



Definition of Paludiculture

Introduction

A peatland is a wet area with a naturally accumulated peat layer at the surface. Conventionally peatlands are drained for agri- or silvicultural use or peat mining. Drainage based peatland use causes enormous problems through greenhouse gas emissions (~25 % of EU agricultural emissions from 3 % of EU agricultural land), loss of biodiversity, water pollution, soil degradation, and subsidence followed by an eventual loss of productive land. Rewetting (i.e. raising the water level to the surface) is essential to minimize emissions and peat degradation, but also prohibits drainage-based land use. The peatland can then be cultivated in paludiculture.

Definition

Paludiculture (Latin ‘*palus*’ = swamp) is the productive land use of wet and rewetted peatlands that preserves the peat soil and thereby minimizes CO₂ emissions and subsidence.

Carbon farming and co-benefits

With *paludiculture*, peatlands are kept productive under permanently wet, peat-conserving and partly even peat forming conditions¹. Thus, it is a blueprint for *peatland carbon farming*. Co-benefits of paludiculture may be the maintenance and restoration of multiple ecosystem services such as water buffering, nutrient retention, local climate cooling and habitat provision for rare species, while allowing biomass harvest simultaneously.

Paludicultural plants and utilisation options

Paludiculture comprises various agri- or silvi-cultural production system targeting the production of plant- or animal-based commodities; from harvesting spontaneous vegetation on semi-natural sites to establishing specific permanent crops. *Paludiculture* uses above ground biomass, while below ground biomass, i.e. a major part of net primary production, remains for peat formation. After implementation of high water tables near soil surface throughout the year, wet grasslands may develop by succession of vegetation, dominated by adapted plant species like Sedges and Reed Canary Grass. In addition, permanent crops with peatland species like Cattail, Common Reed, *Sphagnum* mosses, or Black Alder can be cultivated. The harvested biomass can be used as food, feed, fibre, or fuel like raw material for industrial biochemistry, for production of construction materials, high quality liquid or gaseous biofuels, for heat production through direct combustion or for further purposes like extracting and synthesizing pharmaceuticals and cosmetics. These diverse options for biomass from paludiculture show its great potential for future *bioeconomy* applications.

Bioeconomy

The diverse options for value adding manufacturing of biomass from paludiculture shows that paludiculture has great potential for the bioeconomy, its main objectives are largely or fully addressed. A new orientation towards paludiculture can relieve the pressure on mineral soils caused by the cultivation of renewables, by phasing out the cultivation of renewables on mineral soils and using these soils again for food production.

¹ Peatlands must be wet: for the climate, for the people, for the future. Implementing paludiculture for sustainable land use. Concluding statement of the International conference „Renewable resources from wet and rewetted peatlands”, Greifswald, Germany
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