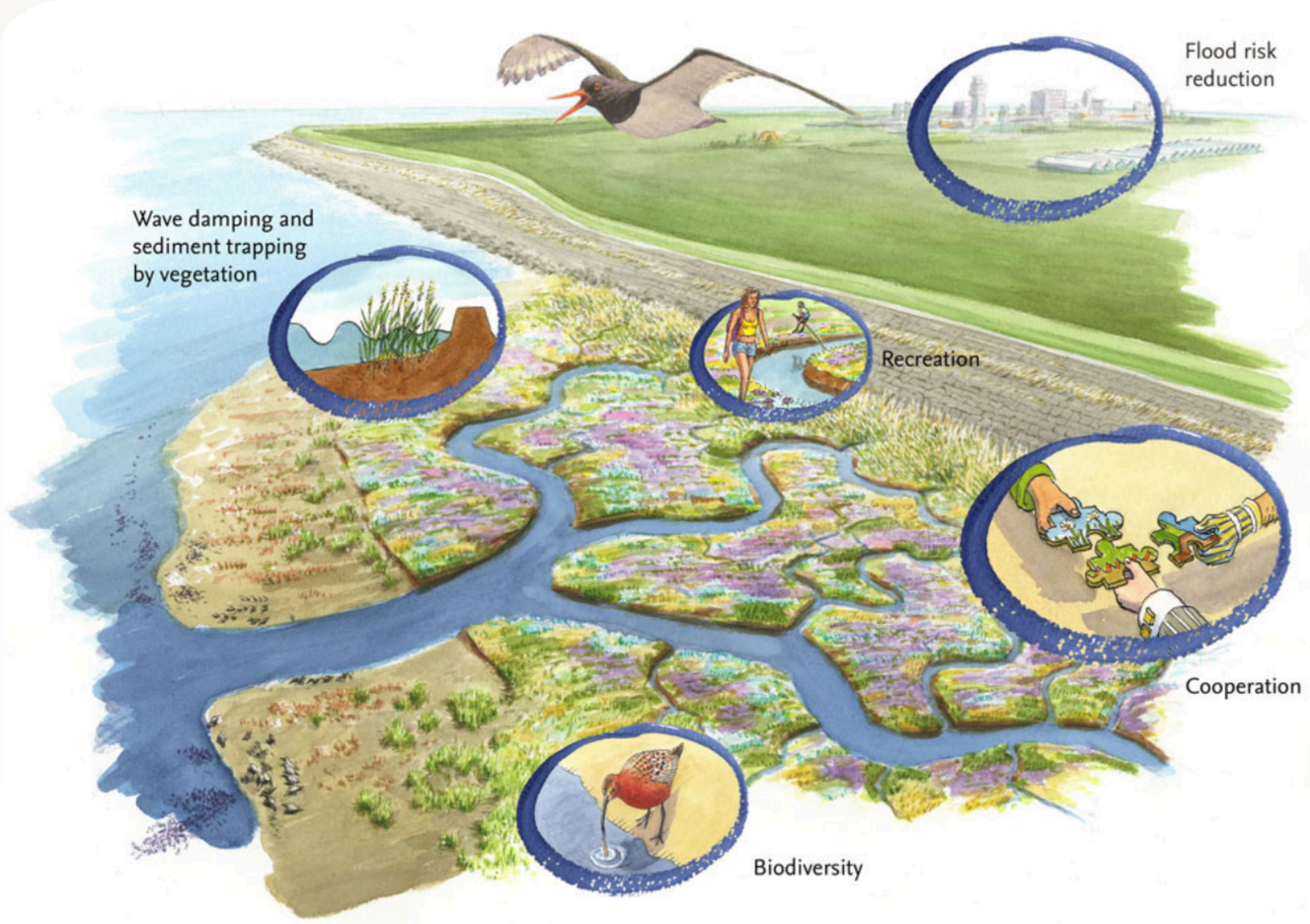
UNIVERSITÉ DE MONTPELLIER

Coastal Adaptation to Climate Change

In the Netherlands

ECOLOGY KEYS - HAG703B



Vegetated foreshores: processes and functions (Source: Jeroen Helmer/ARK Nature)

