

Cattail in the North Sea Region

BBoBB – Interreg North Sea
Bioeconomy conference

2 October

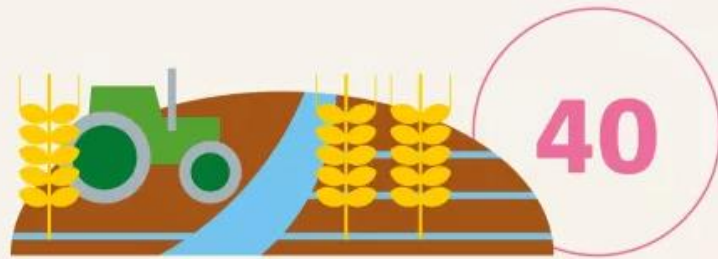
*Jan Köbbing, Alex Sidentopp,
Pascal Gerlach, Amelie Fiegert*



Challenges

JE INTENSIVER DIE NUTZUNG, DESTO GRÖßER DER KLIMASCHADEN

Jährlicher Ausstoß von Treibhausgasen, in Tonnen CO₂-Äquivalente pro Hektar



Ackerland auf entwässertem Moorboden



Grünland auf entwässertem Moorboden



Paludikultur



Naturnahes Moor



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Carbon stock

ES KOMMT NICHT ALLEIN AUF DIE GRÖSSE AN

Fläche und gespeicherter Kohlenstoff weltweit, nach Ökosystem

□ Fläche in Millionen Hektar
● gespeicherter Kohlenstoff in Milliarden Tonnen



Paludiculture – general informations

Paludiculture («palus» – lat. »mire, morass«) describes the agricultural or silvicultural use of wet organic soils. As a requirement, the water table needs to be kept near the surface the whole year round and the soil must hardly be disturbed. As a result the GHG-emissions will decrease to about zero.

Paludiculture on raised bogs:

„*Sphagnum*-farming“



wet grassland



Paludiculture on fen:

