

Assessing crop sequence agronomic quality in grassland regions

A case study in the province of Luxembourg

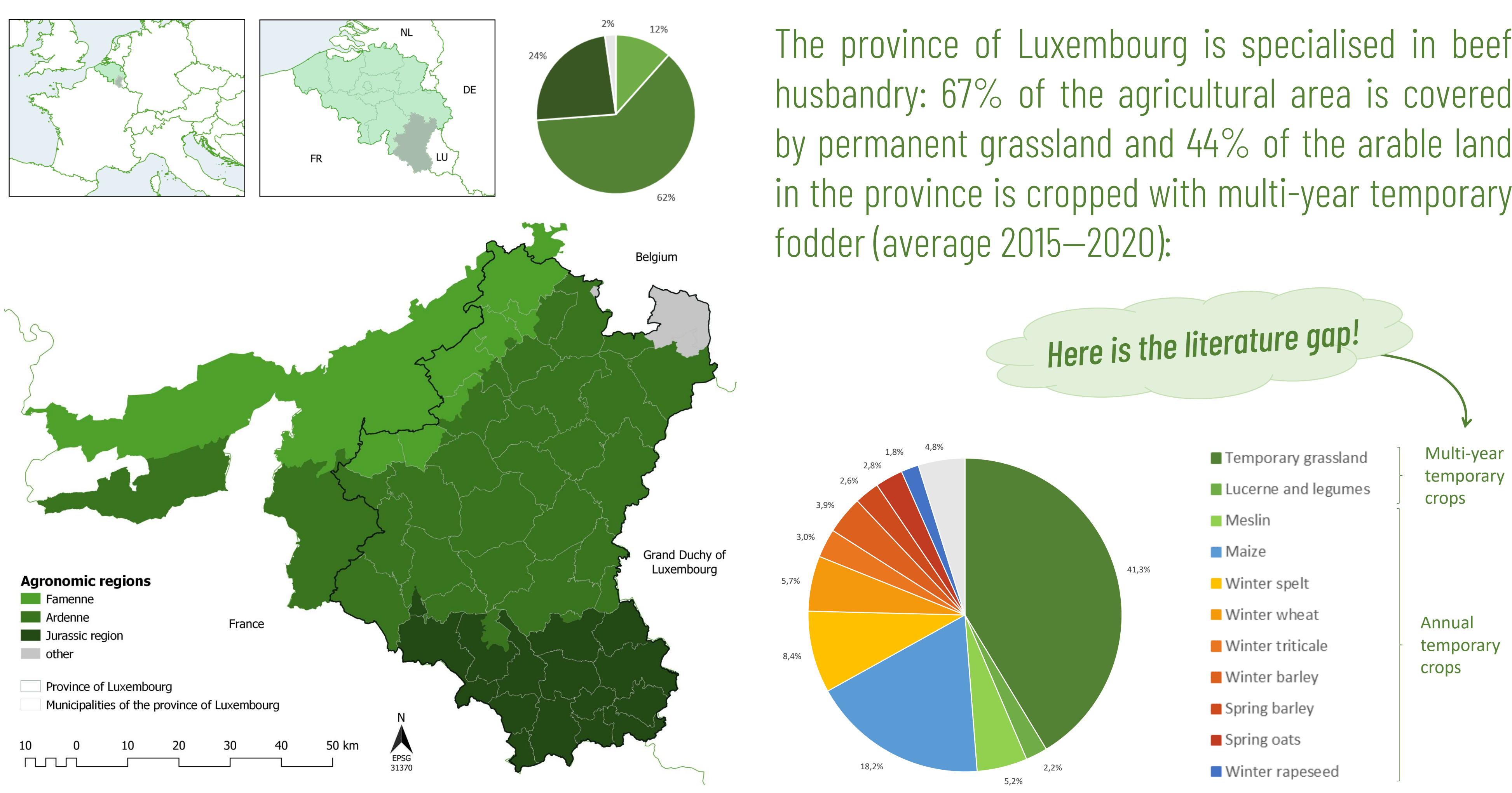
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Introduction

During the last century, industrial inputs in conventional agriculture have replaced crop rotations for fertility and pest management. Today, diversifying crop sequences is a way to reduce industrial input use. Recent literature on crop sequence diagnosis has focused on annual crops, neglecting multi-year temporary grassland and fodder legumes, typical of grassland regions. This is the case of the Walloon's most cited crop sequence agronomic quality assessment by Leteinturier *et al.* (2006)¹. This poster presents a generalisation to grassland regions of Leteinturier's method.