Léa Maenhout | Laura Saignie

The documentary

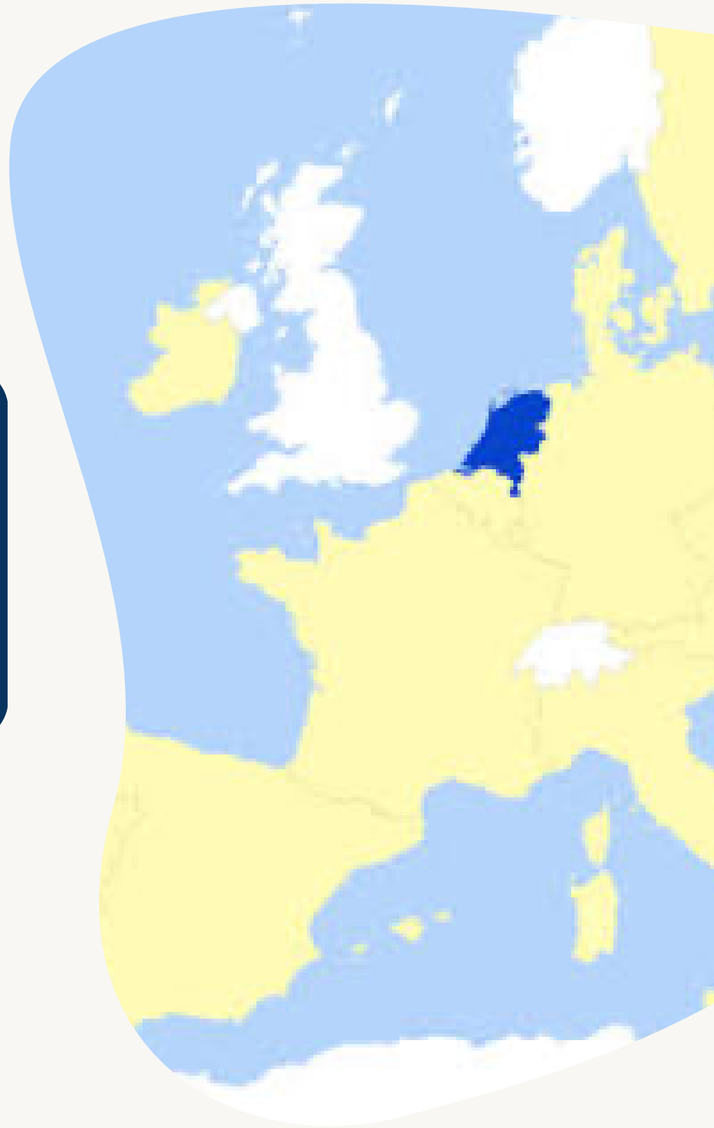
CLIMATE CHANGE IN THE NETHERLANDS – PIONEERING COASTAL MANAGEMENT

af DW Documentary | 16. marts 2023 | Tilpasning

https://www.youtube.com/watch?v=_g3DK70QB5c&t=362s

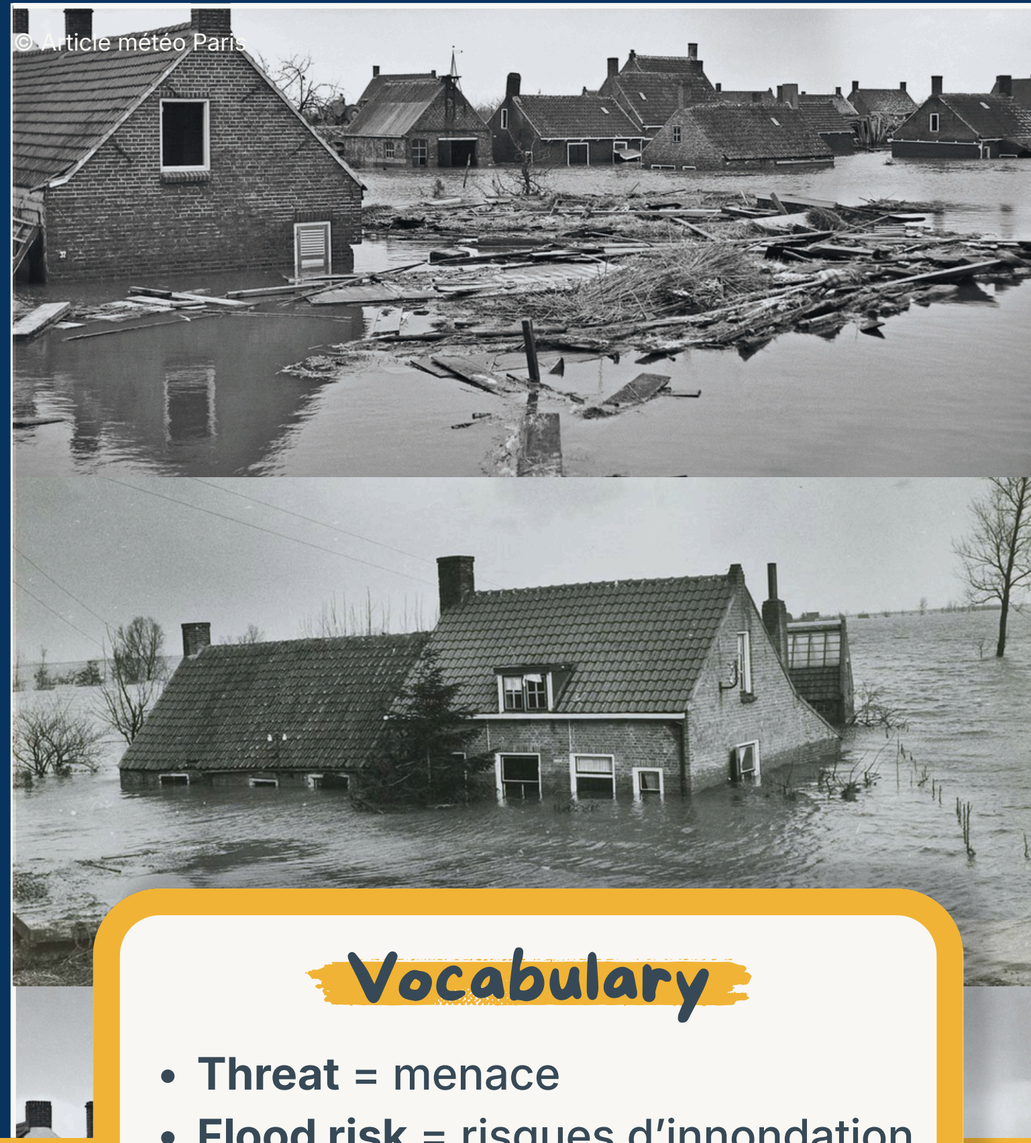


Tjeerd Bouma



Rising sea levels : The limits of hard engineering





- Growing **Threats** : Increase in **flood** frequency and intensity.
- Hard Engineering : highly expensive & unsustainable long-term.
- Combining ecology and engineering (A lesson from 1953).

