

Creating better links between the different bioeconomy sectors



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THEME: Develop recommendations for stronger cross-sectoral cooperation

NIBIO – cross-sectorial bioeconomy

- Bluegreen future
- New departments:
 - Biomarine resource valorisation
 - Food production and climate
- Bluegreen biorefining
- Seaweed farming:
 - Tailored processing for new products & markets
 - Breeding program for higher and consistent yields



Seaweed-farming bottlenecks

- Immature legislation, inconsistent across Europe
- Moving in the right direction: organic vs inorganic arsenic
- Knowledge gaps:
 - Iodine and heavy metals
 - Traceability and labelling
 - Transfer of technology and know-how:
 - Mapping of strains favourable for breeding
 - Interaction between farmed and wild populations



MIND THE GAP

Norwegian case: precaution or Catch-22?

How does farmed seaweed affect wild populations?

- Farmers must collect parent-algae close to their farm-site
 1. How to choose correct site and suitable parents?
 2. Hard to acquire proof of interactions without field studies
- What can we acquire from green bioeconomy sectors?
 1. Strain-selection:
 - a) Identify suitable traits for different regions and products
 - b) Breeding for infertility
 2. Value testing in the field:
 - a) Design & statistics



Cross-sectorial approach: Breeding facilities

- Inhouse competences and worldwide network
- Building new facilities:
 - Gametophyte bank
 - Hatchery and seedling systems
- Identifying traits and strains for breeding:
 - Growth, yield & quality
 - Resilience to climate change, epiphytes & pathogens
- Industrial collaboration:
 - Performance testing at commercial sites
 - Assist farmers to develop breeding programmes



Bridging gaps & overcoming bottlenecks

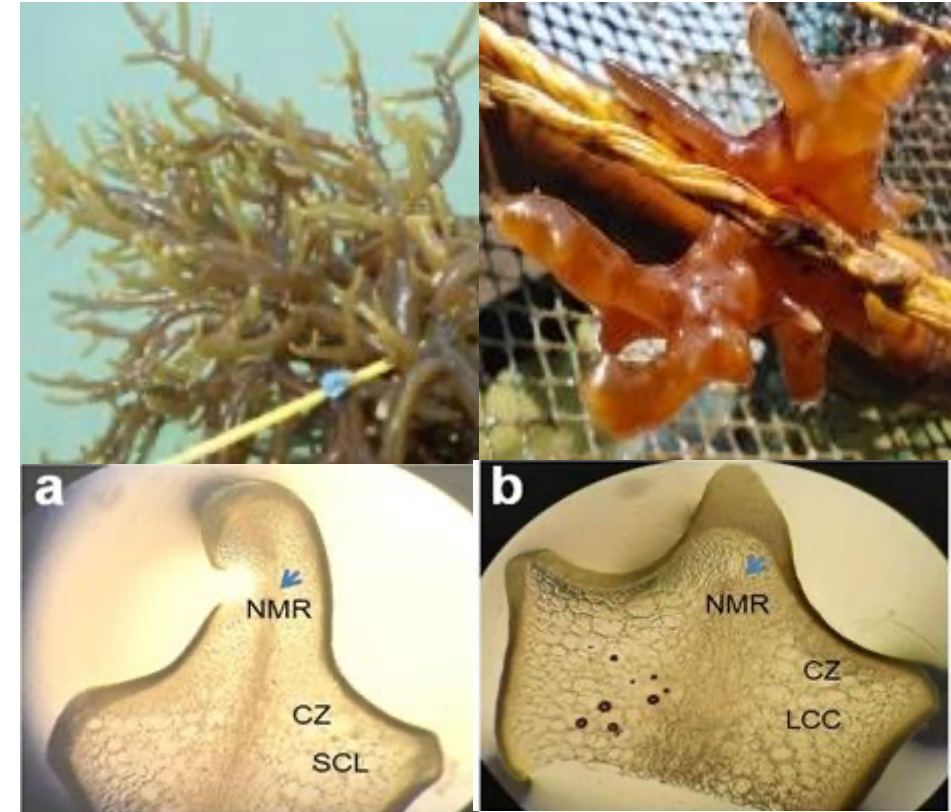
Producing infertile off-spring to protect wild populations

1. 'Seedless' seaweeds:

- Genomic screening for natural mutations in genes regulating cell division
- Crossing such male and female gametophytes to produce sterile sporophytes

2. Polyploidy:

- Disruption of cell division leading to additional sets of chromosomes and production of sterile seaweed
- Associated with higher yield and quality



	Wild strain	Polyploidy strain
Dry matter	8-10 %	12-15%
Carrageenan yield	23-25%	30-33%
Carrageenan quality	550-600 g/cm ²	800-900 g/cm ²
Morphology		thicker, fewer branches
Anatomy		larger cortical & medullary cells, thicker epidermal layer

Thank you for your attention!

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