Case study

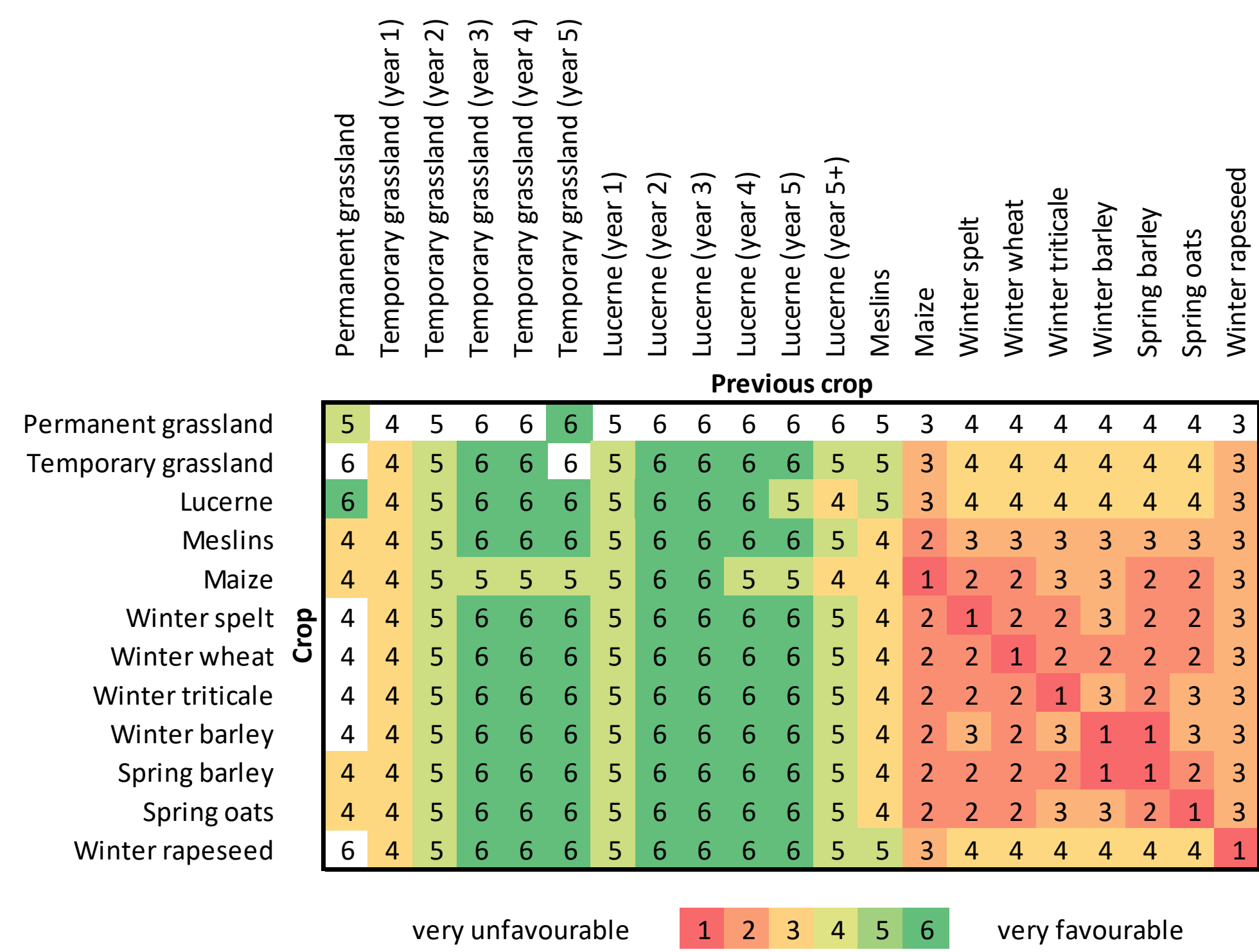
The Belgian province of Luxembourg



Method

Generalisation of a crop sequence indicator¹ (Ics) to grassland regions

For each plot of the LPIS/IACS² from 2015 to 2020, we calculated a *crop sequence indicator* (Ics) assessing the effect of the previous crop on the next in terms of soil structure, risk of disease, pest and weed proliferation, and nitrogen residue characteristics:



