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# Cross compliance and the protection of grassland – Illustrative analyses of land use transitions between permanent grassland and arable land in German regions

Heike Nitsch*, Bernhard Osterburg, Wolfgang Roggendorf, Birgit Laggner

*Heinrich von Thünen-Institute (vTI), Federal Research Institute for Rural Areas, Forestry and Fisheries, Bundesallee 50, D-38116 Braunschweig, Germany*

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ABSTRACT

Permanent grassland combines various ecological functions in terms of nature, soil, water and climate protection. Conversion of grassland to arable land is accompanied by a diminution of these functions. Various developments have led to increased pressure on the EU grassland area. With cross compliance, the EU sets minimum standards for the protection of the ratio of permanent grassland. However, this requirement alone does not ensure the preservation of grassland on sensitive sites, such as water or nature conservation areas or land on organic soils or on steep hills.

This paper deals with land use changes between grassland and arable land. For this purpose we analyse data of the EU's Integrated Administration and Control System (IACS) from four German federal states. The described methodology allows to identify gross changes of land use and to distinguish between conversion of permanent grassland and "loss" due to "deactivation" at a highly disaggregated level. Merging IACS-data with further spatially explicit data provides a picture of land use transitions in ecologically sensitive areas and enables conclusions to be drawn about the effectiveness of protection measures.



## Introduction

Permanent grassland combines various ecological functions. Extensively cultivated grassland belongs to the most species-rich land use types in Europe (Dierschke and Briemle, 2002; Stoate et al., 2009) and, after being destroyed, may only recover very slowly (Kleijn et al., 2009). Compared to arable land it is characterised by high carbon stocks (IPCC, 2000). In particular organic soils store very high amounts of carbon (Freibauer et al., 2009; Lal, 2008). The conversion from permanent grassland to arable land is accompanied by reduced water retention capacity and a massive boost of mineralisation due to decomposition of soil organic matter and consequently rising greenhouse gas (GHG) emissions as well as higher nutrient runoff and leaching to surface and ground water. Converted grassland may lose about 50% or more of its original soil carbon under arable management (Guo and Gifford, 2002). In contrast, a conversion of arable land to grassland results in increased carbon storage, however at a much slower pace and rarely reaching the former level (Guo and Gifford, 2002). The risk of erosion can also be increased. Thus, conversion of grassland into arable land is accompanied by loss of ecological functions regarding biodiversity, water, soil and climate protection. The scale of these effects is site-specific.

The EU has acknowledged the ecological functions of grassland and introduced measures within the Common Agricultural Policy (CAP) for its protection against conversion into arable land as well as for preserving or enhancing its ecological quality. In addition activities at national or regional levels may regulate the maintenance of grassland. The following instruments can contribute to the protection of grassland:

- Cross compliance, linking the full receipt of direct payments to compliance with environmental and further standards, explicitly addresses the protection of grassland twice: According to Reg. (EC) No. 796/2004, EU member states have to "ensure the maintenance of the ratio of land under permanent pasture[1] in relation to the total agricultural area. . .". The protection of permanent grassland is again included in the "good agricultural and environmental conditions" (GAEC), for which member states have to define specific standards taking into account national characteristics. The latter standard was rated as compulsory for member states as a result of the CAP "Health Check" (Reg. (EC) No. 73/2009).
- Support payments for rural development within the CAP may give incentives for continued management of grassland.

* Corresponding author. Tel.: +49 531 5965234; fax: +49 531 5965599.
*E-mail address:* heike.nitsch@vti.bund.de (H. Nitsch).

[1] "Land used to grow grasses or other herbaceous forage that is not included in the crop rotation of the holding for five years or longer". In the following the term "permanent grassland" will be used.

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Agri-environment payments often focus on grassland areas. Besides offering payments for compliance with certain management prescriptions on grassland, they may prohibit a site-specific conversion into arable land or require the maintenance of the grassland area at farm level. Natural handicap payments for less favoured areas also support the continuation of grassland management.
– Environmental national and regional legislation in the areas of nature conservation and water and soil protection may limit the conversion of grassland in ecologically sensitive locations, such as nature protection areas, drinking water protection areas or flood plains, supporting both national and EU objectives.

However, the effectiveness of these instruments has been challenged by various recent developments. Decoupling of EU direct payments to farmers allows land use change, including the conversion of permanent grassland to arable land, without losing the eligibility for the payments on the area concerned. The decrease of grazing livestock numbers results in surplus grassland. This increases the risk of grassland being converted to other agricultural land use or else abandoned. In Germany high incentives for energy production from biomass favour the cultivation of energy crops on arable land, such as maize for biogas production. Finally, high prices for agricultural commodities in 2007 have increased the attractiveness of arable production at the cost of grassland.

