

Bayerische Landesanstalt für Landwirtschaft



Carbon farming for climate adaptation and mitigation – opportunities and challenges

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Carbon farming in the spotlight



Carbon credits



Agrarökologie

Quelle: www.oekoregion-kaindorf.at

Carbon credits



Denn erstmals wird es auf der Wiesn klimaneutral hergestelltes Bier geben: Und zwar im Hofbräu-Festzelt und allen Festbetrieben, die HB-Bier ausschenken (Schönheitskönigin, Weißbierkarussell Fahrenschon und die Weißbieralm). "Hofbräu hat bereits 2010 angefangen, seinen C02-Fußabdruck wissenschaftlich komplett zu messen, und zwar vom Acker bis zum Glas", erklärte Brauereichef Michael Möller am Montag bei der Vorstellung des Konzepts.

Quelle: www.carbocert.de



Carbon credits to foster soil carbon sequestration?

Challenges of carbon credits:

- 1. Methodological challenges
- 2. Fairness
- 3. Additionality
- 4. Leakage effects
- 5. GHG emissions
- 6. Permanence

BONARES BonaRes Series 2020/4 | DOI: 10.20387/BonaRes-NE0G-CE98 Wiesmeier, M., Mayer, S., Paul, C., Helming, K., Don, A., Franko, U., Steffens, M., Kögel-Knabner, I. CO, certificates for carbon sequestration in soils: methods, management practices and limitations



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Carbon credits: methodological challenges

Sampling:

- Representative
- Re-sampling of identical locations
- Sampling depth = tillage depth
- Sampling before tillage/fertilization in early spring

Determination of SOC changes:

 Calculation of SOC stocks: determination of SOC contents and bulk density (PTFs are not precise enough!)





Photo: J. Zimmer

Carbon credits: fairness, additionality and GHG emissions

Fairness:

- no rewards for farmers with already high SOC stocks

Additionality:

- only management practices for C sequestration contribute to climate mitigation that are fully motivated by carbon credits
- no rewards for management practices that are mandatory (e.g. by conditionality regulations)

GHG emissions:

- high SOC level may cause N₂O emissions, full GHG assessment required



Carbon credits: Leakage effects and Permanence

- Leakage effects: application of external C sources (e.g. compost) does not contribute to climate protection, only relocation of C
- Permanence: increase of SOC as climate protection measure only effective if C storage is permanent





Don & Flessa, 2021

Projected decline of soil carbon under climate change

- Projected decrease of SOC stocks in temperate cropland soils due to climate change
- C input into agricultural soils has to increase by 30-90% in Bavaria/Germany until 2095 only to maintain present SOC stocks



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Potential of cover crops for increasing soil carbon

Increased cover cropping in Germany (from 10 to 30%) could sequester 0.6-0.7 Mt C, but would only reduce projected soil carbon losses!





Seitz et al., submitted

Summary

- Carbon credits can stimulate soil carbon sequestration and promote it's social perception as contribution to climate protection
- Minimum standards are required for carbon credits (methodological requirements, leakage effects, additionality, permanence)
- SOC projections point towards a long-term SOC loss due to climate change
- Implementation of measures to increase SOC necessary in order to maintain current SOC stocks: focus on SOC preservation instead of increasing SOC
- Alternative funding measures are required that take into account not only SOCbased climate mitigation but also it is contributions to climate adaptation



Government funding to preserve/increase SOC in Bavaria

- Development of a practical planning tool based on C models for site-specific SOC management
- Projection of SOC development, site-specific SOC benchmarks as target values for SOC development, separated between preserving or increasing SOC:





Government funding to preserve/increase SOC in Bavaria



Aararökologie