GREIFSWALD MIRE CENTRE

ERNST MORITZ ARNDT UNIVERSITÄT GREIFSWALD

Economic viability of Sphagnum farming on former bog grassland

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Majority of bogs in NW Germany is drained

Grassland: 44 %

Peat extraction: 8 %

Sphagnum farming → sustainable alternative for degraded bogs

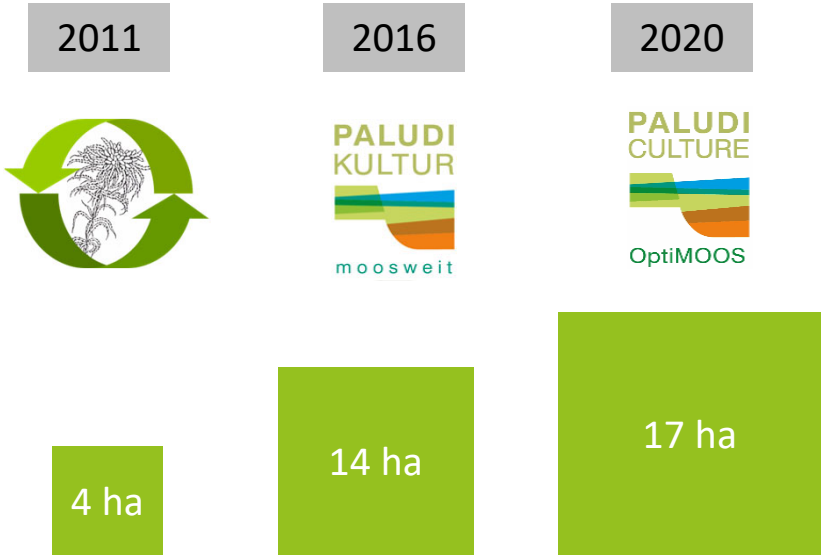
Sphagnum biomass → high-quality alternative to peat

photos: University of Greifswald

Large-scale pilot sites required

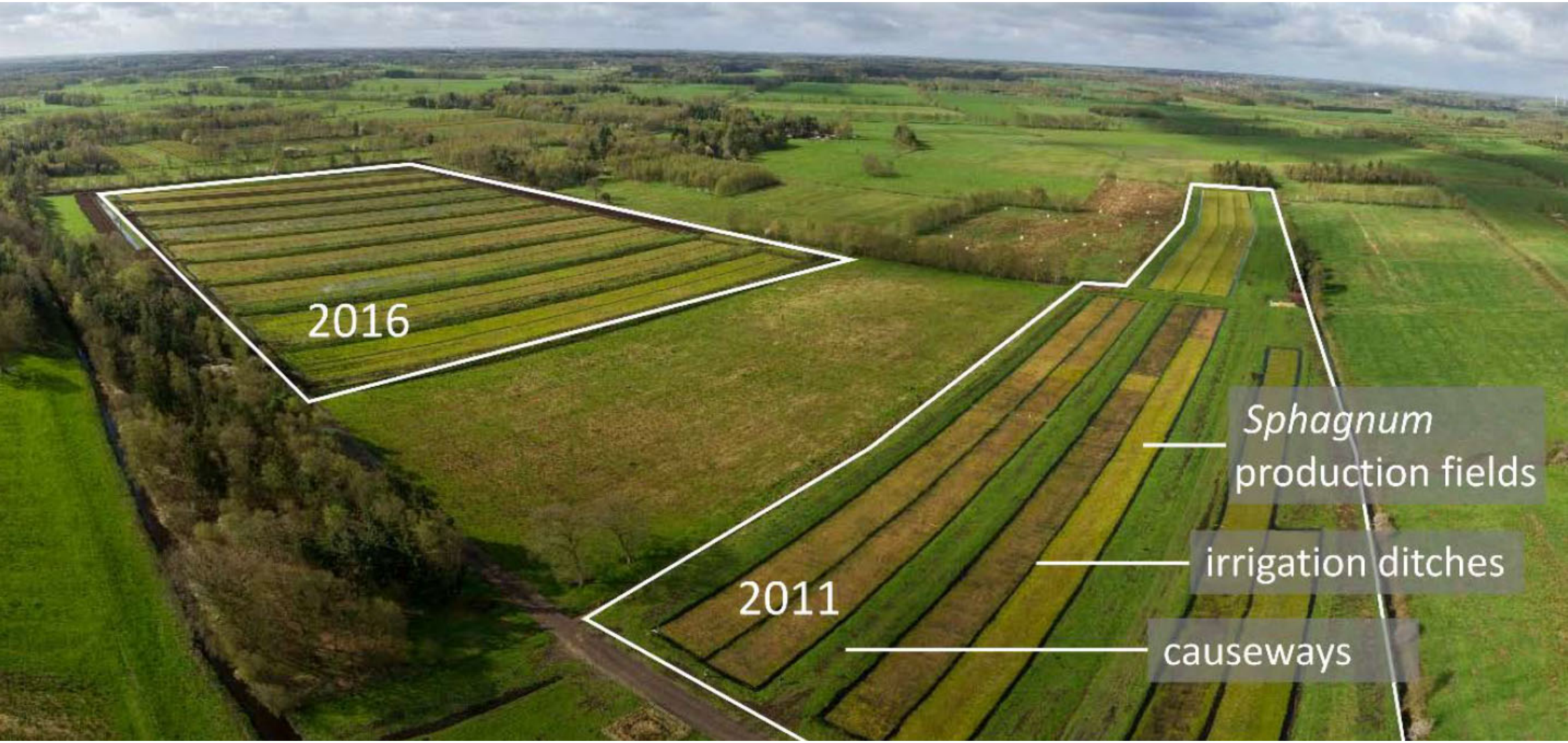
- Mechanical implementation → real-life cost data
- Closing gaps of knowledge, e.g. harvested yields
- Potential for optimisation and cutting costs

