

Species-rich grassland as an ecological good in an outcome-based payment scheme

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Keywords: biodiversity, outcome-based payment scheme, species-rich grassland

Introduction Agriculture plays an important role in protecting the biodiversity of the rural environment. Since the reform of the EU's common agricultural policy (CAP) in 1992, agri-environment schemes have been supported by the EU within the framework of the second pillar of CAP. In these programmes, farmers were rewarded for environmental services. The predominantly action-oriented programmes imply particular disadvantages; they tend to lack economic efficiency and to fail with regard to the conservation and improvement of biodiversity (Kleijn & Sutherland, 2003; Wilhelm, 1999). This situation was the starting point for the development of an outcome-based payment scheme. We focus on the process of defining ecological goods - in particular with regard to grassland - as the results of ecological services, which are to be remunerated by means of this innovative payment system.

Payment system The payment scheme differs from current agri-environment programmes in four main aspects. First, it is an outcome-based scheme. Farmers will not be rewarded for particular actions, but for the results of ecological services, i.e. the ecological 'goods' of plant species diversity. Secondly, the design of the programme is based on fundamental components of market economies, such as supply and demand. Farmers can offer ecological goods voluntarily, for example, in a bidding procedure. Thirdly, the payment scheme is organised regionally in accord with the EU principle of subsidiarity. Lastly, the preferences of the local population will be taken into account in a participatory approach, with a regional advisory board making decisions according to local demand for ecological goods. This board consists of local stakeholders from nature conservation, agriculture and local government (Gerowitt *et al.*, 2003). These four aspects will improve the cost-efficiency of schemes aimed at the conservation of biodiversity in agricultural landscapes and will increase the social acceptance of environmental programmes. The described system of reward was developed for the administrative district Northeim in the south of Lower Saxony (Germany), but is transferable to other regions.

The definition of ecological goods connected to grassland Ecological goods have to be defined by transparent floristic criteria that meet specific requirements: (i) the ecological benefits should exceed those achievable merely by good farming practice - a direct connection between the criteria and grassland management is therefore necessary; (ii) they have to be clearly defined - farmers should easily be able to demonstrate fulfilment; (iii) floristic criteria should imply additional benefits to fauna and abiotic resources; and (iv), criteria have to be adapted to regional conditions and therefore have to be assessed on the basis of regional investigations.

The aims of the production of "ecological goods grassland" are the preservation of grassland on marginal sites in particular, the promotion of species-rich grassland and the protection of regionally endangered plant communities. In relation to these requirements, two criteria are suitable for the definition of the "ecological goods grassland": (a) the number of species per area unit, and (b) a catalogue of grassland species that are adapted to extensive grassland management and that are characteristic of regionally endangered plant communities. The number of plant species is strongly dependent on grassland management, e.g. N-fertilisation and the frequency of defoliation. This relationship allows the setting of a specific number of species as a minimum level for reward. Moreover, the total number of species is correlated with the number of forbs in the grassland, so that we can use the number of forb species per area unit as an indicator for the total plant species diversity, saving time and effort compared to counting all species. Three quality levels of "ecological goods grassland" have been defined. The lowest level is defined by the number of forbs (≥ 8 species of herbs/12.6 m²), whilst higher levels (grassland II and III) are defined by this same number of forbs and additionally by the occurrence of species from the above-mentioned catalogue. The ecological goods are achieved when the required criteria are met on the whole field. Standardised methods for the determination and the control of such goods have been developed.

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