



## Environmental evaluation of agri-environment schemes using participatory approaches: Experiences of testing the Agri-Environmental Footprint Index

Alice L. Mauchline<sup>a</sup>, Simon R. Mortimer<sup>a</sup>, Julian R. Park<sup>a,\*</sup>, John A. Finn<sup>b</sup>, Karen Haysom<sup>a,3</sup>, Duncan B. Westbury<sup>a</sup>, Gordon Purvis<sup>c</sup>, Geertrui Louwagie<sup>c,i,1</sup>, Greg Northey<sup>c,2</sup>, Jørgen Primdahl<sup>d</sup>, Henrik Vejre<sup>d</sup>, Lone Søderkvist Kristensen<sup>d</sup>, Kasper Vind Teilmann<sup>d,6</sup>, Jens Peter Vesterager<sup>d</sup>, Karlheinz Knickel<sup>e,4</sup>, Nadia Kasperczyk<sup>e</sup>, Katalin Balázs<sup>f</sup>, László Podmaniczky<sup>f</sup>, George Vlahos<sup>g</sup>, Stamatios Christopoulos<sup>g,5</sup>, Laura Kröger<sup>h</sup>, Jyrki Aakkula<sup>h</sup>, Anja Yli-Viikari<sup>h</sup>

<sup>a</sup> School of Agriculture, Policy and Development, University of Reading, Earley Gate, PO Box 237, Reading RG6 6AR, UK

<sup>b</sup> Teagasc, Environment Research Centre, Johnstown Castle, Wexford, Ireland

<sup>c</sup> School of Agriculture, Food Science & Veterinary Medicine, University College Dublin, Belfield, Dublin 4, Ireland

<sup>d</sup> Danish Centre for Forest, Landscape and Planning, University of Copenhagen, Rolighedsvej 23, DK-1958 Frederiksberg C, Denmark

<sup>e</sup> Institute for Rural Development Research (IfRS) at Johann Wolfgang Goethe University, Zeppelinallee 31, 60325 Frankfurt am Main, Germany

<sup>f</sup> Institute of Environmental and Landscape Management, Szent István University, Páter K. u. 1, H-2103 Gödöllő, Hungary

<sup>g</sup> Dept of Agricultural Economics and Rural Development, Agricultural University of Athens, Greece

<sup>h</sup> MTT Agrifood Research Finland, Jokioinen, Finland

<sup>i</sup> European Commission – Joint Research Centre, Institute for Prospective Technological Studies, Agriculture and Life Sciences in the Economy Unit, Ed. Expo – Calle Inca Garcilaso 3, 41092 Sevilla, Spain

### ARTICLE INFO

#### Article history:

Received 25 July 2010

Received in revised form 8 July 2011

Accepted 9 July 2011

#### Keywords:

Evaluation

Participatory approach

Agriculture

Multi-criteria analysis

Agri-environment scheme

Policy assessment

### ABSTRACT

The Agri-Environment Footprint Index (AFI) has been developed as a generic methodology to assess changes in the overall environmental impacts from agriculture at the farm level and to assist in the evaluation of European agri-environmental schemes (AES). The methodology is based on multi-criteria analysis (MCA) and involves stakeholder participation to provide a locally customised evaluation based on weighted environmental indicators. The methodology was subjected to a feasibility assessment in a series of case studies across the EU. The AFI approach was able to measure significant differences in environmental status between farms that participated in an AES and non-participants. Wider environmental concerns, beyond the scheme objectives, were also considered in some case studies and the benefits for identification of unintentional (and often beneficial) impacts of AESs are presented. The participatory approach to AES evaluation proved efficient in different environments and administrative contexts. The approach proved to be appropriate for environmental evaluation of complex agri-environment systems and can complement any evaluation conducted under the Common Monitoring and Evaluation Framework. The applicability of the AFI in routine monitoring of AES impacts and in providing feedback to improve policy design is discussed.

© 2011 Elsevier Ltd. All rights reserved.

