

Surveying farmer attitudes to nature conservation in Finnish grasslands under a changing climate

Background and objectives

With climate change, many species are predicted to shift towards higher latitudes and altitudes. The viability of such projected range shifts will largely depend on the availability of suitable habitat networks. Semi-natural grasslands are in decline in Finland, due to agricultural intensification and abandonment of marginal areas. Farmers can have a significant impact on biodiversity conservation by managing different grassland habitats. An agro-environmental (AE) agreement is the main policy measure that offers farmers incentives to give biodiversity conservation a greater role in farm management.

The objective of this study was to conduct a questionnaire survey of farmers' views on the condition of wildlife and biodiversity in farmlands and the usefulness of AE-agreements. Analysis of the questionnaire responses has only just begun, and we focus exclusively on farmers' attitudes towards biodiversity conservation.

This work is part of a wider case study to investigate the ecological and economic implications of climate change for biodiversity conservation of semi-natural grasslands in Finland, using butterfly species as a key biodiversity indicator. The work is being conducted as part of the European Commission-funded FP7 MEDIATION (Methodology for effective decision making on impacts and adaptation) and Academy of Finland-funded A-LA-CARTE (Assessing limits of adaptation to climate change and opportunities for resilience to be enhanced) projects.



Photo: Antti Below / YHAFoto



The survey

Two study areas, Southwest Finland and Pirkanmaa, were selected for the survey. A postal questionnaire was sent at the beginning of April 2012 to a random sample of about 1000 farmers selected for each area. The final overall response rate was 19.3 % (18 % in SWV Finland 20.5 % in Pirkanmaa).

