Data are impacted by stochastic weather events (e.g. 2012 and 2013 in UK) • Surveys are weather dependent and can not be carried out at low visibility, high winds or heavy rain

Lessons learnt and applicability

- The study provided evidence of both temporal and regional variation in farmland bird response– therefor long-term, regionally-stratified study is important

- **Data -** Construction of robust counterfactual data needed for comparison

- **Primary data collection** – requires adequate time allocated for field survey preparation and subsequent data analysis, interpretation and reporting

- **Data confidentiality** – the collection requires consent to access sites at multiple times

- **Limitations in survey timing** – in this case study April/May and June/July

- **Time plan** – temporal study requires multiple years of data

- **Costs** - the 2014 study was carried out under contract at approximately €185,000, including field survey, data analysis, interpretation and reporting

- **Skillset –** trained ornithologists/data and statistical skills

- **Software** – data management (e.g. Excel) and statistical package (eg the R statistical package)

Thank You

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Further information:

Walker LK, Morris AJ, Cristinacce A, Dadam D, Grice PV & Peach WJ (2018) Effects of higher-tier agri-environment scheme on the abundance of priority farmland birds. *Animal Conservation 21-3* 183-192
https://zslpublications.onlinelibrary.wiley.com/doi/abs/10.1111/acv.12386