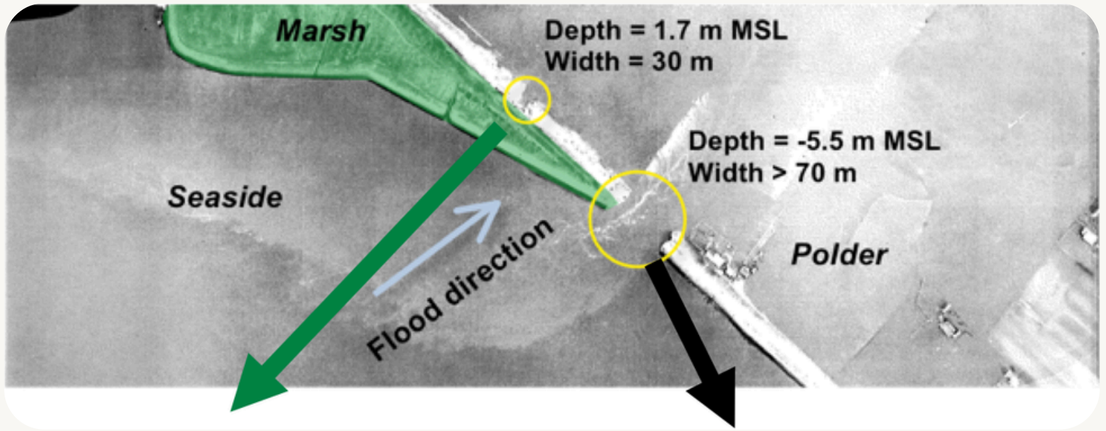
Vocabulary

- **Threat** = menace
- **Flood risk** = risques d’innondation

The North Sea flood of 1953



Yves Chenal - Janv. 1953



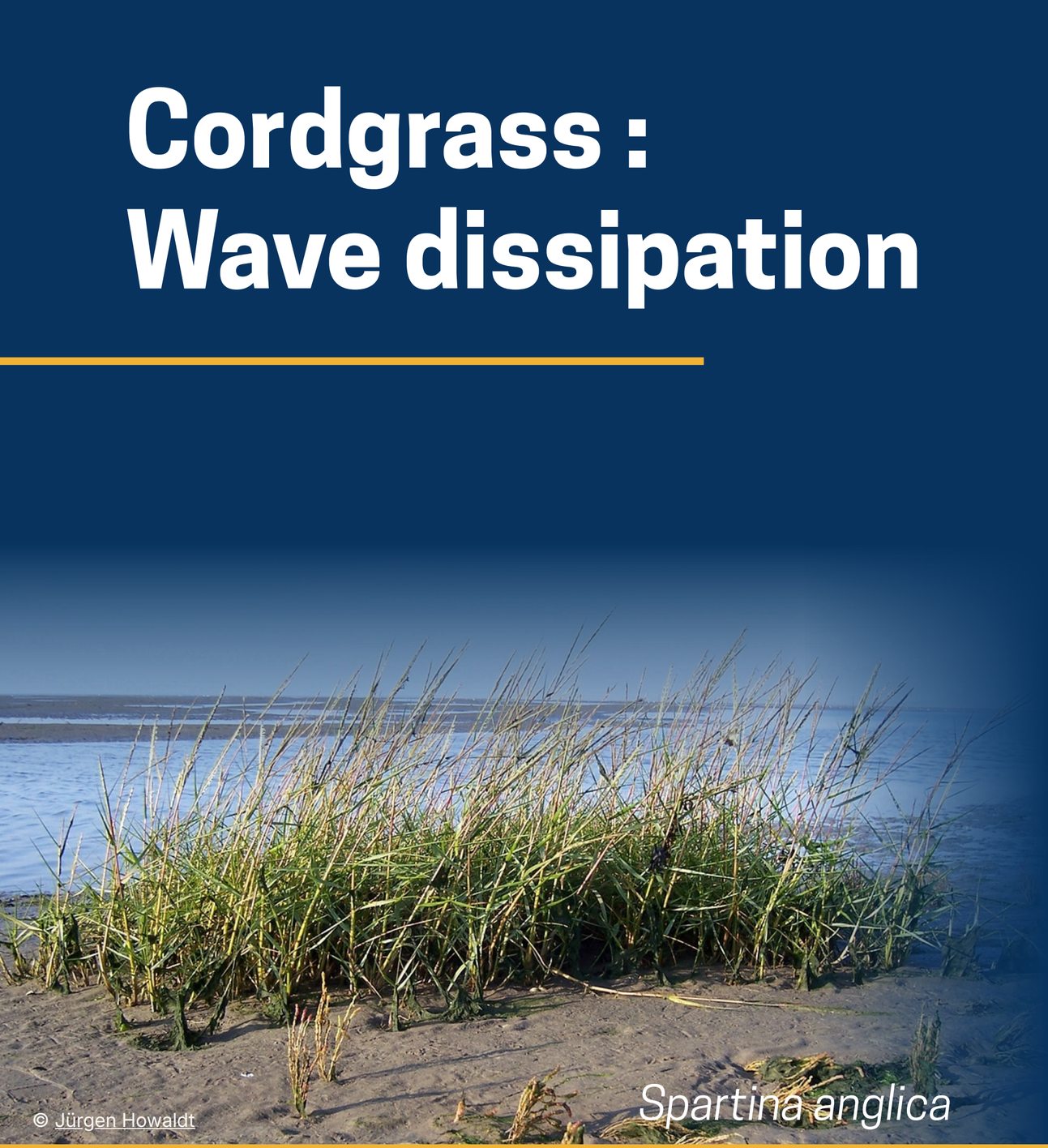
THE 1953 DISASTER

- Hurricane-driven flooding
- 1836 deaths in the Netherlands
- Water rose above 3 meters

Vocabulary

- **Salt marshes** = marais salé
- **Dyke breaches** = brèches dans les digues
- **High tide** = marée haute
- **Stems** = tiges

Cordgrass : Wave dissipation



© Jürgen Howaldt

Spartina anglica

Natural **buffer** : Absorbs wave energy before impact with the dike wall.