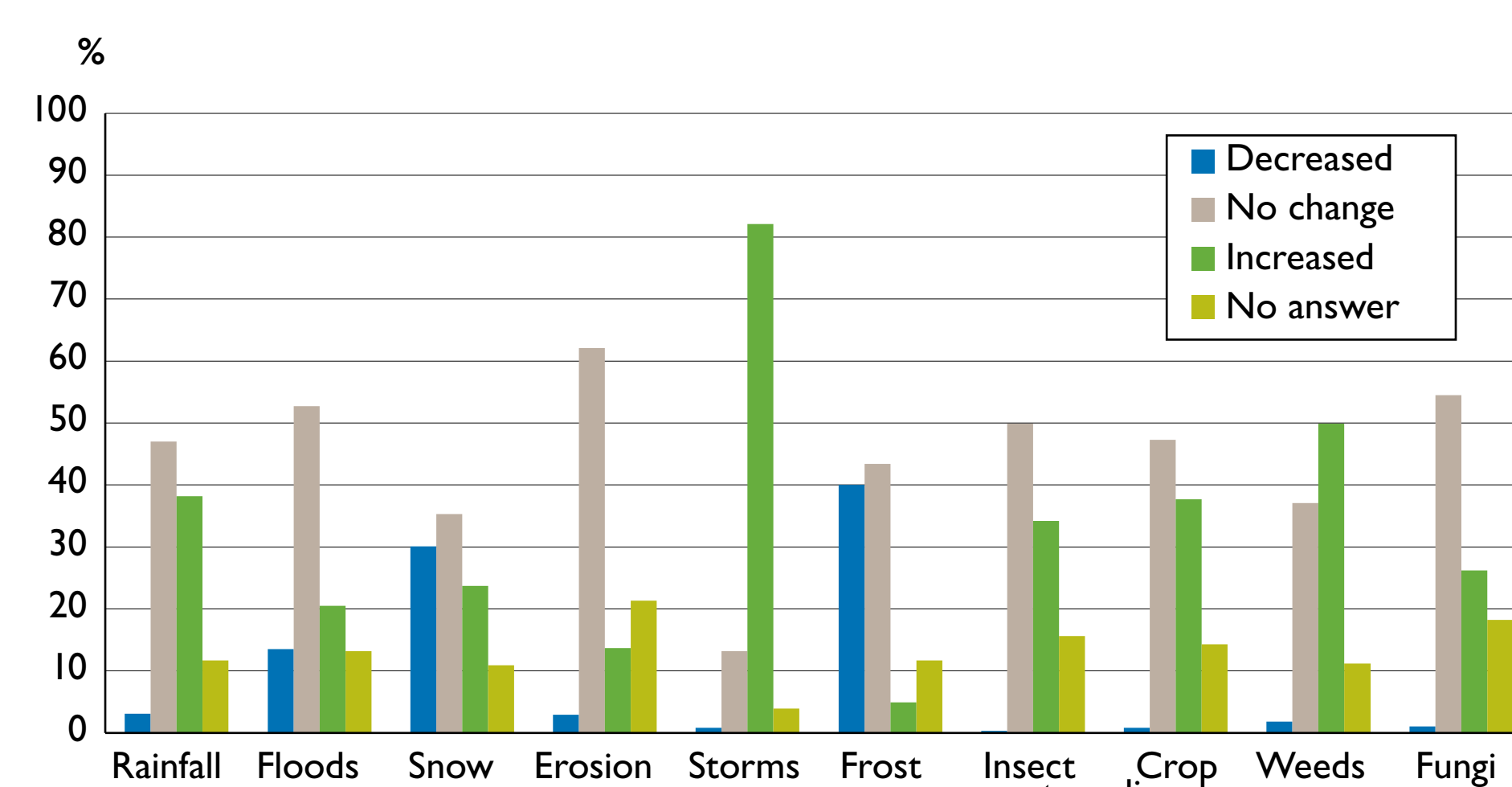


Figure 1. Have you noticed changes in your local environment during the time you have lived here? (N=385).

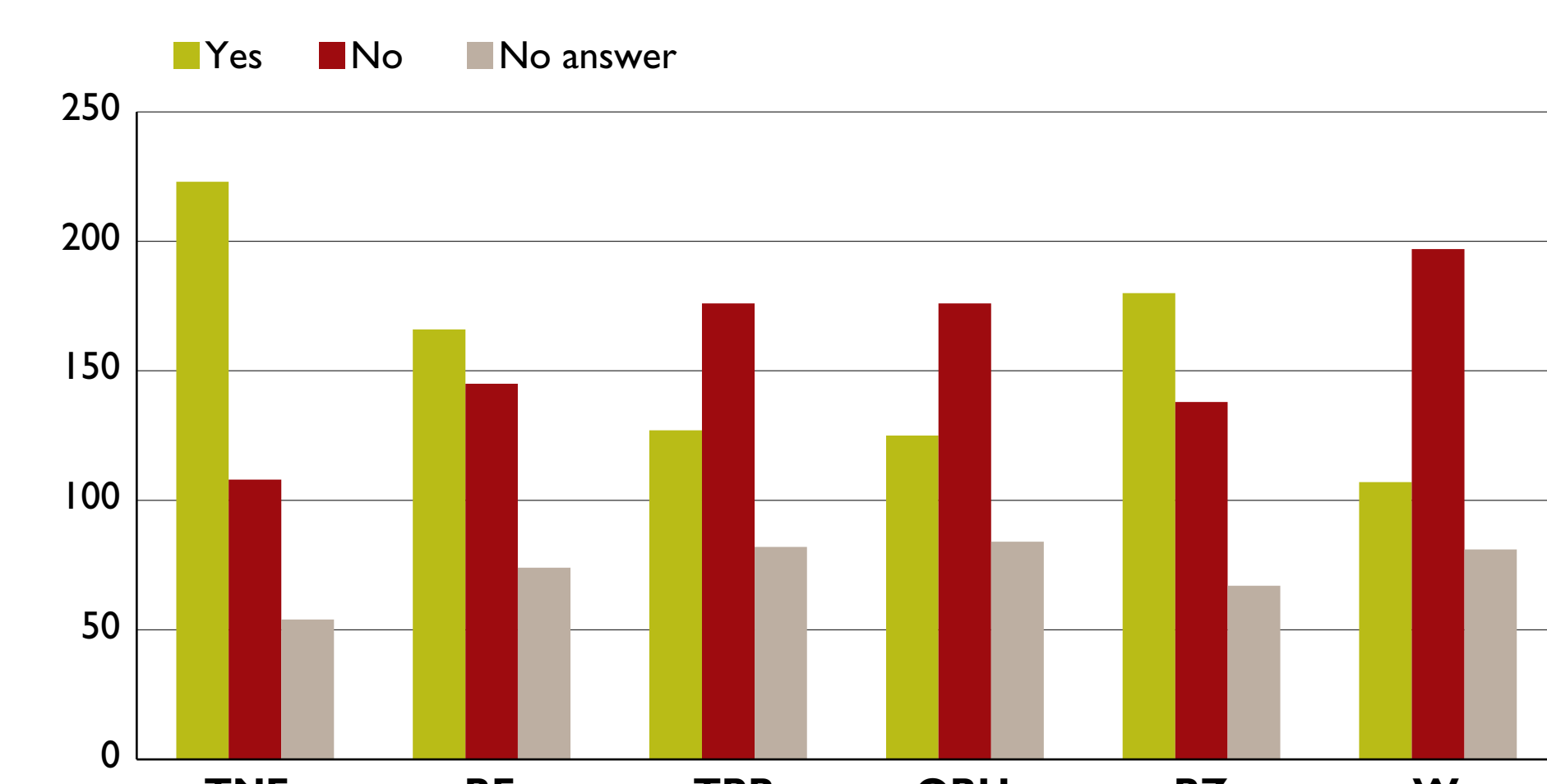


Figure 2. Which of the following agro-environmental measures would you be willing to implement at your farm? (N=385)