### Introduction

The 1992 Common Agricultural Policy reforms (CAP) (Council Regulation (EEC) No. 2078/92) and Agenda 2000 (Council Regulation (EEC) No. 1257/99) required Member States to introduce agri-environmental measures throughout their territory. By 2002 about 24% of agricultural land in the EU was covered by agri-environment contracts (EEA, 2006) and this area continues to expand. However, the wide diversity of agri-environmental priorities among different Member States results in considerable variation in the scope, aims and methods of implementation of the various national and regional schemes (Buller et al., 2000; Primdahl et al., 2010; Purvis et al., 2009).

\* Corresponding author. Tel.: +44 0118 3786686; fax: +44 0118 9352421.

E-mail address: [j.r.park@reading.ac.uk](mailto:j.r.park@reading.ac.uk) (J.R. Park).

<sup>1</sup> Present address: European Commission – Joint Research Centre, Institute for Prospective Technological Studies, Agriculture and Life Sciences in the Economy Unit, Ed. Expo – Calle Inca Garcilaso 3, 41092 Sevilla, Spain.

<sup>2</sup> Present address: Canadian Federation of Agriculture, Ottawa, Canada.

<sup>3</sup> Present address: Bat Conservation Trust, 15 Cloisters House, 8 Battersea Park Road, London SW8 4BG, UK.

<sup>4</sup> Present address: Ministry for the Environment, Information Directorate, Environmental Economics, Wellington, New Zealand.

<sup>5</sup> Present address: MTT Agrifood Research Finland, Luutnantintie 13, 00410 Helsinki, Finland.

<sup>6</sup> Present address: Center for Tourism and Culture Management, Copenhagen Business School, Solbjerg Plads 3, 2000 Frederiksberg, Denmark.

All EU Member States are obliged to monitor and evaluate the environmental, agricultural and socio-economic impacts of their agri-environment programmes (Article 16, EC Regulation No. 746/96) and the Common Monitoring and Evaluation Framework (CMEF) requires the evaluation methods to be comparable (EC, 2006). Member States often use routinely-obtained administrative data to monitor the extent of uptake of different AES measures. However, this does not often provide a reliable measurement of the environmental impact of the policy instrument *per se* because participation in an AES does not guarantee the actual delivery of environmental protection or improvement in terms of e.g. attainment of certain environmental standards or population sizes (Kapos et al., 2009; Knickel and Schramek, 1998; Primdahl et al., 2003).

For schemes with biodiversity objectives, ecological sampling methods have most commonly determined the effectiveness of single AE management packages by monitoring areas under AES compared to control areas; see the review of 62 scheme evaluations by Kleijn and Sutherland (2003). This simple, comparative approach may be suitable for monitoring specific issues such as the population recovery of a single species (Peach et al., 2001); however, it does not provide the holistic approach needed to monitor the environmental impact of complex agri-environment schemes with multiple environmental objectives, nor does it provide any way to detect unintended side-effects of the policy (Knickel et al., 2009). A recent survey of 244 EU-funded schemes found that two-thirds of the schemes had a broad range of environmental objectives that targeted multiple dimensions of the agri-environment (Purvis et al., 2009). Ultimately, evaluation methodologies must encompass quantitative approaches for integrating multiple environmental data in order to evaluate multi-objective schemes (Carey et al., 2003).

A fundamental problem for scheme evaluation is that AESs often have poorly-defined objectives and are missing the underlying impact models that describe the cause-and-effect assumptions that relate the AES management practices to the intended environmental outcomes (Primdahl et al., 2010). The design and *ex ante* assessment of AESs is important for ensuring effectiveness (Finn et al., 2008; Llusia and Oñate, 2005); however the relative importance of higher level objectives are often not explicitly stated, and the expected relative contribution of several management packages to a single objective is also often unclear. Therefore, an accurate evaluation needs to consider the relative importance of these factors using some form of weighting rather than simply summing environmental indicator scores or focusing on the impact of an individual management package (Finn et al., 2009).

