

Opportunity Costs of Rewetting Agricultural Peatlands in Germany

Christoph Buschmann, Johannes Wegmann, Arndt Piayda

Thünen-Institute of Rural Studies, Thünen-Institute of Climate-Smart Agriculture



Introduction

- Majority of peatlands (organic soils) in Germany have been drained for agricultural production
- Recent studies have focused on the current status of production on peatlands to estimate the potential production loss due to rewetting based on contribution margin calculations (e.g. Domke et al., 2025)
→ not considering farm's dependency on peatlands
- Contribution margins have been used for determining compensation in peatland conservation scheme in Germany („Palu“-Scheme)
- **Research questions**
 - How high are the income losses of conventional agriculture in €/ha/p.a. because of rewetting?
 - How are the losses distributed regionally in the peatland-rich federal states of Germany?
 - How high are the abatement costs in €/t CO₂ equiv. and how are they regionally distributed?



Data and Methods



IACS data for farm level information

- Total area
- Share of arable land, share of permanent grasslands
- Share of peatland/share of mineral soils



HIT database

- Total number of animals
- Type of animals
- Age of animals

Identification of farms:

Without bovine:
calculation of
standardized
contribution
margins/income losses

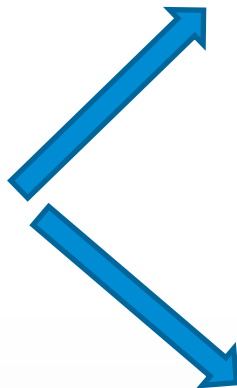
with bovine:

Clustering of farm types
economic modelling
with „Farm Boss“



Which rewetting variants do we simulate?

From **drained peatlands** to...



Moist use (fen soils, grassland, water level elevated by 20 cm, no fertilization): 2 hay cuts, grazing: suckler cows, heifers



Full rewetting (water level close to surface): near-natural conditions



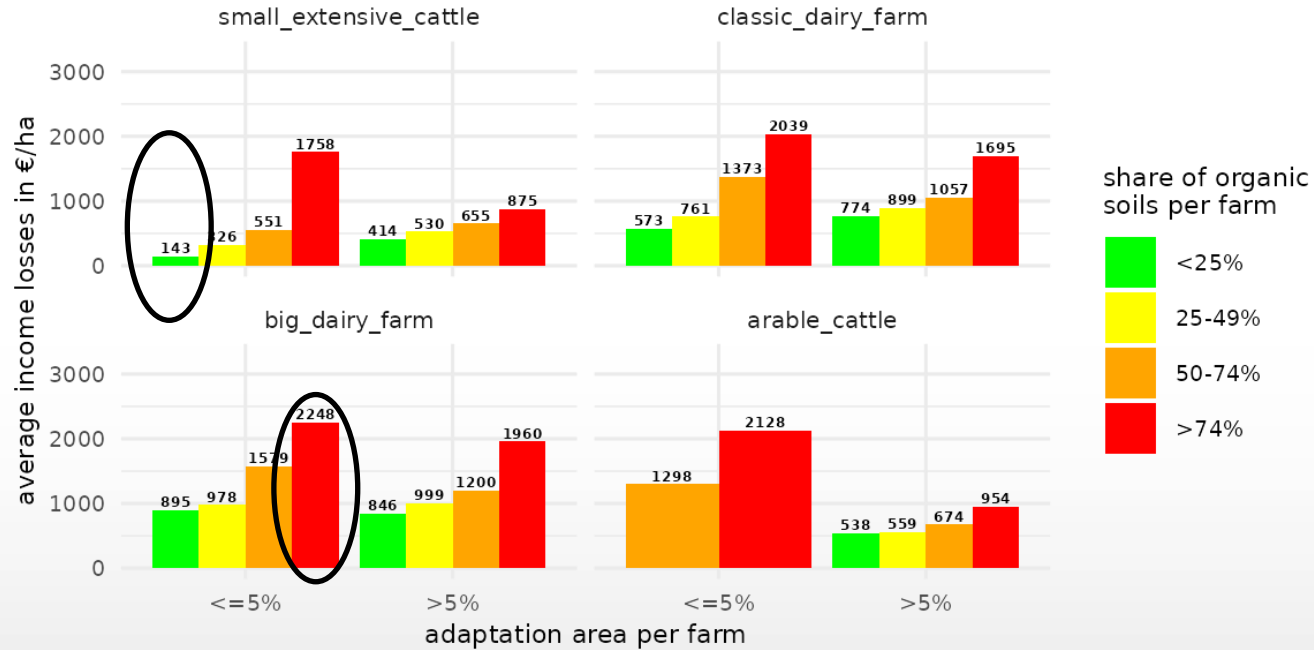
Simulation of rewetting of farmland

- Linear programming farm modell Farm Boss
- Simulation of adaptation reactions
 - Intensification of grassland use
 - More arable forage, less cash crops
 - More silage maize, less fodder grains
 - Arable field grass
 - More purchase of concentrated feed
 - Reduction of the cattle herd