Key findings

Farmers were asked if they have noticed changes of the local environment during the time they have lived in the area (Figure 1). The responses indicate that for some indicators clear changes have been noted by a substantial proportion of respondents that are directly related to ongoing climate variations (e.g. increasing storminess, increasing rainfall and declining frost occurrence). For some other climate indicators the respondents report either little change (e.g. for floods) or opinion is divided. For indicators that are known to be influenced by climate, between a quarter and a half of respondents reported increases in the amount of fungi, insect pests, crop diseases and weeds. Such trends might logically be related to a lengthening and warming growing season, though other factors such as changes in farm management may also have been influential. Overall, the environmental changes observed by farmers appear to be broadly consistent with observations of warming over recent decades (Tietäväinen et al. 2010) though rainfall and storminess trends are less clear, and are also in line with future projections of warmer and wetter climate for Finland (Jylhä et al. 2009).

When asked about the current state of biodiversity conservation slightly more than half of the farmers thought that the current level of conservation is sufficient. A third of the respondents recognize a need for increased conservation efforts. A tenth of the farmers argued that too much effort has already gone into biodiversity conservation.

The farmers were also asked whether or not, in their opinion, AE-agreements help protect endangered species and habitats. An overwhelming majority of respondents (three quarters) either somewhat or strongly agreed that they do, with less than one tenth disagreeing with this view. About one eighth of respondents neither agree or disagree with this view.

Finally the farmers were asked which of the available voluntary biodiversity conservation AE-measures (Table 1) they would be willing to implement at their farm (Figure 2). The responses

show that the most popular AE-measures were the establishment and management of a temporarily non-cropped field (TNCF), buffer zone (BZ) or a biodiversity field (BF). Not all farmers would have suitable habitats on their farms for some of these measures to be applicable, which accounts for the large numbers who didn't answer (and possibly also some who answered no).

Discussion

- Changes in the local environment have been detected by many respondents. These observations are broadly in line with observed climate changes as well as being consistent with projected change for Finland. However, some of the responses might have been unduly influenced by recent weather events, such as the two snowy winters 2010/11 and 2011/12 as well as recent storms.
- Although one third of the farmers have recognized a need for more biodiversity conservation, more than half consider that enough or too much is being done. There is an apparent contradiction among some members of the latter group between recognition of ongoing changes in the local environment and perception of biodiversity conservation needs.
- Farmers see agro-environmental agreements as an effective way to protect and maintain biodiversity. The most popular AE-measures that farmers would be willing to adopt are TNCF, BZ and BF. This means that the future target level of semi-natural grasslands could potentially be met by encouraging farmers to adopt a wider range of AE-measures and/or implement it in a wider scale.
- Farmers' possible underlying motivations can also explain some of the above results. The AE-agreement subsidy is an important

Table 1. Specifications of voluntary agro-environmental conservation measures

AE-measure	Definition
Temporarily non-cropped field, TNCF	TNCF can include either sown or naturally developed grass cover. Grass cover must be kept on the same field for at least two growing seasons.
Biodiversity field, BF	BF is sown annually with meadow plant seed mixtures.
Traditional rural biotope, TRB	Grazed and/or mown semi-natural grasslands / natural pastures which are maintained (or being restored) according to a specific management plan.
Other biodiversity habitat, OBH	Can include a variety of different habitats that are in some way valuable for a certain plant/animal species/group.
Buffer zone, BZ	At least 15 m wide BF refers to agricultural fields that are established and managed according to a specific plan and covered with perennial grasses. Tilling, fertilization or the use of pesticide after establishment is not allowed.
Wetland, W	Annual management measures include the removal of slurry, dam management and the moving and removal of plants in the wetland and its edges.

source of extra income for the farmers. Therefore it is understandable that farmers emphasize the effectiveness of AE-measures. Some farmers may also have an incentive to downplay the need for conservation, which could imply extra work and cultivation restrictions, with possible income losses as a result.

Future analysis is needed to:

- explore measures that might be required to address a changing climate and are additional to the existing AE-measures
- evaluate the effectiveness of the current measures, using objective criteria to assess their contribution to biodiversity conservation

Such analyses are among the broader goals of the MEDIATION and A-LA-CARTE projects.

References

- Jylhä, K., Ruosteenoja, K., Räisänen, J., Venäläinen, A., Ruokolainen, L., Saku, S. and Seitola, T. 2009. The changing climate in Finland: estimates for adaptation studies. ACCLIM project report 2009, Finnish Meteorological Institute, Helsinki, 102 pp (In Finnish with English summary).
- Tietäväinen, H., Tuomenvirta, H. and Venäläinen, A., 2010. Annual and seasonal mean temperatures in Finland during the last 160 years based on gridded temperature data. *Int. J. Climatol.* 30 (15), 2247-2256.