



ELSEVIER

Contents lists available at ScienceDirect

Journal of Environmental Management

journal homepage: www.elsevier.com/locate/jenvman

Research article

Facing the future for grassland restoration – What about the farmers?

Emelie Waldén*, Regina Lindborg

Department of Physical Geography, Stockholm University, SE-106 91 Stockholm, Sweden



ARTICLE INFO

Keywords:

Agri-environmental scheme

Farmer

Restoration

Semi-natural grassland

Social aspects

Sweden

ABSTRACT

In line with the 2010 Aichi Convention for Biological Diversity, the European Union has a goal to restore 15% of degraded ecosystems and their services by the year 2020 (target 2, Europe 2020). This includes restoration of semi-natural grasslands (SNGs). Management of both intact and restored SNGs is dependent on people's willingness to manage them. Due to low profitability, management abandonment still occurs all over Europe, which highlights the need to raise farmers' and landowners' perspectives. In this study, we combined survey data and in-depth interviews with farmers/landowners managing previously restored SNGs, to understand how they perceive the restoration process, the outcome and future management. Survey and interview data were analysed in relation to biodiversity and Agri-environmental payments data from the restored sites. Almost all respondents considered the restoration successful and the re-inventoried restored SNGs also showed an increase in plant diversity. Nevertheless, 10% of the restored SNGs were abandoned again post-restoration and 40% of the respondents were unsure if they would continue the management in the future. Abandoned management may cause a negative trend in terms of decreased biological, cultural and aesthetic values, in the local community, as well as for the society in general. Most respondents explained a strong dependency on Agri-environmental payments, both as a restoration incentive and for post-restoration management. Also non-financial support from authorities in form of feedback and advice was requested, as well as support from the local community and society as a whole. Future management in a longer time perspective was strongly coupled to the farm economy, i.e. received Agri-environmental payments at farm-level and profit from selling agricultural products, and whether the farmers had successors. We conclude that both social and ecological factors, here farm economy, authority support and proper management, must be in place for long-term success of grassland restoration.

1. Introduction

Mitigating biodiversity loss is one of the major globally established environmental goals. As biodiversity decline often is the result of decrease in habitat amount and quality, restoration of habitats is a widely used measure to counteract further losses. Most studies evaluating what affects biodiversity recovery after restoration have focused on physical, chemical and biological conditions and processes. Although, biodiversity recovery in many habitats is highly dependent on post-restoration management, we lack studies that have examined how social and economical factors affect long-term restoration success (McDonald et al., 2016; Perring et al., 2015). Incorporating these aspects is especially important when considering the long-term engagement needed for some types of habitat restoration.

Interdisciplinary restoration studies combining biophysical and socio-economical effects on biodiversity recovery is crucial when studying habitats depending on human management (Hartel and Plieninger, 2014; Stenseke et al., 2012). One such key habitat in Europe

is the semi-natural grassland (SNG). Throughout centuries, humans have maintained them by grazing and mowing, creating a unique habitat type containing a very high small-scale plant diversity (Habel et al., 2013; Kull and Zobel, 1991; Wilson et al., 2012). However, due to agricultural intensification and land-use changes, extensive areas of SNGs have been abandoned (Hansson and Fogelfors, 2000; Stoate et al., 2009; Willems and Bik, 1998) or transformed into arable land or forest plantations (Cousins, 2009; Fuller, 1987; Pärtel et al., 1999; Poschod and WallisDeVries, 2002). Since traditional management of SNGs rarely is financially profitable, grazing and mowing currently occur mainly on sown leys on arable fields (Beaufoy et al., 2011; Swedish Board of Agriculture, 2009). During the last century, up to 90% or more of the European SNGs have been lost (Cousins and Eriksson, 2008; Strijker, 2005; WallisDeVries et al., 2002). Decreased quality in remaining SNGs is also a problem (BIO by Deloitte, 2015). As an example, 18% of the Swedish SNGs reported as “valuable” in 2002–2004, no longer were considered valuable ten years later, due to management abandonment or loss of species (Swedish Board of Agriculture, 2013).

* Corresponding author.

E-mail address: emelie.walden@natgeo.su.se (E. Waldén).

To mitigate the biodiversity loss caused by SNG abandonment (Beaufoy et al., 2011; Queiroz et al., 2014; Stoate et al., 2009), restoration of these habitats is currently in focus. Within the European Union, more than 97 800 km² of SNGs have been reported by the member states to need improvement in structure and function to reach the Bird and Habitat Directives (BIO by Deloitte, 2015). Moreover, additional > 6800 km² SNGs is needed to fulfil the Habitat Directive in terms of area (BIO by Deloitte, 2015). Compared to restoration of natural habitats, the long-term goal when restoring semi-natural habitats is that the re-instated management must continue (McDonald et al., 2016). To promote restoration and continued management of SNGs, farmers are offered a financial incentive through different schemes and programs, e.g. Agri-environmental schemes (EU) and Man and the Biosphere program (UNESCO). However, the effectiveness of Agri-environmental payments (AEP) from a biodiversity point of view has been questioned (Ansell et al., 2016; Borgström et al., 2016; Jakobsson and Lindborg, 2015). Moreover, payments aimed for promoting continued management requires people willing to manage (Roellig et al., 2016; Sandberg and Jakobsson, 2018). Analyses of eventual synergies between promoting biodiversity and benefits for farmers, besides received AEP, is therefore highly relevant.