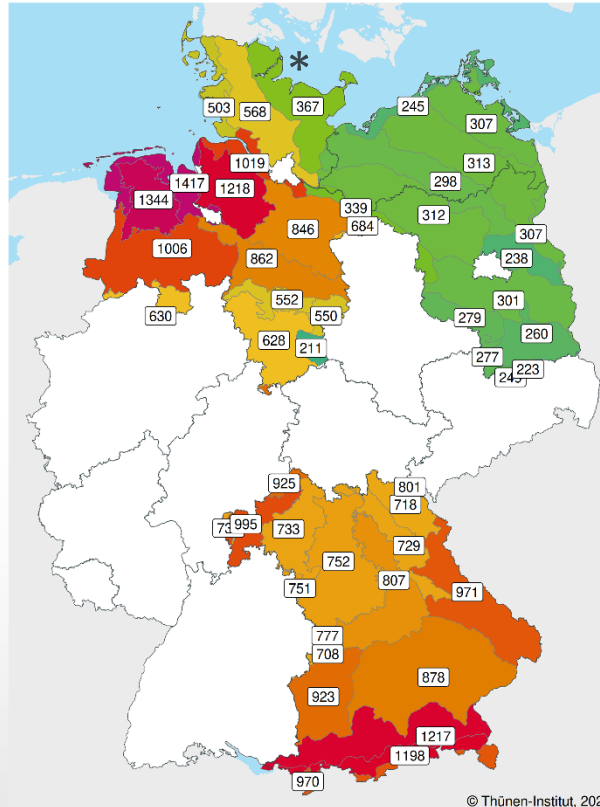
Income losses (€/ha p.a.) for Lower Saxony

- Big differences between farm types, adaptation areas and share of organic soils (AL+GL) : 143-2248€/ha p.a.



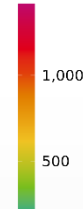
Average income losses per natural region in €/ha p.a.

- **Farms site specific** (8 model farms per fed. state & share of organic soils)
- **Per natural region: Average** weighted by affected area
- **Highest** average income losses:
Northern parts of Lower Saxony,
Southern parts of Bavaria
- **Lowest** average income losses:
Brandenburg, Mecklenburg-Western Pomerania



* Schleswig-Holstein results not comparable

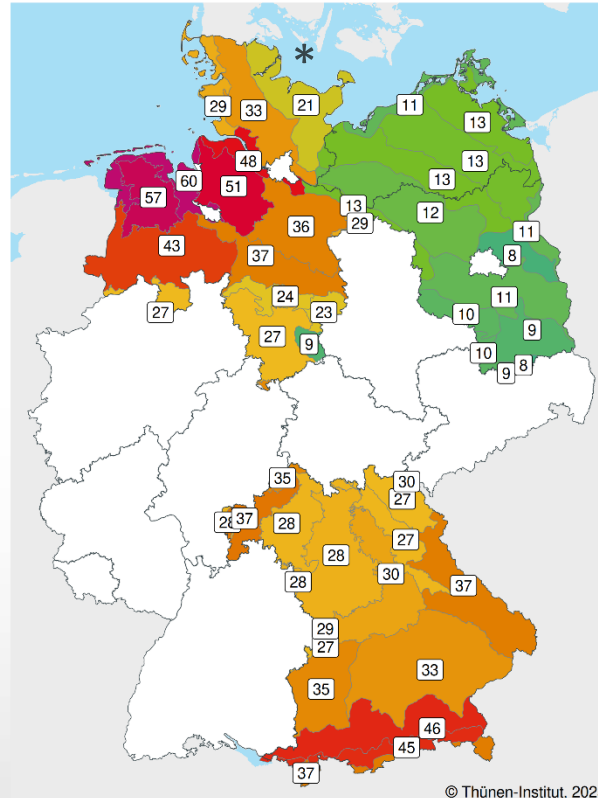
Average income losses per natural region in €/ha



© Thünen-Institut, 2025

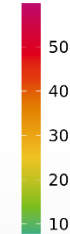
Average abatement costs per natural region in €/t CO₂ equiv.

- **Highest** abatement costs: **Northern** parts of **Lower Saxony** (50-60 €/t), **Southern** parts of **Bavaria** (45 €/t)
- **EU emission trading scheme 1** (energy, industry, aviation, shipping): **50 – 100€/t** (2022-2024)



* Schleswig-Holstein results not comparable

Average abatement costs per natural region in €/t CO₂ equiv.



© Thünen-Institut, 2025

Conclusion

- Income losses: full rewetting
 - **Wide range** of losses (143- 2250€/ha p.a.)
 - Dependent on **farm type, share of organic soils & adaptation areas**
 - Northern Lower Saxony & Southern Bavaria particularly affected
- **Income losses** for moist use **lower**, but less emissions saved & less ha
- Abatement costs in €/t CO₂ equiv.
 - **Full rewetting** (6-95€): Overall lower than in other sections (EU ETS scheme 1)
 - Particularly low in Brandenburg and Mecklenburg Western Pomerania
 - **Moist use** (22-181€) higher than full rewetting



Thank you!

Contact

Christoph Buschmann
christoph.buschmann@thuenen.de

Johannes Wegmann
johannes.wegmann@thuenen.de

The study was part of the project „Roadmap for rewetting of organic soils in Germany (RoVer)“

RoVer was funded by the Federal Ministry of Food and Agriculture as part of the German Climate Protection Program 2022

Gefördert durch:



Bundesministerium
für Landwirtschaft, Ernährung
und Heimat

aufgrund eines Beschlusses
des Deutschen Bundestages