Sphagnum farming on former bog grassland



→ Many presentations on Day 1!

Tanneberger et al 2017



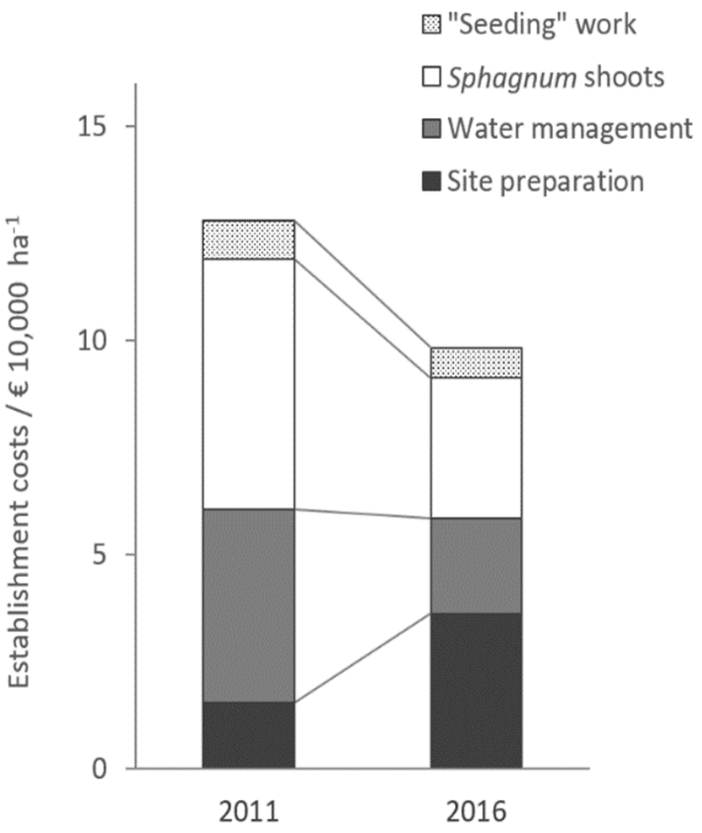
→ Virtual excursion!

