# The effect of farm type on ecosystem services
## in Swedish mixed agricultural-forestry regions


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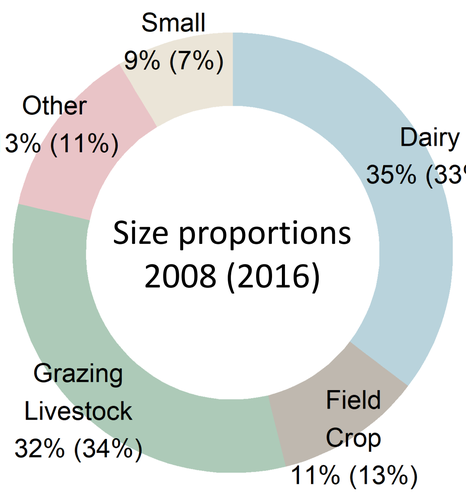
## Results

**Dairy** presents a very high trade-off between landscape openness, biodiversity and climate emissions. However, **Grazing Livestock** generate a similar landscape openness and biodiversity but with a lower climate impact.

**Field Crop** have the highest calories produced per emissions and most calories produced per hectare. However, they also have the lowest biodiversity (high nature value area and plant indicator species) and landscape openness values.



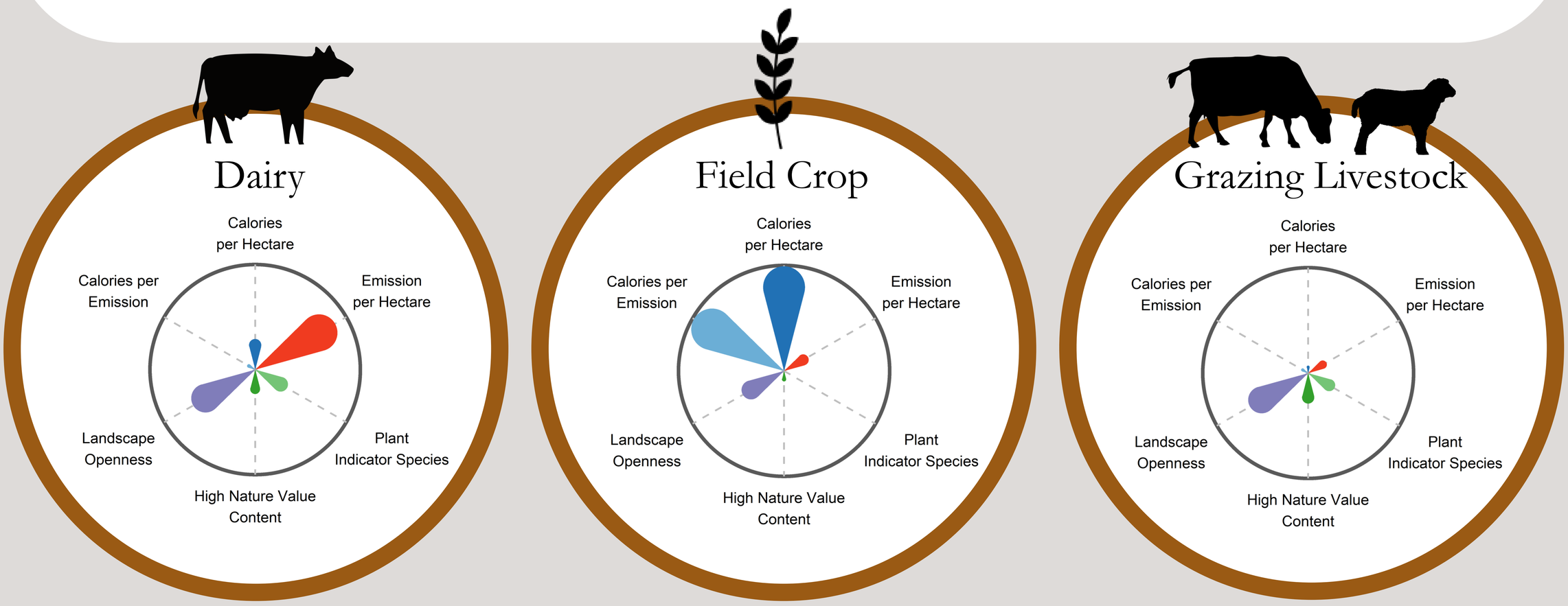

The farm class development between 2008 and 2016 shows that we get **fewer but bigger farms**. This is especially apparent for Dairy farms where the average farm size increased with **+4.9 ha / yr**.