reed



black alder



wet grassland

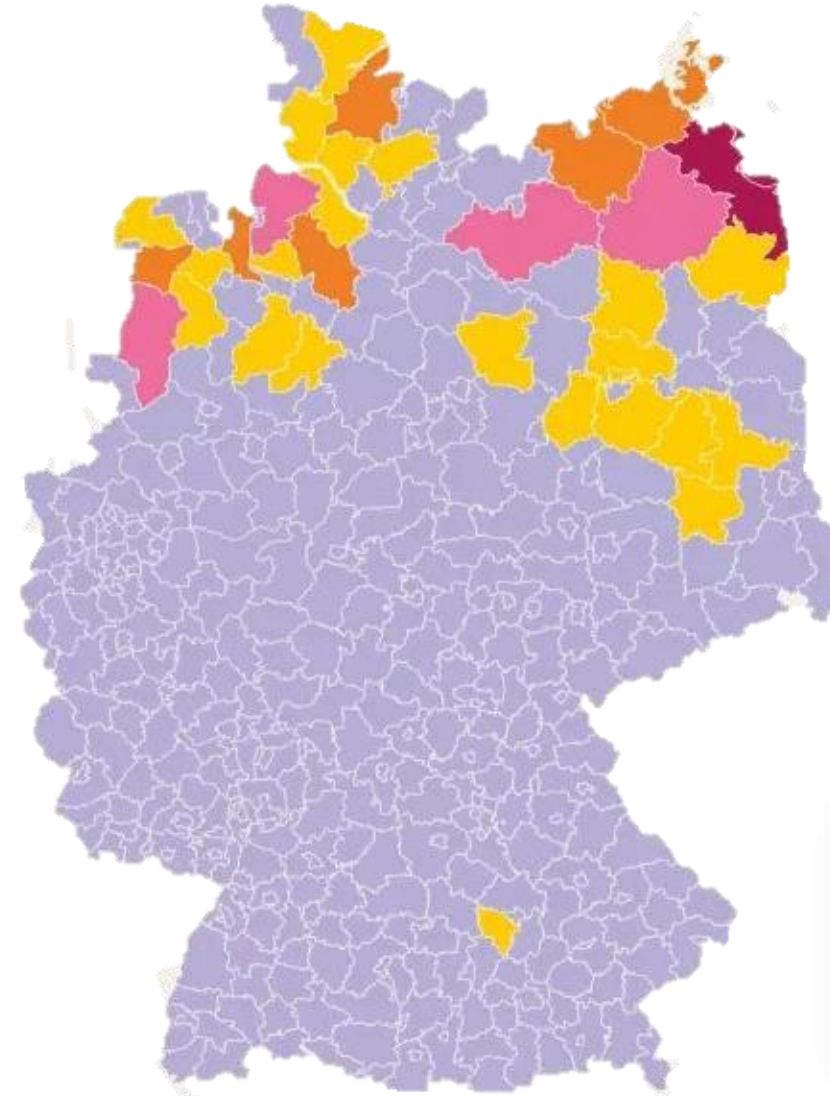


cattail



Peatland in Germany

- Peatland area: 12.800.000 ha
- % of land area: 3,6%
- Emissions
 - 53 Mio tCO₂/a = 6,7% of national emissions
 - 15,8 Mio tCO₂ = 14,1% of federal emissions



**Total emissions from drained peatlands
[in 1000 tons CO₂ eq.]**



Cattail cultivation in Lower Saxony



2022: Bederkesa I
0,5 ha cattail and reed
(3N / NLWKN)

Planning stage: Bederkesa II
1,3 ha only cattail
(Stadt Geestland / 3N)

Planning stage: Bederkesa III
> 5 ha only cattail
(Naturschutzstiftung LK Cuxhaven /
Stadt Geestland / 3N)

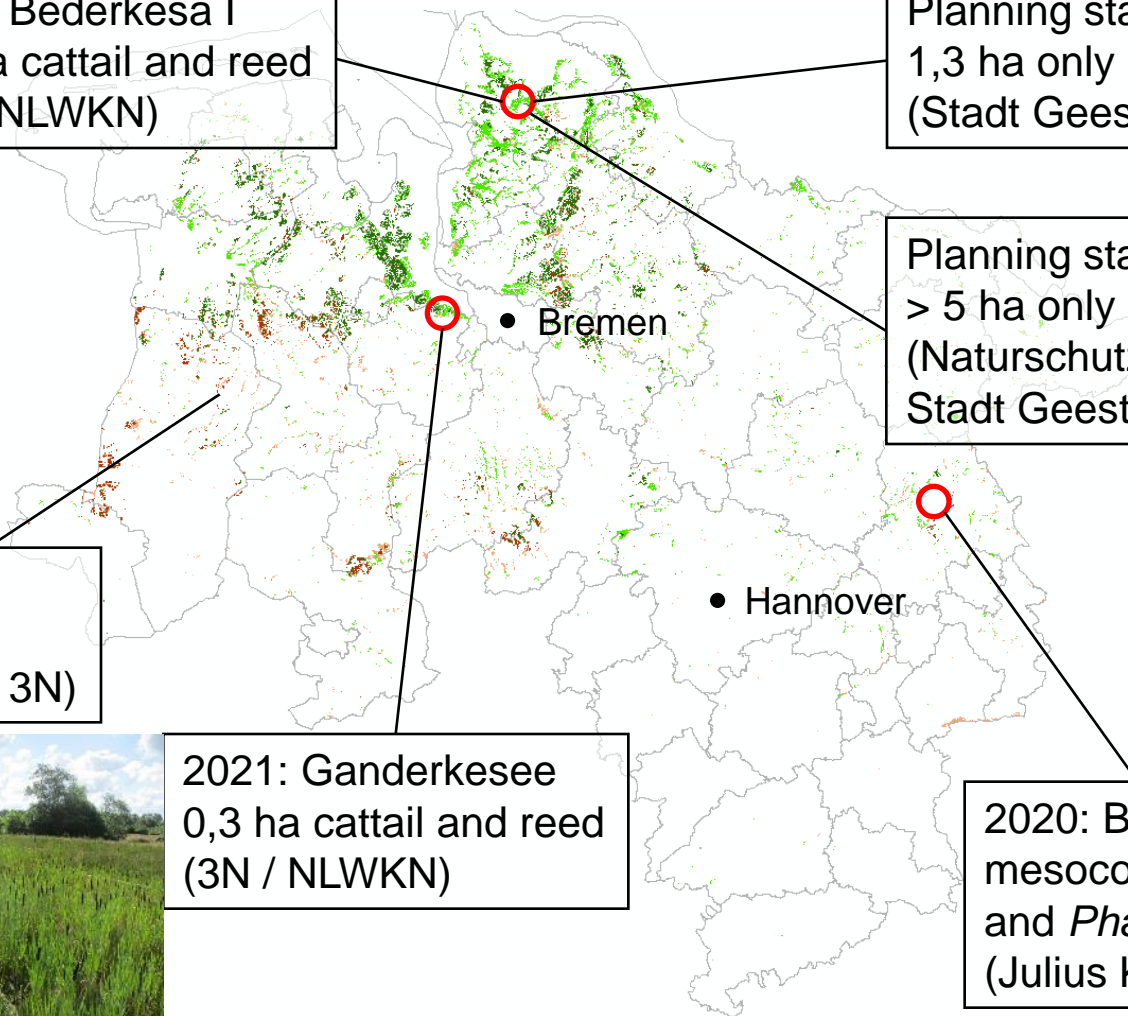
Planning stage: Emsland
> 5 ha only cattail
(Naturschutzstiftung EL / 3N)