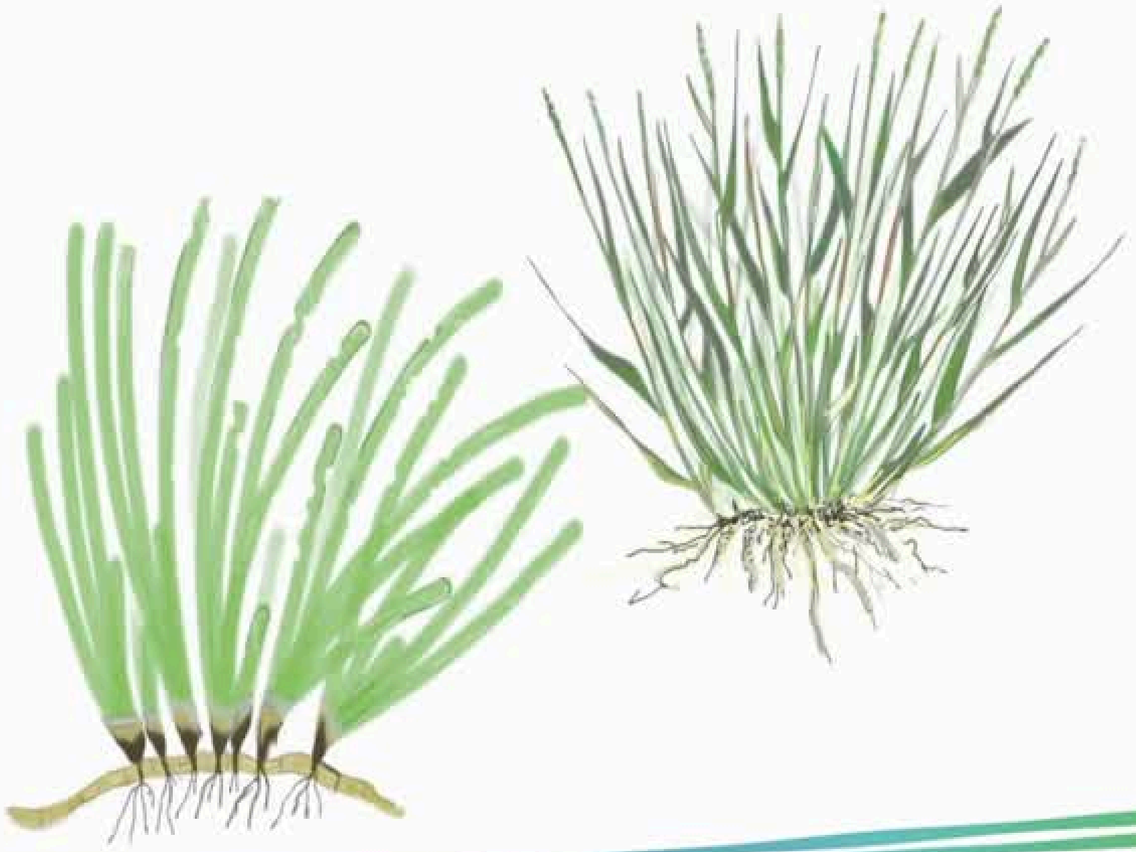
NIOZ Wave machine : Pneumatic system creating realistic, irregular North Sea waves.

Quantifying Protection : Measures precise erosion reduction: Vegetated Dike vs. Bare Dike.

Vocabulary

- **Buffer** = tampon
- **Tide** = marée

Here, we mimicked key emergent traits that locally suppress physical stress using biodegradable establishment structures.



