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An approach to optimise the establishment of grassy headlands in the Belgian Walloon region: A tool for agri-environmental schemes

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Abstract

Farming in Europe is constantly changing as environmental concerns have increasingly been taken into account since the mid 1980s and emphasis has been put on agri-environmental matters throughout all European countries. For instance, in Wallonia (Belgium), as a result of the provisions of the Government Decree on agri-environmental measures, farmers are increasingly encouraged to adopt environmentally friendly practices such as the creation of grassy headlands in their fields. As European agriculture is changing, tools are needed to monitor the evolution of agricultural practices, to control policy application and to advise farmers. In this framework, we present a new approach to optimise the establishment of grassy headlands in cultivated fields. Using a Geographic Information System (GIS), we identify exact locations where farmers can introduce grassy headlands in accordance with legal specifications and environmental concerns and calculate the total length of grassy headland that farmers can establish considering the features of their farm and parcels and for which they can receive subsidies. It indicates a potential, which could serve as a calculation baseline for an indicator. Wallonia was chosen as study area because a digitised parcel plan has been available from the Integrated Administration and Control System (IACS) since 1997. The methodological approach proposes a new valorisation of this spatial information layer and can be considered as an example of application providing relevant information for several intervention levels: national or regional decision-makers, advisors and individual farmers. Since all EU Member States had to set up their own GIS-based land parcel system starting in 2005, our approach may be useful as is or in similar applications in other countries.

Keywords: Agri-environmental measures; Grassy headlands; GIS; Land parcel; Policy tool; Wallonia

Introduction

Agri-environmental schemes (AES) were introduced in Europe in the 1980s as a separate policy domain accompanying the Common Agricultural Policy (CAP) of the European Union (EU) (Primdahl et al., 2003). The goals of the AES, away from food production imperatives, are to curb over-production, integrate environmental protection and promote wider rural development (Falconer and Ward, 2000). With the 1992 reform of CAP, it became obligatory for the Member States to implement Regulation 2078/92/EEC which was the legal framework for AES until 2000, and the EU co-financing share increased to 50% (Wilson et al., 1999). AES are now applied on more than 20% of the EU's farmland (Feehan et al., 2005; Herzog, 2005). Subsidies paid to farmers following implementation of an AES on their land are partially provided by local or national governments as well as by the CAP (Carey et al., 2005). As a matter of principle, the purpose of the agri-environmental measures is to encourage farmers to develop environmentally friendly farming practices (Wilson, 1996; Zalidis et al., 2004) aimed at reducing environmental risks associated with modern farming while preserving nature and cultivated landscapes. They may be designed and implemented at the national or the regional level so as to be adapted to the various farming systems and environmental conditions encountered throughout the EU (Primdahl et al., 2003). The growing interest of environment concerns in relation with agriculture requires, more than ever, tools

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able to monitor the agriculture evolution, to verify the compliance to specifications and to advise farmers about agricultural practices. In this paper, we show that it is possible, by means of a GIS-model, to propose such tools based on a GIS-based land parcel system.

The Walloon Region (Belgium) has a parcel plan where the reference element is the individual CAP parcel. In this region, agri-environmental measures have been suggested to farmers since 1995 (Walloon Government Decree of 8/12/1994) and are periodically reviewed. The measure advocating the maintenance of headland (generally defined as a cultivated or uncultivated strip of land at the end of a field where tillage implements turn) is currently the second most frequently applied in the Walloon region of Belgium with some 3000 contracts affecting 37,000 ha already set.

Belgium is not the only EU country promoting creation of grassy headlands and other buffer zones, especially on watercourse banks. So do Finland (Hietala-Koivu, 1999), Denmark (Veihe et al., 2003) and England (Critchley et al., 2004). As a matter of fact, the management of arable field edges is now an integral component of many AES in Europe (Haysom et al., 2004).

Buffer zones directly address many of the agri-environmental issues cited by the Organization for Economic Cooperation and Development (OECD, 1999a) and found in numerous publications (Huffman et al., 2000; Menge, 2003; Piorr, 2003). They contribute to maintenance of surface water quality (Tattari et al., 2003) by filtering sediments and pollutants present in runoff, preventing them from reaching streams (OECD, 2001; Syversen and Bechmann, 2004). The larger the strip of land is, the better its filtering capacity and the greater its effectiveness in reducing erosion by preventing the formation of channels or rivulets and mudslides (OECD, 2001; Bielders et al., 2003). Buffer zones also provide a habitat for species that can be found in the two interfaced environments and species specific to this type of area (de Snoo, 1999; Hald, 2002) thus creating a feeding area for small game because of the wealth of flora and insects (Ma et al., 2002; Vickery et al., 2002; Pywell et al., 2005). Finally, buffer zones bring greater diversity to the countryside, through the introduction of grasses and flowering plants on farmland (OECD, 1999b, 2001) and thus complete the ecological network.

In Wallonia, the Government Decree of 28/10/2004 recognises two types of buffer zone in cultivated fields: grassy headland (Measure 3a) and improved strips of land (Measure 9). Grassy headland is mainly encouraged along watercourses or wetlands in or near protected areas but can also be established along shelterbelts or hedgerows. They can be used to limit the contamination of agricultural land by outside elements (road traffic, industrial areas, etc.). In addition, the farmer may strategically choose to create grassy headlands in unproductive areas where soil conditions are not ideal for cultivation or on outlying fields, thus benefiting from subsidies payable on sections of fields that are generally less productive and more difficult to manage while protecting the environment. Table 1 summarises the criteria set out in the specification that must be met in order for aids to be payable on grassy headlands. These criteria relate to either the creation of grassy headlands or guidance on management practices once the headland has been installed.

As stated earlier, growing concerns about the possible adverse impact of agriculture on the quality of the environment justify the need to develop tools able to monitor agriculture evolution, verify farmers' compliance with AES's specifications and to advise farmers about agricultural practices. With these concerns in mind, we show in this study that it is possible, using an existing GIS-based land parcel system, to easily develop such a tool. In this specific application, we propose a new methodology to identify the exact locations where farmers can introduce grassy headlands in their cultivated fields in accordance with legal specifications and environmental concerns. We calculate the total length (expressed in meters) of crop field margins that a farmer can convert to grassy headland and for which he will receive subsidies because of compliance with all specifications of the Wallonia Government Decree. We believe the results presented may be of useful for national or regional decision-makers as well as advisors and individual farmers.

Table 1
Criteria defined by the Walloon Region Administration relating to the management of grassy headland at the edges of cultivated fields

	Description of criteria	Category
1	Installation by replacing cultivated land or an area previously registered with headland for a minimum period of 5 years	Installation
2	Standard width 10 m but subsidies are payable on widths ranging from 6 to 12 m	Installation
3	Not alongside permanent grassland unless separated by hedge	Installation
4	Combined sections $\geqslant$20 m (4a)—minimum length per farm $\geqslant$200 m (4b)	Installation
5	Total surface area $<$8% of the area on the farm under crops	Installation
6	Sown with a varied mix of seed	Maintenance
7	No fertiliser	Maintenance
8	No phytopharmaceutical products	Maintenance
9	Not used as pasture	Maintenance
10	Mown after 1st July if at all, removal of mown herbage	Maintenance
11	Topping without harvesting for 12 weeks after sowing	Maintenance
12	Not accessible by motor vehicles, no paths, no deposits	Maintenance