2021: Ganderkesee
0,3 ha cattail and reed
(3N / NLWKN)



2020: Braunschweig
mesocosm experiments with cattail, reed
and *Phalaris arundinacea*
(Julius Kühn-Institut / 3N)



Setting up site in Bad Bederkesa



Monitoring on site

- yield and quality of biomass
- greenhouse gas emissions
- soil analysis
- water quantity
- water purification effects
- biodiversity



Harvest



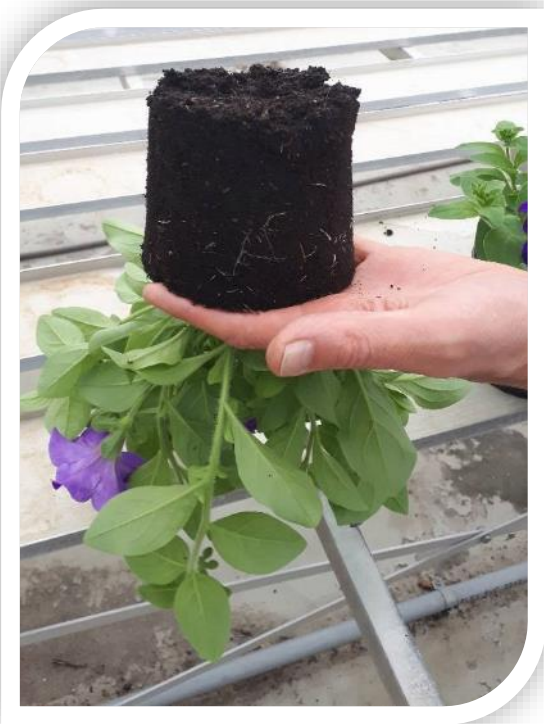
Adopted snow cat



...new machines will be tested soon!

