Biodiversity conservation of semi-natural grasslands profits from a multi-objective and broader scale spatial optimization approach

Short description: Recent actions to mitigate biodiversity loss in agricultural environments appear insufficient despite the considerable efforts channeled via the European Union's Common Agricultural Policy (CAP). One likely reason for this failure is the limited attention paid to the regional and landscape level ecological characteristics in farmland conservation planning. We demonstrate how to obtain conservation prioritization solutions that would address simultaneously three goals, including two landscape level targets: minimizing local habitat quality loss, maximizing habitat connectivity, and incorporating landscape heterogeneity

Area: Southwest province of Finland, 20 000 km^2

Data: Semi-natural grassland data: Traditional biotopes of open semi-natural grasslands from the National Land Survey of Finland and oher open grasslands from the SLICES land cover database. Landscape elements data: the Finnish IACS (Integrated Administration and Control System) data on field parcels. We used the information on production line and on parcels entitled to agri-environment payments according to AES. These measures were semi-natural grasslands under management contract, permanent pastures, buffer zones, organically cultivated fields, and biodiversity and landscape management contract fields These data included the land use information for each field parcel in the landscape and the field parcel boundaries. We separated different types of field margins because their influence on grassland biodiversity differs. The forest data for field-forest boundaries were drawn from the Corine Land Cover database (2006), and the water network systems for field-water boundaries from the SLICES land cover database (National Land Survey of Finland 2005).

Focus: Under socio-economical pressure caused by demands of food production and agricultural industry we demonstrated that multi-objective optimization considering can help with targeting biodiversity conservation more effectively and to help mediate the implementation of CAP objectives. Socio-political factors driven by CAP influence farmland biodiversity conservation, and we thereby determined the baseline settings for our prioritzation according to existing support system. Because an increase of non-crop habitats is not necessarily economically and socially feasible, we suggested an approach where spatial arrangement of existing biodiversity-friendly landscape elements supported by AES is included in conservation prioritization process.

Use: Regional authorities may allocate financial aid with the aim of forming functional ecological networks.

Special analysis features: Integration of biodiversity rich landscape element data into spatial prioritization of open semi-natural grasslands.

Link: Harlio, A. (2017). Voluntary biodiversity conservation optimization in agricultural and forest environments. Licentiate thesis. University of Helsinki, Faculty of Biological and Environmental Sciences, Department of Biosciences, Ecology and Evolutionary Biology. http://hdl.handle.net/10138/217483

Contact: Reseacher Anni Arponen (University of Helsinki, anni.arponen@helsinki.fi), researcher Annika Harlio (University of Helsinki, aharlio@yahoo.com)