Peat soils from the farmers' perspective: integration, importance and implications in the context of climate change

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***Abstract* - Adapting the management of peat soils to reduce greenhouse gas (GHG) emissions is one way in which farmers can contribute to sustainable food production. Yet, climate-friendly management changes might have major economic consequences for affected farmers. In order to assess these for farmers in Austria, our study investigates, for the first time, how farmers in Austria manage peat soils, how they are integrated into the farming systems and what they mean to the farmers. Therefore, a survey of 16 typical farms managing peat soils was conducted. Initial results show that although the management of peat soils poses challenges, the farms' productivity in terms of crop and fodder production largely depend on these areas. Peat soils are also of particular importance with regard to climate change, as they can buffer yield losses on other soils during dry periods.**

Introduction

Reducing GHG emissions by adapting management of drained peat soils is one possibility for farmers to contribute to sustainable food production (Joosten et al. 2015). This is also a goal in the new CAP (EC 2019) as well as in Austria's recently published peatland strategy (BMLRT 2022).

Studies from Germany show, that such climate-friendly management alternatives can be associated with high income losses for farmers, which mainly depend on type and intensity of the management (Krimly et al. 2016, Schaller 2014). For the case of Austria, it is not yet known how farmers manage peat soils, how they integrate those soils into their farming systems and how important they are for them. Thus, the economic consequences of climate-friendly management options for farmers cannot be estimated.

Our study therefore aims at analysing how Austrian farmers manage and use peat soils, what role they play for the farms' productivity and what perspectives result from this, also for possible climate-friendly adaptions of management such as extensification or rewetting.

Data and Methods

Combining the digital soil map of Austria (BFW 2020) and IACS (Integrated Administration and Control System) data on farm level (BMLRT 2021), the structure and types of agricultural use on peat soils and their spatial distribution in Austria were identified. On this basis, three case study regions, representing typical context situations of peatland management in Austria, were selected. By means of expert consultations, five to six typical farms managing peat soils were identified per region and interviewed personally using a structured questionnaire. The questionnaire included general questions describing the farm as well as specific questions on land use and animal husbandry. The importance of peat soils for the farmers was surveyed by asking them to express their agreement with certain statements on a four-point scale from "strongly disagree" to "strongly agree". Moreover, specifics and importance of peat soils, as well as farmers' attitudes towards possible measures (e.g. extensification or rewetting) for climate-friendly management options were surveyed.

In Flachgau (Salzburg) six dairy farms were interviewed. Their affectedness, i.e. the share of peat soils in their total utilized agricultural area (UAA), is between 46% and 82%. In the Klagenfurt Basin (Carinthia) the sample consists of two arable farms, two pig farms and one dairy farm with an affectedness between 25% and 79%. In the Rhine Valley (Vorarlberg) we interviewed three dairy farms as well as one suckler cow and one ewe farm, who have a share of peat soils from 36% to 86%.

Results

Integration of peat soils into farming systems

Peat soils are fully integrated into the farming systems in Flachgau, but management and use of forage often differs from that of mineral soils. Four out of six farms manage peat soils partly more extensively. Two farmers state that they do not produce silage on peat soils due to their characteristics, but hay instead. Half of the farmers do not feed the forage from peat soils to dairy cows but rather to their offspring or dry cows.

In the Klagenfurt Basin, too, peat soils are fully integrated into the farming systems, but their management is not so clearly different from other soils. Only one farmer states that he does not cultivate grains and uses conservation tillage especially on peat soils. Although all farmers recognise differences in yields, trafficability and pressure from pests and diseases and adapt their management accordingly, they use the same crop rotation as on other soils.

As four out of the five farms in the Rhine Valley cultivate 80% or more peat soils, they are also fully integrated there. The farmer with only a smaller share of peat soils manages them more extensively and uses the forage only for the offspring. Probably

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because of the limited possibilities due to their high affectedness, other farmers hardly distinguish between peat soils and other soils.

Importance of peat soils for farms

The cultivated peat soils are of great economic importance for farmers. 13 out of 16 farmers fully agree with the statement, that the management of peat soils provides fodder and yields that they could not do without. 14 farmers agree at least partly, that peat soils contribute significantly to their farm income, but for most not because of the subsidies they receive from these areas but because of yields and fodder. In addition, all farmers at least partially agree, that peat soils are important to buffer losses on other soils in dry years.

Ten out of 15 farmers at least partly agree, that the management of peat soils is also done for traditional or emotional reasons. Only one farmer agrees, that cultivating peat soils is more of a burden.

Nine farmers fully agree with the statement, that they want to keep the landscape open and prevent scrub encroachment by managing peat soils. Twelve agree at least partly, that they also want to contribute to nature conservation on peat soils.

Implications for future management of peat soils

As mentioned, peat soils are important for farmers to buffer losses on other soils in dry years. Accordingly, when asked whether peat soils play a special role against the background of climate change, a large proportion of farmers said that they will become more important if dry periods become more frequent as a result of climate change. Two farmers in Carinthia even stated, that they would like to lease or buy more areas on peat soil, precisely for this reason. Most farmers are optimistic that peat soils will continue to be cultivable as until now, even if climate change with increasing drought but also heavy rainfall events may lead to challenges in cultivation.

Farmers were also asked whether they could imagine to implement climate-friendly management alternatives to reduce GHG emissions on their peat soils. Likely due to the full integration and great importance, also in relation to climate change, farmers can hardly imagine implementing measures.

Discussion and Outlook

The results show that a dichotomy is emerging: farmers could help to reduce GHG emissions by adapting their management on peat soils. In the meantime, the cultivation of peat soils is an opportunity for them to buffer the impacts of climate change. And while abatement costs for GHG emissions on drained peat soils are comparatively low (Röder and Osterburg 2012), the economic consequences for farmers are likely to be extensive (Krimly et al. 2016, Schaller 2014). Such negative consequences for farmers are confirmed by our results, as similarly observed by Schaller (2014).

Our results are shaped significantly by the fact that the farms in our sample have an above-average proportion of peat soils in their total UAA. On average, farms with peat soils in Austria have a share of about 27% of them, whereas the average in our sample is about 62%. However, the majority of peat soils is cultivated by farms with a high share of peat soils; thus, these types of farms are therefore particularly relevant.

The external circumstances specific to each region also have an influence on the farmers' perspective. While in the Rhine Valley the massive pressure on land limits the farmers' development opportunities, in Flachgau conflicts with nature conservation are an issue. In Carinthia, on the other hand, some farmers state that there is probably not even enough water available for the rewetting of peat soils. Overall, a complex picture emerges with regard to the management of peat soils in Austria. In order to improve our understanding and to be able to assess the consequences of possible climate-friendly management alternatives, the evaluation of the importance of peat soils in economic figures will be addressed next.

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