Establishment cost: 2011 vs. 2016

- **Sphagnum**: ~40% ↓
- **Investment for water management**:

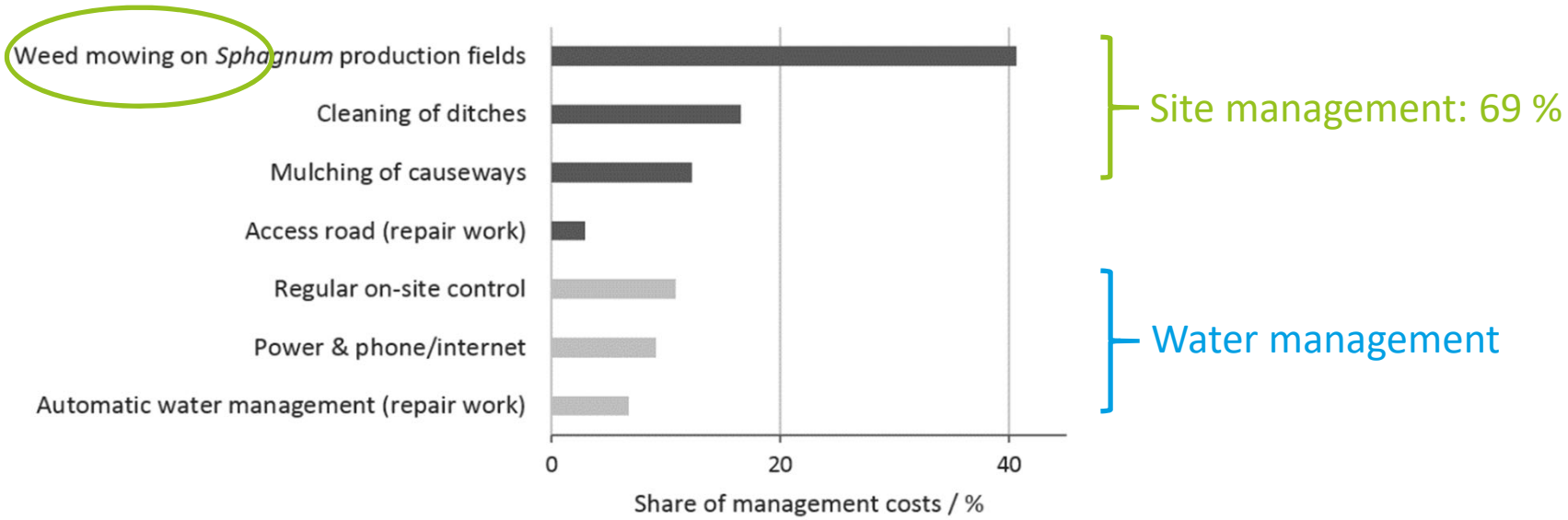
  proportionate costs ~50% ↓
- **Site preparation**: ↑ ↑

  36% of costs



Wichmann et al. 2017, 2020

Management (2011-2016)