Possible applications

**Horticultural substrate
(substitute for peat)**



Biopolymers



Building material

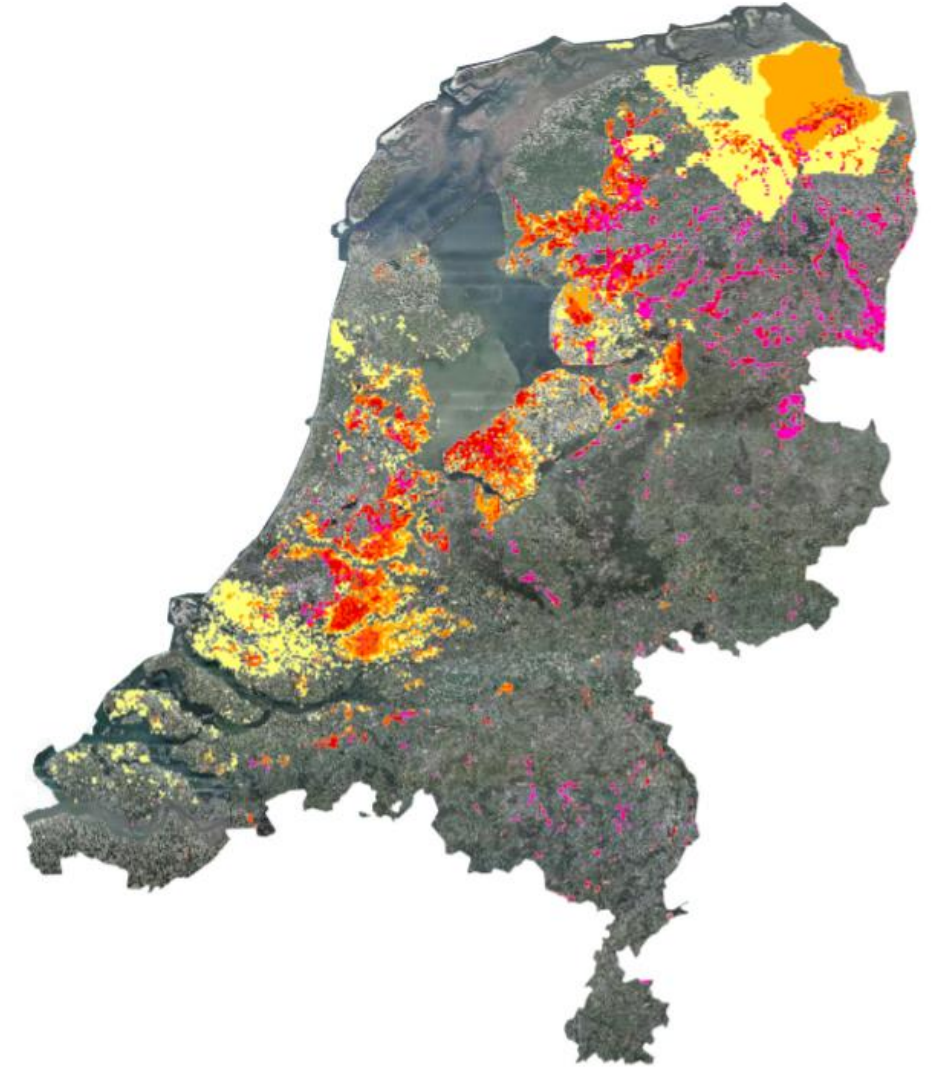


- **Building material**
 - Cattail is not approved for building physics
 - Approval is very expensive
- **Building material, biopolymers, Horticultural substrate**
 - Creating land involves a great deal of effort and high costs for farmers
 - There should be subsidies for the establishment and management of the areas

Peatland in the Netherlands



- Peatland area: 2.733.000 ha
- % of land area: 7,3%
- Emissions
 - 7 Mio t CO₂-eq./y
 - = 4,3% of the total national emissions



Cattail in the Netherlands



- Utilization
 - Isolation
 - Sheetmaterial for furniture
- New and potential value chains
 - Construction
 - Textiles
 - Water purification
- Obstacles
 - competition with traditional agriculture
 - when the water level should be kept low



Tjeerd Veenhoven



- Peatland area max.: 202.900 ha
- % of land area max.: 4,7%
- Emissions
 - 4 Mio. t CO₂-eq./y
 - = ca. 9% of the total national emissions



- Cattail is currently not a political instrument for the green transition in Denmark
- Cattail does not receive much attention in the construction industry either
- Approach: Cattail could probably be very relevant in areas where we want to remove nutrients and avoid leakage to fiords and sea and a solution for parts of the 100.000 ha of lowland that is to be taken out of cropping – and at the same time contribute to a greener building tradition.