A lattice strutcure made of potato starch



BEFORE



- Biodegradable lattice structure
- Fixed with wooden stakes

AFTER



- Vegetation established
- Roots stabilise the sediment

Coastal protection

→ Vegetation reduces wave energy

→ Traps sediment and raises marsh elevation

→ Support natural, sustainable coastal defence

Vocabulary

- **Mudflats** = vasières
- **Roots** = racines
- **Lattice structure made of potato starch** = structure en treillis faite de fécule de pomme de terre



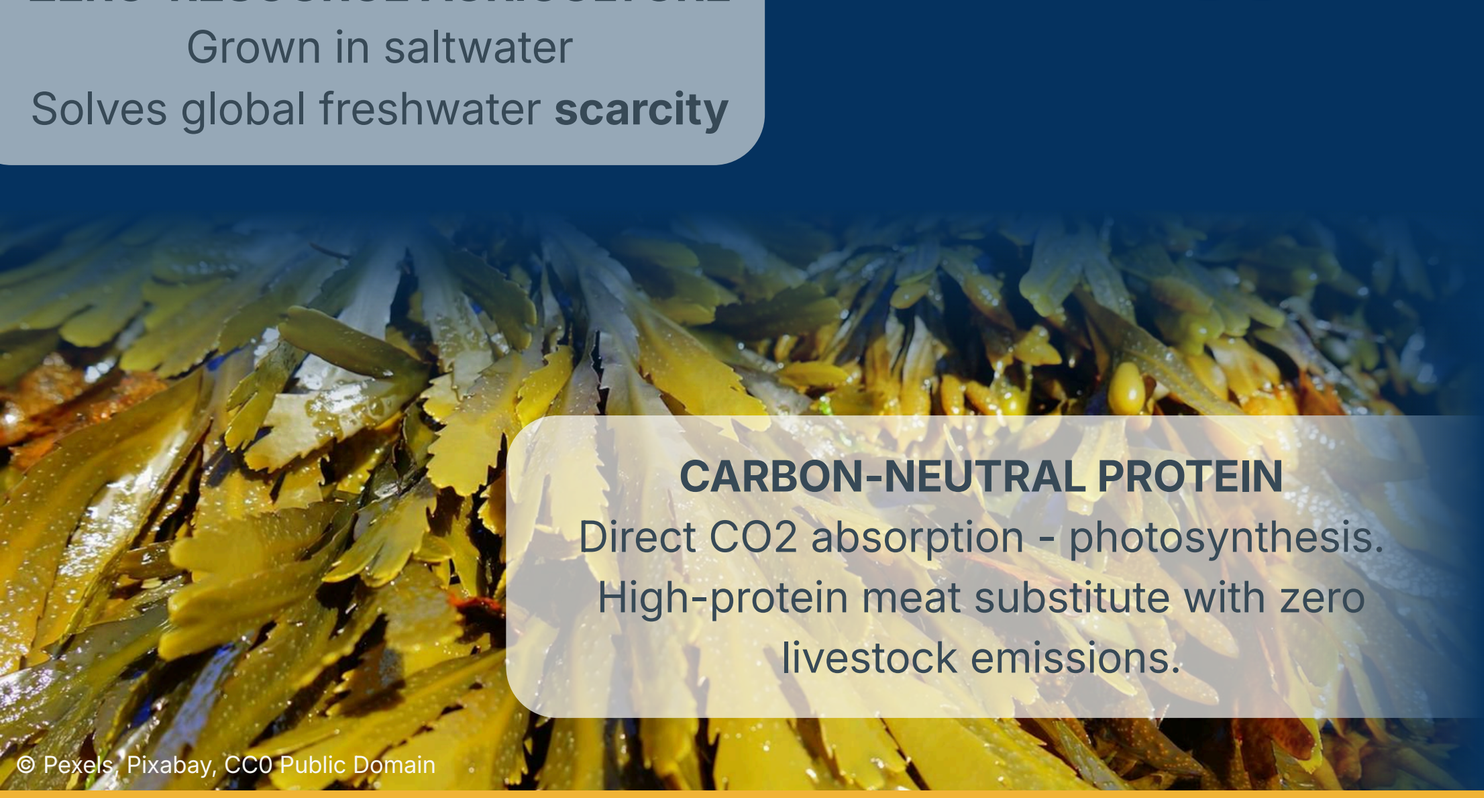
© North Sea Farmers

Reducing carbon footprint

ZERO-RESOURCE AGRICULTURE

Grown in saltwater

Solves global freshwater **scarcity**



CARBON-NEUTRAL PROTEIN

Direct CO2 absorption - photosynthesis.

High-protein meat substitute with zero livestock emissions.

© Pexels, Pixabay, CC0 Public Domain

CLIMATE VULNERABILITY CHALLENGE

Ocean warming threatens wild seaweed forests.

Urgent need to master controlled aquaculture.