2016: First large-scale harvest of cultivated Sphagnum

→ real-life costs + biomass yields + regeneration potential

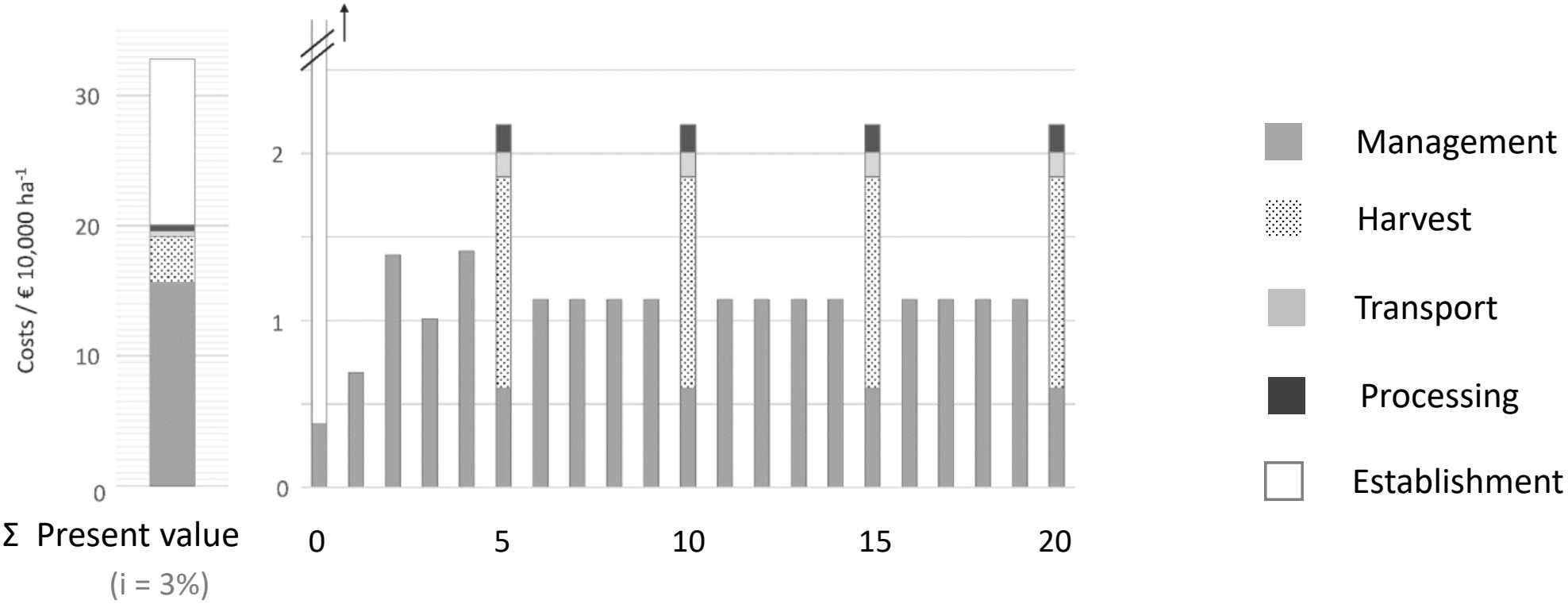
Foto: Gerd Block/MOKURA

Sphagnum = permanent culture

5-years of field experience

→ Extrapolation of data

Investment appraisal



- Present value: management costs > establishment costs

Sensitivity analysis

Costs

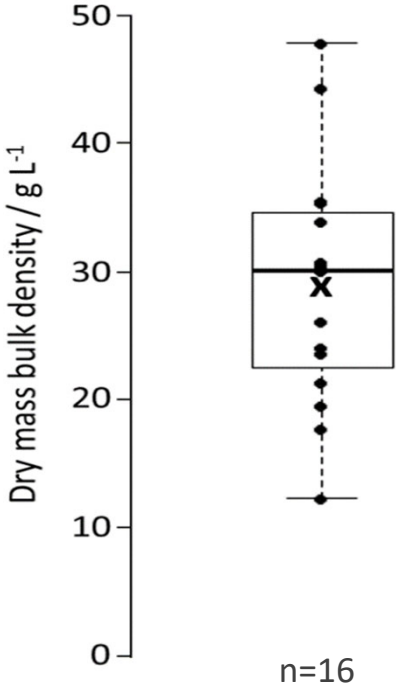
- Establishment: high (2011) / medium (2016)
- Management: high (2011-2016) / medium (25% ↓)

Yield

- Productivity: low / mean / high
- Bulk density: low / high

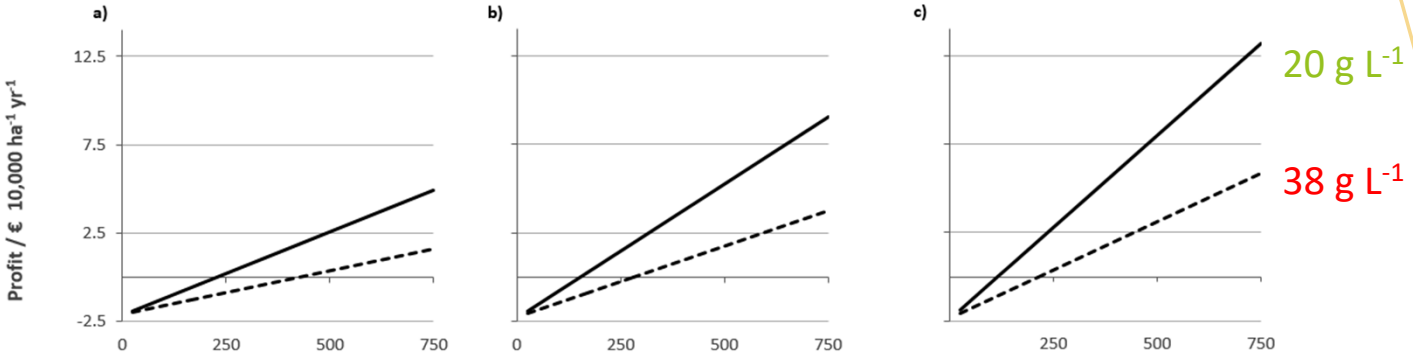
Revenues

- Market price: low / mean / high
- Non-market income: (CAP, PES) none / medium payment level