Cultivation Cattail



environmental performance	Evaluering environmental performance	Cattail
Climate change (CO2 uptake)	O	Highly variable biomasspotential (12.5±6.6 tons/ha)
Biodiversity	+	
Nutrient release (Reduced nitrate leaching)	++	Have a “filter effect” on nitrate leaching from agriculture to the aquatic environment
Land use, Land demand,	++	The carbon is the main product, but as the lowland areas have already been taken out, further land use should not be used in this production. Can even be used for nature enhancement
Pollution (Pesticide consumption)	++	Paludicultures outcompete everything other growth
Freshwater consumption	-	given low growth, they don't have high transpiration

- INTERREG Project CANAPE
- Crops: cattail, reed grass and tall fescue
- Area size: 6ha
- Previous use: potatoes



- biogas, feed, food, construction and insulation material.
 - In addition, biorefining can increase the application potential by separating the biomass into several fractions of concentrated products (protein concentrates, fiber pulp and brown juice) for feed and biogas and potentially a number of other products.
- The time of harvest has a significant impact on biomass characteristics and and potential applications.
 - Harvesting spring/early summer → increase biogas potential
 - Late Harvesting → the production of fibers for building and insulation material, as the moisture content is significantly lower

Aim of the BBoBB Project

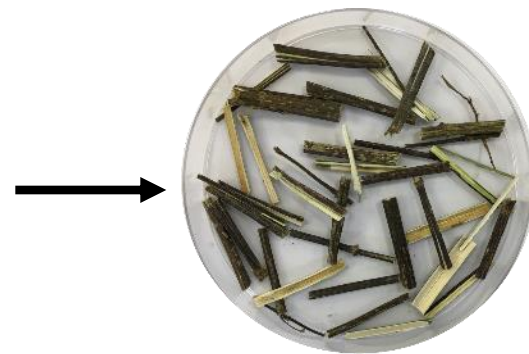
- Transmission of special know-how to strengthen natural fiber-based new building products, procedures and services in the field of regional biobased economy.
- Initiating demonstration buildings in the region including collecting relevant data together with JadeHochschule and other regional associated partners
- Reducing restrictions and barriers
- Regional sustainable land use concepts (cattail, hemp, cupplant),
- Production and development of fiberbased biopolymercompounds for testings
- Transnational knowledge exchange and networking.

A close-up, low-angle shot of a field of tall grasses. The foreground is dominated by large, vibrant green blades of grass that are slightly out of focus. In the mid-ground, numerous seed heads are visible, some in sharp focus, showing their intricate, feathery structure. The background consists of a dense field of similar grasses extending to a flat horizon under a pale, overcast sky. The overall lighting is soft and diffused, creating a natural and serene atmosphere.

**THANK YOU FOR
YOUR ATTENTION**

Versuche zur Compoundierung
Labortests, um Eigenschaften zu bestimmen

Erste Ergebnisse zeigen die Eignung



Rohstoff

Compoundierung



Compound in Granulatform

Spritzguss



Zugprüfkörper

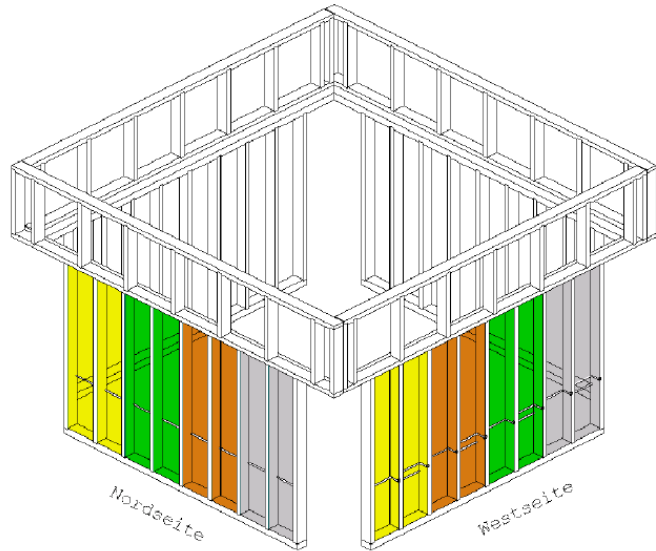
Baumann et al. (2024): Resources from sustainable land use for natural fibre composite injection moulding [Poster session]. Binetruy, C.; Jacquemin, F. (Eds.), *ECCM21 - Proceedings of the 21st European Conference on Composite Materials*, 2: 498-502, Nantes, France