**Field Crop** and **Grazing Livestock** farms are the only farm classes that **increase** their total **area** between 2008 and 2016. Field Crop is also the only farm type that increase in numbers between 2008 and 2016 from 1036 to 1124 (+8.5%).

The **total farm area** in the study regions were reduced with 7700 ha (-2.7%) between 2008 and 2016.

## Conclusion

**There are potentially large benefits of reducing land use for intensive dairy farming, and instead increase intensive cropping for food and grazing livestock to maintain openness and biodiversity.**

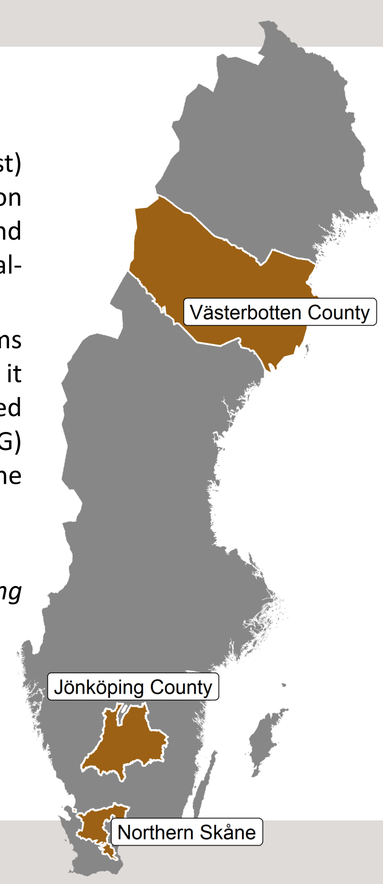



## Background

The **Farm2Forest** project (www.cec.lu.se/farm2forest) aims to investigate how a reform in the EU Common Agricultural Policy (CAP) will affect the landscape and ecosystem services in Swedish mixed agricultural-forestry regions.

The specialization of farming allows grouping of farms based on their primary activity, which makes it possible to link a farming activity to their provided ecosystem services and greenhouse gas (GHG) emissions. It will in the end be the decisions of the farmers that shape the agricultural landscape.

*It is however not clearly understood how farming activity relates to the provided services.*




## Method

Each farm in the study regions has been classified into a type (8 in total) based on their land-use and livestock ownership. The method is based on the 2/3 rule of the monetary standard output to classify farms according to their specialization (Andersen et al., 2006) combined with moving arable land standard output into livestock groups like the method by Swedish Board of Agriculture (SCB, 2000). Our combined method allows the standard output of both livestock and land to be combined, which gives a more accurate description of the actual farm specialization. The classification was done for 2008-2018 and used to analyse **how the farm structure has been changing over time**

Further, we used the spatial location of the farms and their activities to calculate their contribution to **food production, greenhouse gas emissions, landscape openness, and biodiversity**. Food production and greenhouse gas emissions were estimated from land-use and number of animals. The measure includes both the direct and indirect emissions. Landscape openness was estimated by analysing how the visibility changes if a specific farm type is replaced by forest. The biodiversity was estimated using meadow and pasture inventory data (TUVA) including number of grassland indicator species. This was complemented with the spatial data on European High Natural Value (HNV) farmland areas.

This analysis allowed us to **show differences** between all the above-mentioned services.

The circular flower plots are showing how the average value in each class relates to the 5$^{th}$ percentile (circle center) and 95$^{th}$ percentile (outer circle) of all the data.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### References


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SCB, Statistics Sweden. (2000). Jordbrukstatistik sammanställning 2000 (Agricultural statistics 2000).


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