Agricultural land use in Germany is characterised by a long-term decline in agricultural grassland area. Between 1990 and 2006 the area of permanent grassland in Germany declined at an annual rate of 0.8%. Arable land only decreased at a rate of −0.05% per year. The overall loss of farmland due to urbanisation seems to have occurred mainly at the expense of grassland (Osterburg et al., 2010). The years following 2005 show a slightly intensified loss of grassland compared to the previous years, while the arable area increased (see Fig. 1). This suggests a rising pressure for conversion of grassland to arable land. However, these net land use changes may mask regional differences and further transitions between these categories, which do not show up in the net numbers. This provokes questions about the fate and location of the grassland areas concerned.

This paper focuses on the land use transitions between permanent grassland and arable land. It is based on the analyses of grassland conversion in four German federal states between the years 2005 and 2007. In 'The protection of grassland under cross compliance in the EU', we provide an overview on the rules for the protection of permanent grassland existing under EU cross compliance. We describe the methodology used to analyse data of the EU's Integrated Administration and Control System (IACS) in 'Methodology'. 'Results' presents the results. In the concluding section we critically discuss the suitability of the cross compliance rules and further instruments for the protection of grassland.

## The protection of grassland under cross compliance in the EU

Cross compliance affects most of the EU's agricultural area and is thus a central instrument for steering agricultural land use and management. Standards under cross compliance can be both: previously existing national or regional mandatory standards or new standards solely introduced with cross compliance. Where cross compliance refers to already existing mandatory standards, the threat of additional financial sanctions can be expected to strengthen their enforcement. The introduction of standards beyond the legal baseline results in a more ambitious protection of grassland. Member states' approaches vary in this respect.

As a minimum requirement for the protection of permanent grassland EU member states must ensure that at the national scale the ratio of the land under permanent grassland in relation to the total agricultural area may not decrease by more than 10% compared to the year 2003 (plus permanent grassland registered in 2005). In most cases, Member States implemented precautionary measures before the 10% threshold is reached, e.g. a need for authorisation if the 5% level is exceeded (Alliance Environnement, 2007). Some member states additionally regulated the conservation of permanent grassland in certain locations under cross compliance (e.g. general prohibition of conversion of permanent grassland in Greece, Italy and Spain, no conversion on steep hills and along water courses in Austria, no conversion of semi-natural grassland in the UK) (Alliance Environnement, 2007). Due to the GAEC-standard for the protection of permanent grassland having become obligatory after the "Health Check" in 2009 all member states have to define standards in this respect. In addition, compliance with standards stemming from the EU Habitats and Birds Directives is also relevant under cross compliance. This might include a ban on converting permanent grassland in Natura 2000 areas, an EU-wide network of areas, which is supposed to assure the long-term survival of Europe's most valuable and threatened species and habitats. Concrete standards depend on the implementation of these directives in the different member states.

Germany is one of the few EU member states showing a clear decline of the ratio of permanent grassland since the introduction of mandatory cross compliance. By 2010 the 5% threshold has been exceeded in four federal states, the regional level at which this ratio is calculated in Germany. In this case the German rules require the introduction of authorisation procedures. As a result, for any further conversion of permanent grassland authorisation has to be sought and as a rule grassland has to be created elsewhere as compensation.

However, in most EU member states the monitoring for cross compliance takes place at the national level, in Germany it occurs at the federal state level. Consequently, the results may mask regional differences at a lower spatial level and underestimate conversion of permanent grassland to arable land to the degree that land use change in the opposite direction is also taking place. The value of cross compliance monitoring is further limited in so far that the ratio of permanent grassland may vary simply because agricultural land is not recorded any more (e.g. due to farms ceasing to apply for direct payments, or areas losing eligibility for direct payments and not being included into the land of a holding any more) or the inclusion of hitherto not registered land into the administrative system. In addition, location and quality of permanent grassland and thus its environmental value are not considered.

In order to receive more environmentally meaningful information on the dynamics of land use change, "gross" land use change has to be analysed, as net changes may mask land use transitions. Besides, in order to assess environmental implications of land use change, the analysis has to differentiate according to environmentally sensitive locations.

## Methodology

### *General approach*

The basis for the quantitative analyses are data of the Integrated Administration and Control System (IACS) from four German federal states, Lower Saxony, Mecklenburg-Western Pomerania, North-Rhine Westphalia and Rhineland-Palatinate. They comprised 36.4% of the German utilised agricultural land in 2005 (Statistisches Bundesamt, 2009). IACS data serve to administrate and control applications for support payments within the CAP,