



Utilization options for biomass from paludiculture

Introduction

Paludiculture produces biomass that can have wide-range applications. The biomass from wet peatlands is a raw material that is in demand, however, sales market across some sectors necessitate development. The advantage paludi- biomass holds is that its production and utilization can contribute to climate change mitigation in several ways, namely by:

- reducing greenhouse gas emissions from peatlands upon rewetting of the paludiculture site
- the replacement of fossil raw materials with renewable raw materials, and
- a long-term commitment, e.g. in building materials or plant charcoal.

Whether used as packaging material, molded parts, insulating materials, peat substitutes, or generation of heat or electricity - climate protection is achieved across every product sector. besides higher water table is one of the requirements for paludiculture, that helps in reducing high GHG emissions from peatlands. Paludiculture is thus also carbon farming. There is a high economic potential for the processing of biomass from wet peatlands in new utilization paths of bioeconomy.



Photos: Examples for paludiculture: Sedges (left), Common Reed, Cattail, Peat-mosses (right)

Agricultural utilization

The most apparent option to utilize biomass from paludiculture is in the agricultural enterprise. Conventional technology and common harvesting methods adapted to poor trafficability of wet soils can be used. Paludi-biomass can be introduced into existing processing and pre-processing lines. The following utilization options may be considered, such as:

- livestock feed (grazing, mowing: fresh, as hay or silage)
- litter (hay)
- compost, or
- substrate for the biogas plant (see energy recovery)

Utilization as livestock feed (grazing, mowing: fresh, as hay or silage) is severely limited due to low carrying capacity for grazing animals, possible parasite contamination, and because of poor feed quality. Water buffaloes appear to be the only grazing animals that can efficiently utilize cellulosic or crude fiber biomass, besides there are some minor problems relating to hoof diseases and parasites. Due to the aforementioned problems, grazing with robust cattle is highly constrained under wet conditions. If litter is used as a straw substitute in cattle husbandry as embedding material, a small portion may be ingested by the animals which may serve as a part of the basic feed ration. Biomass from wet meadows is well suited for on-farm production of compost. This can be applied as organic fertilizer on arable land.

Application as fuel

The exploitation of paludi-biomass for energy production on fen peatlands enables the utilization of heterogeneous stands of gramineous biomass such as reeds, reed canary grass and sedges. The high calorific value of the biomass, combined with high combustion efficiency and the availability of proven (straw) combustion technology, speaks in favor of thermal utilization. There is a demand and a market for the paludi-based production of gas, heat and electricity. Thermal utilization of paludiculture biomass is favored where district heating networks already exist. In addition to direct combustion, it is generally possible to use fresh biomass or silage from wetland and wet grassland as substrate for biogas production. As intermediate or end products, biogas, electricity or heat can thus be fed into the respective networks.



Photos: Intermediate products from paludiculture for transportation of biomass (left: pellets, right: round bales).

Material utilization

With the material use of paludiculture biomass, a higher added value can generally be achieved in comparison to energy recovery. Carbon can additionally be sequestered in the product preventing its re-entry into the atmosphere for a long term, for example when the biomass is used as a building material. Options for material use include: Roof thatching, insulation materials, interior finishing, precious wood production, bioplastics, paper production and packaging, biochar, and substrate feedstock for horticulture and potting soils. Currently, a large number of products and utilization processes for various renewable raw materials (wood, straw, hay, green waste, etc.) are under development. These are often not specifically designed for biomass from wet peatlands, but are potentially applicable to it. However, the revenues for the biomass utilization in these sectors additionally include the necessary investment costs and operational expenses for wet peatland utilization. An appropriate reward for climate protection performance should be integrated with the product price or supported by subsidy programs.



Photos: Products from paludiculture biomass (left: Construction board, molded part, reed bundles for roofing material, right: Insulation boards).

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