3.3 Carbon farming and Neutrality Certifications

Oral presentations

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Swiss Agricultural and Climate Strategy: a missed opportunity for agroforestry?

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Introduction
The overarching goal of the international community is to achieve climate neutrality by 2050. Many countries, including the European Union and Switzerland, have committed to this as part of the Paris Agreement. To achieve this ambitious goal, the European Union has implemented the European Green Deal, the new Common Agricultural Policy (CAP) and the European Climate Law, which places a strong focus on active carbon sinks through land use / land use change. The agricultural sector is explicitly included with new approaches such as carbon farming. Alongside others, agroforestry in particular is named as one solution.

In Switzerland, a slightly different approach was chosen. Joint efforts have been made between agriculture and the food sector so that Swiss agricultural production has to reduce greenhouse gas emissions by at least 40% compared to 1990. The Swiss Climate Strategy for Agriculture and Food 2050 was presented in 2023 (BLW, BLV, BAFU, 2023). It reports that the Swiss agricultural sector emitted 8.1 million tons of CO2eq (Mt CO2eq) in 1990 and still 7.1 Mt CO2eq in 2020. The climate strategy sets out several measures in two areas in order to achieve the zero emissions target by 2050. Firstly, 1.6 Mt CO2eq are to be avoided by adapting consumption and production patterns (food sector). Secondly, 1.4 Mt CO2eq are to be mitigated by improving the efficiency of herd management and feeding, optimal fertilizer management, substitution of fossil fuels with renewable energies and curbing the loss of soil carbon stocks (agricultural sector). Agroforestry is not listed as a measure, but only in the annex it is proposed to support modern agroforestry starting earliest in 2030 (BLW, BLV, BAFU, 2023).

Against this background, we posed two research questions: i.) How great is the potential of agroforestry as a climate mitigation measure in Switzerland? And ii) what is the impact of a 5-year delay in the implementation of a support scheme in relation to the overall 2050 net zero target?

Method
To address the first research question, we evaluated the potential of agroforestry for climate mitigation on Swiss agricultural areas. We assumed that agroforestry could potentially be implemented on both arable land and grassland. An average Swiss agroforestry system consists of 50 trees per hectare. According to monitoring and modelling, these systems store between 2.5 and 5 t CO2eq per hectare per year (Kay et al. 2020).

Addressing the second research question, we focus on two different components over time – the social behaviour of the agroforesters (=implementation rate) and the biological development of agroforestry systems (=growing rate) and calculated their effects over time. Based on the theory of the diffusion of innovations (Rogers 2003), the rate of implementation follows a fixed pattern und will increase over time. This is in line with observations from Swiss agroforestry projects, where farmers and landowners needed up to two years to design their individual agroforestry system. Moreover, the growth of agroforestry systems also follows a fixed pattern. While we often assume an average growth rate per year, young trees actually have a significantly lower biomass growth rate than older trees, the development is not linear.

Results and Discussion
Implementing agroforestry on additional 1% of Swiss agricultural land would results in 0.025 – 0.05 Mt CO2eq per year, increasing it to all grasslands (60% of Swiss agricultural land) would even mitigate 1.5 – 3 Mt CO2eq per year. This exceeds all other measures mentioned in the climate strategy. Traditional agroforestry systems already exist on around 8% of Switzerland's agricultural land (Herzog et al. 2018), while around 500 hectares are managed as modern agroforestry systems.

For running up against the 2050 deadline, it makes a difference when large scale agroforestry implementation starts. An average hectare of agroforestry planted in 2025 will already be 25 years old and will have

captured around 27 t CO2eq, while a system established in 2030 will only have captured around 10 t CO2eq (Figure 1). The climate protection effects are further delayed by the implementation rate, which more or less resembles a Gaussian distribution curve. In the case of agroforestry, farmers and landowners will wait until there is a legislation in place and will afterwards adapt their systems to the legal framework. Consequently, the climate effect will be slowed down significantly. A similar time lag effect between introducing a legal measure and their effects was seen by Watts et al. (2020) establishing biodiversity action.

Conclusion

Agroforestry could make a significant contribution to climate protection in Switzerland. It also has a climate adaptation effect by promoting resilient food and feed production and fostering biodiversity and natural resources. However, time is running and delaying support programs for the introduction of agroforestry will be costly because people need time to think and implement and nature needs time to grow.

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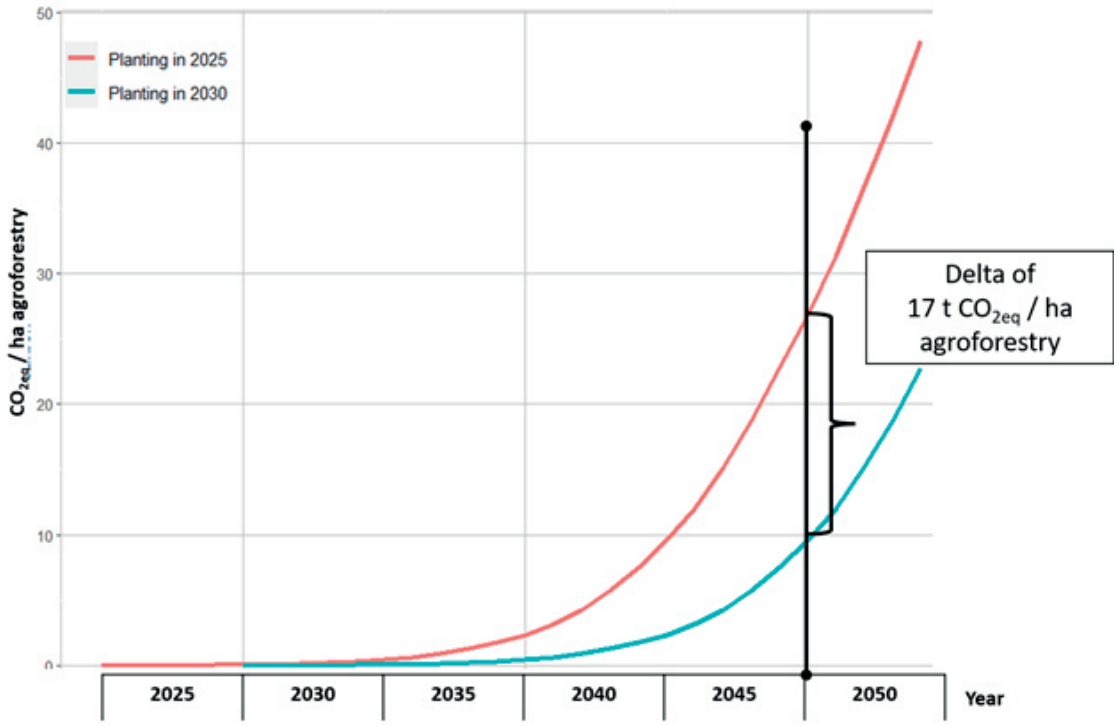
Keywords

Policy, Agroforestry, climate mitigation, carbon sequestration

Aditional Attachment II.



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