Nachhaltiger Dämmstoff aus Rohrkolben

Science Cube in Werlte



Energieeffizienzprüfstand in Oldenburg



- Zellulose
- Mineralfolle (Glas)
- Typha / Typha-Holzweichfaser (70/30)
- Holzwohle

Monitoring bauphysikalischer Parameter zur Modellierung des Temperatur- und Feuchteverhaltens:



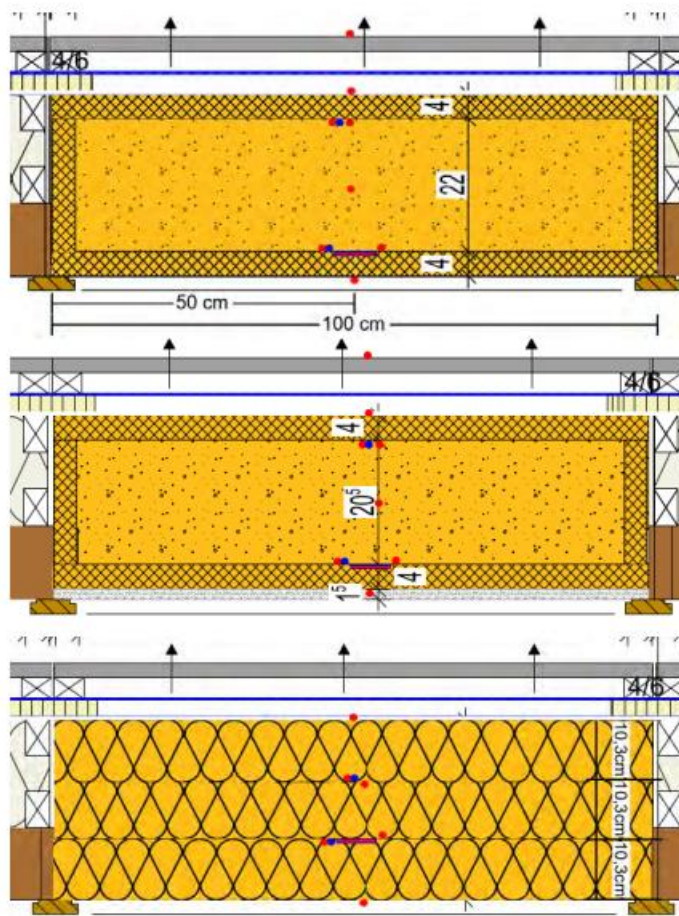
Nachhaltiger Dämmstoff aus Rohrkolben



Schwammgewebe

Stützgewebe

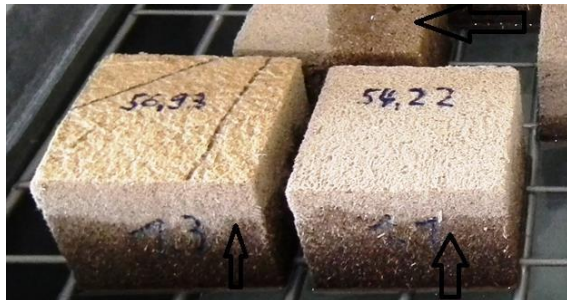
Wandaufbauten im Energieeffizienzprüfstand



Krus, Theuerkorn, Großkinsky, Wigger, Kordes (2023)

Entwicklung neuer Baustoffe (IBP+WKI)

Typha-Schaum als Dämmstoff



Typha-Holzschaum-Sandwich



Nachhaltiger Dämmstoff aus Rohrkolben



Sandwich
(Typha-Board mit
Einblas-Dämmmaterial)

Vorteile:

- Nachwachsender Rohstoff
- Dämmplatten: Kombination aus Dämmung und Tragfähigkeit
- Schimmelpilz- und Fäulnisresistenz
- Guter Brand-, Schall- und sommerlicher Wärmeschutz
- Gute akustische Eigenschaften
- Einfache Verarbeitbarkeit
- Materialverträglichkeit
- Diffusionsoffen, kapillaraktiv, feuchtigkeitsregulierend
- Energiearme Produktion
- Relativ unempfindlich gegenüber Produktionsschwankungen



„Typha-Board“



Einblas-
Dämmmaterial