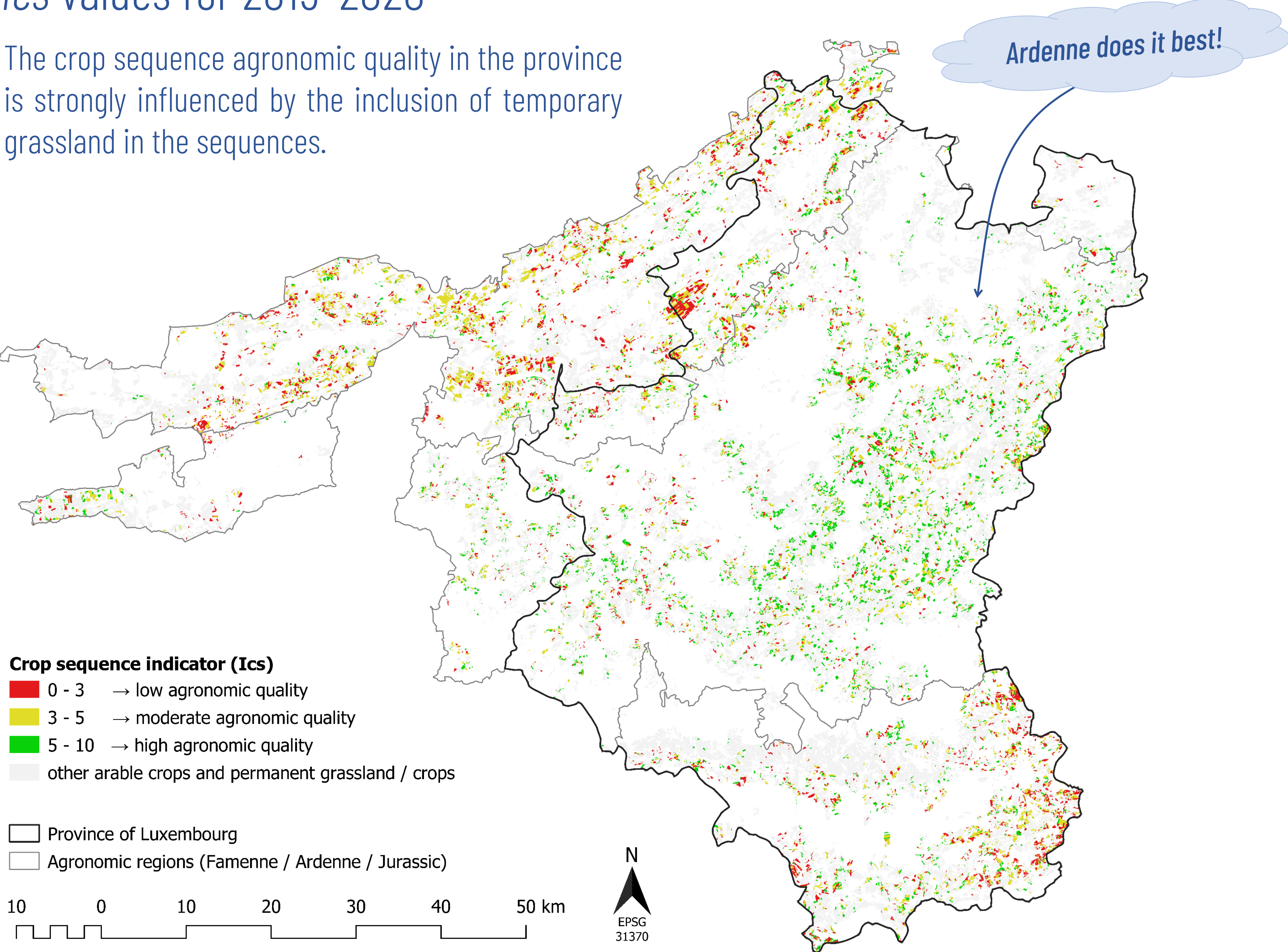
The indicator is then weighted by factors verifying the respect of the recommended return times of the crops and their diversity in the sequences:

$$Ics = \text{effect of the previous crops} \times \text{respect of the return times} \times \text{crop diversity}$$