A common methodology must be customisable to integrate the wide range of agronomic, environmental, administrative and cultural circumstances found across Europe (Knickel et al., 2009) and must also allow for a context-dependent development of indicators that are relevant to the specific evaluation of the particular policy's aims. Multi-criteria analysis techniques that incorporate a participatory approach can provide the underlying basis for customising such complex environmental evaluations (Carey et al., 2003; Finn et al., 2009; Knickel et al., 2009; Park et al., 2004; Primdahl et al., 2003).

Well designed AESs should have clearly defined objectives, the relative contribution of measures to an objective should be clear and the impact model should be well-developed. However, in the absence of such information, a participatory approach can allow stakeholders to establish the relative importance of AES objectives and their respective management packages and to agree appropriate environmental indicators customised for different regions (Knickel and Kasperczyk, 2009). Further, a participatory approach is now actively encouraged in AES evaluation following the European Agricultural Fund for Rural Development (EAFRD) regulation

that requires Member States to strengthen the involvement of partners (i.e. stakeholders) in the development and implementation of Rural Development Programmes (Council Regulation (EC) No 1698/2005).

#### *The Agri-Environmental Footprint Index*

In response to the need for a new approach to AES evaluation, the Agri-Environmental Footprint project developed a common methodology for assessing the environmental impact of European AESs. The output is the Agri-Environmental Footprint Index (AFI); a farm-level, customisable index that aggregates measurements of agri-environmental indicators. The AFI is achieved via a step-wise process (Fig. 1) that incorporates multi-criteria analysis (MCA) (Guitouni and Martel, 1998; Hayashi, 2000; ODPM, 2000). Multi-criteria analysis has previously been used as a structure for evaluating landscape and habitat enhancement mechanisms (Park et al., 2004) and *ex-post* environmental evaluation of AESs (Finn et al., 2009). The conceptual development of the AFI methodology is described by Purvis et al. (2009) and the resulting, interactive process is described fully in the AFI Users' Manual (Mortimer et al., 2009). Ideally, AFI values are calculated for each farm in a representative sample of a category of farms; thus, the approach enables tracking of temporal changes and/or comparisons between groups of farms that participate in an AES and those that do not.

In general, the purpose of the AFI and other AES evaluation methods is to assess the effectiveness of a given AES in achieving its environmental objectives. The AFI was designed to integrate evaluation of multiple and complex environmental issues. In particular, it aimed to provide either a holistic or a strongly policy-focused assessment methodology that could be applied to the majority of EU AESs with wide-ranging environmental objectives (Purvis et al., 2009). However, it is important that the methodology does not prove impossible to conduct, and provides sufficient sensitivity to detect differences between scheme and non-scheme farms (van der Werf and Petit, 2002). Therefore, the main objective of this study was to determine the feasibility of the AFI method for such a purpose. In this paper we:

- i. describe the application of the Agri-Environmental Footprint Index in 14 case studies across Europe
- ii. test the AFI to gain insights into the potential environmental effectiveness of AESs
- iii. test the AFI to incorporate wider environmental impacts of the scheme into the evaluation process
- iv. report on the consultation process and discuss the value of a participatory approach in AES evaluation.

## **Methods**

### *The case studies*

The AFI method was applied to a wide range of agri-environmental contexts and farming types in 14 case study areas across Denmark, Finland, Germany, Greece, Hungary, Ireland and the UK during 2006–2007 (Table 1). The case study AESs varied from broad agri-environmental measures for the protection of wildlife and landscapes (e.g. Countryside Stewardship, UK) to specific (narrow) schemes targeting environmental pollution (e.g. Reduction of Nitrate Pollution, Greece).

In each case study a sample of 'scheme' farms was compared to a sample of 'non-scheme' farms. Where this comparison was not possible (i.e. Finland where 96% of farms are in the AES) alternative comparisons were made (the Finnish case study included a comparison of AFI scores of scheme farms of different farming types). The farms were selected (in some cases in consultation with local

Download English Version:

<https://daneshyari.com/en/article/93307>

Download Persian Version:

<https://daneshyari.com/article/93307>

[Daneshyari.com](https://daneshyari.com)