Common restoration practice of abandoned and overgrown semi-natural grasslands is removal of trees and shrubs to increase light availability, and reintroduction of traditional management regimes (Swedish Board of Agriculture, 2014a,b). Nevertheless, to uphold biological and cultural values and to reach long-term restoration goals (Shackelford et al., 2013), strategies for post-restoration management are needed. Due to e.g. re-sprouting (see Rydberg, 2000) and released nutrients from root decomposition (see Coleman et al., 2004), re-abandonment of restored SNGs could lead to a more rapid encroachment of trees and shrubs. Moreover, the previously dormant seed bank containing desired grassland species might be depleted if abandonment reoccurs before the seed bank is replenished (see Fenner and Thompson, 2005). Thus, it is essential to incorporate social aspects when evaluating the long-term effectiveness of restoration schemes.

Economical rewards is still the main motivation for most farmers (Burton et al., 2008; Home et al., 2014; Roellig et al., 2016; Siebert et al., 2006), while some farmers also are environmentally concerned (Boonstra et al., 2011). As an example, 25% of surveyed Swedish farmers had doubts about re-applying for AEP for managing their permanent pastures and meadows (Beaufoy et al., 2011). One reason was fear of penalties, but also discontent with the AEP rules. Only a few intended to continue grazing without payments, at least in the short-term (Beaufoy et al., 2011). In fact, receiving payments may restrict the development of farmers' intrinsic motivation, compared to implementing voluntary measures for enhancing biodiversity (Hanley et al., 2012; Herzon and Mikk, 2007; Josefsson et al., 2017). Studies show that current Agri-environmental schemes only have limited influence on European farmers' attitudes towards promoting biodiversity and limit environmental degradation in a long-term perspective (Burton and Paragahawewa, 2011; Burton and Schwarz, 2013) - a perspective that is highly needed in restoration.

In this study, we analysed Swedish farmers' and landowners' opinions about restoration outcomes and future for their restored SNG. This was assessed in a questionnaire study and through in-depth interviews. To understand the relationships between management, biodiversity and policy, the social aspects were combined with biodiversity data from the restored SNGs and documentation of received AEP from the County Administrative Boards. Our main questions to the farmers and landowners concerned:

1. How they perceive managing SNGs with livestock grazing or mowing.
2. Their experience from the SNG restoration, both regarding outcome and procedure.
3. Their thoughts and opinions of future management of their SNGs.

2. Methodology

2.1. Semi-natural grassland restoration practices in Sweden

Within the Swedish Rural Development Programme more than 14 200 ha of SNGs (pastures and meadows) were restored with AEP to a cost of approximately € 26 million (approx. 256 million SEK) during 2000–2013 (Andersson et al., 2009; Swedish Board of Agriculture, 2016). The most common restoration methods are clearing of trees and shrubs and reinstating a proper management regime (Swedish Board of Agriculture, 2014a,b). To get financial support for restoration, the SNG must have been mown or grazed before abandonment and contain residues of plant or animal species dependent on management or have a high cultural value (Andersson et al., 2009; Swedish Board of Agriculture, 2014a). It should only have been marginally fertilised and not be smaller than 0.1 hectare (Andersson et al., 2009). In restored pastures, the grazing should be continuous to maintain a short and dense grass sward without accumulation of litter or recruitment of new shrubs and trees (Swedish Board of Agriculture, 2004). Restored meadows should be mowed yearly with removal of litter (Swedish Board of Agriculture, 2004). Restoration payments covering extra costs of machine rental, fence material and labour are given during the initial 5 years, with a precondition that the farmer will continue the management for an additional 5 years (Swedish Board of Agriculture, 2016, 2004). One common restoration aim is that the SNG should reach a biological value high enough to be eligible for another, areal-based, AEP after the five initial years (Swedish Board of Agriculture, 2014a).

2.2. Study area

We studied 30 restored SNGs in the counties of Uppsala (7 sites), Stockholm (4 sites), Södermanland (6 sites), Östergötland (8 sites) and Västmanland (5 sites) in south-central Sweden (Fig. 1). All counties have remnants of traditional small-scale agriculture, where managing SNGs were essential parts of the historical farming (Ekstam and Forshed, 2000; Eriksson et al., 2002). The restored SNGs were chosen with acquired information from the County Administrative Boards, the municipalities and the Uppland Foundation (Upplandsstiftelsen). Sixteen of the restored SNGs were selected in 2001 (Lindborg and Eriksson, 2004) and 14 in 2011 (Winsa et al., 2015). The restored SNGs were previously abandoned SNGs restored 7–26 years prior to this study (i.e. year 1990–2009). Restoration was done by clearing of trees and shrubs and reintroducing suitable SNG management; domestic grazing (all sites; mostly grazed by cattle, but also horses and/or sheep) and mowing (4 sites). Three sites were no longer managed when the survey took place. The sites had dry (20 sites, average site area = 5.24 ha), dry-mesic (6 sites, average area = 4.28 ha), mesic (1 site, 7 ha) and moist (3 sites, average area = 10.49 ha) abiotic conditions. Their plant diversity was inventoried during summer in 2001, with a re-inventory in 2012 (16 sites; for more details on methods, see Waldén and Lindborg, 2016) or in 2011 (14 sites; see Winsa et al., 2015). Information of contact with AEP-controllers and areal shifts post-restoration were acquired from the County Administrative Boards with the farmers' and landowners' permissions.

2.3. Survey and interviews

At a first stage, all farmers and landowners of restored SNGs, whose plant diversity was inventoried in previous studies (Lindborg and Eriksson, 2004; Waldén and Lindborg, 2016; Winsa et al., 2015) were asked to participate in a short individual survey. The overall response rate was 88%, thus 29 farmers and landowners of 30 restored SNGs contributed to the survey. The survey was chosen as a pre-study and a method to collect quantitative data. It consisted mostly of checkbox questions related to the history of their restored grassland, but also contained open-ended questions requiring written answers by the

Download English Version:

<https://daneshyari.com/en/article/10140630>

Download Persian Version:

<https://daneshyari.com/article/10140630>

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