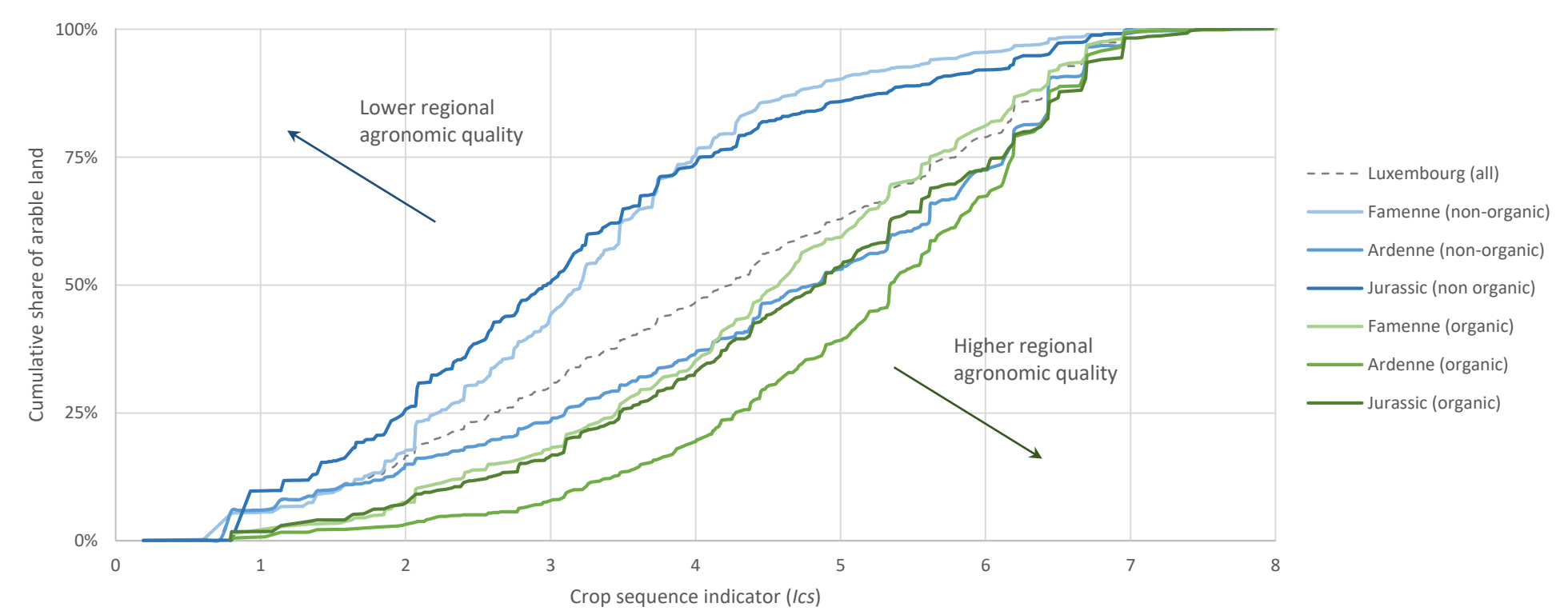
Results

Ics values for 2015–2020

The crop sequence agronomic quality in the province is strongly influenced by the inclusion of temporary grassland in the sequences.



Organic crop sequences present a higher agronomic quality, and in Ardenne the non-organic sequences have a similar quality to that of organic sequences in the other agronomic regions:



Low agronomic quality sequences are dominated by maize (monoculture) and high agronomic quality sequences are characterised by temporary grassland:



Conclusions

The inclusion of multi-year temporary grassland and fodders is essential in the analysis of crop sequences in grassland regions; the current literature has led to biased results in these regions. Organic sequences and sequences in sub-regions with harsher climatic and environmental conditions have overall higher agronomic quality.

¹ Leteinturier, B., J. L. Herman, F. de Longueville, L. Quintin and R. Oger (2006). Adaptation of a crop sequence indicator based on a land parcel management system. *Agriculture, Ecosystems & Environment*, 112(4), 324–334.
² Data courtesy: Services Publiques de Wallonie (SPW).