Current profitability

	Low yield	Mean yield	High yield
Productivity [t ha^{-1} a^{-1}]	**3.1**	**4.9**	**6.8**
Harvested yiel [t ha^{-1} a^{-1}]	**2.0**	**3.2**	**4.4**
Bulk density [g L^{-1}]	38 /20	38 20	38 20
"Seeding material"	✓	✓	✓
Orchid cultivation	✗	✗ ✓	✗ ✓
Peat substitute	✗	✗	✗



Price for Sphagnum biomass / € m^{-3}

Photos: University of Greifswald

How to improve profitability?

High potential for cost reduction

a) Management, b) establishment (seeding material, water management, site preparation)

→ Scenario high cost vs. medium costs: Break-even price: 20% ↓

Non-market income

→ e.g. 1,300 € ha^{-1} a^{-1}: Break-even price: 6 % ↓

Surcharge on peat free cultivated end products

→ e.g. + 10 % end consumer = 5 x price of peat

➔ Reaching break-even point of Sphagnum farming with high yields

	Average yield	DM t ha^{-1} yr^{-1}	2		3.2		4.4	
	Bulk density	DM g L^{-1}	38	20	38	20	38	20
High costs	**Break-even price**	€ m^{-3}	423 [397]	226 [212]	278 [262]	150 [141]	213 [201]	115 [109]
Medium costs	**Break-even price**	€ m^{-3}	330 [301]	177 [163]	220 [204]	119 [111]	170 [159]	93 [87]

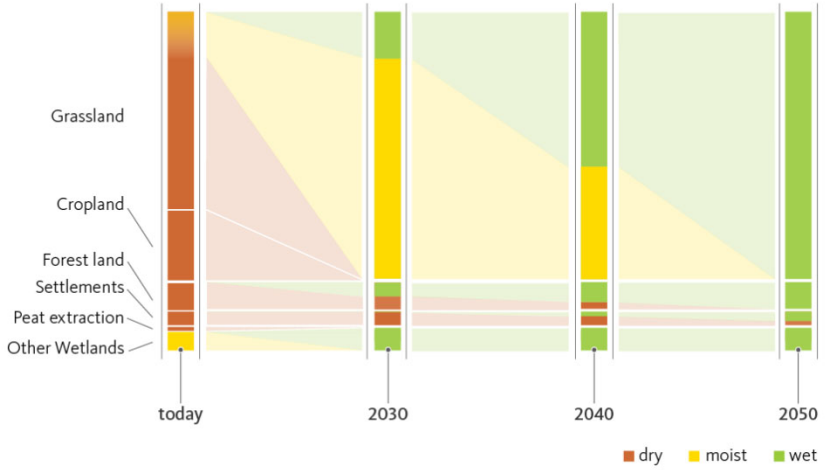
Is Sphagnum farming an alternative to drained bog grassland?

- ✓ Sphagnum farming → technical feasible
- ✓ Sphagnum biomass → valuable product
- ✓ Societal perspective → climate benefits proven, balanced provision of ecosystem services
- – Major obstacles from farmer's point of view

  High investment, regulations inhibit transformation, no incentives for climate measure, …

Challenge: Regional and national transition of peatland use & socio-economics

→ SF = only alternative combining productive use and substantial peat preservation



Tanneberger et al. 2021

For further reading ☺

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Wichmann, S., Prager, A., Gaudig, G. (2017)
Establishing *Sphagnum* cultures on bog grassland, cut-over bogs, and floating mats: procedures, costs and area potential in Germany.
Mires and Peat Volume 20, Article 03/2017: 1-19.

Wichmann, S., Krebs, M., Kumar, S., Gaudig, G. (2020)
Paludiculture on former bog grassland: Profitability of Sphagnum farming in North West Germany.
Mires and Peat 26, 08/2020: 1-18.

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