Vocabulary

- **Scarcity** = Pénurie

Salt marshes as natural protection



Support young plants

Young plants need help at the beginning of their life cycle. If we stabilise their roots, they can survive and grow.



Give nature time

Salt marshes do not appear overnight. They need time to expand, trap sediment and reduce wave energy

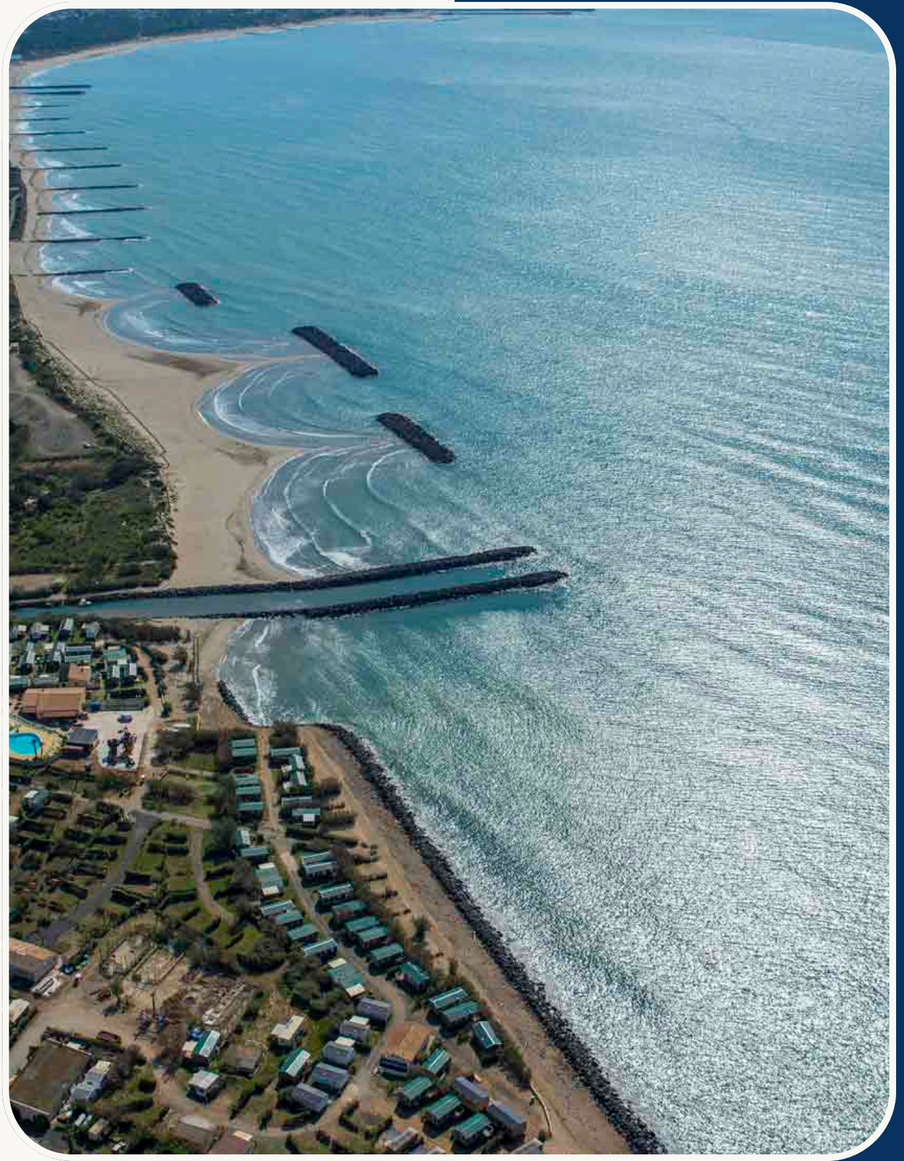


Stronger coastal protection

Well-developped salt marshes can extend further into the intertidal zone and provide a larger protective buffer fot our dikes

Do you have any questions ?

YouTube



Vocabulary

- **Threat** : menace
- **Flood risk** : risque d’inondation
- **Tide** : marée
- **Salt marsh** : marais salé
- **Flooding** : inondation
- **Storm :** tempête
- **Mudflats** : vasières
- **Seaweed farm** : ferme d’algues
- **Fresh water shortage** : pénurie d’eau douce
- **Drought :** sécheresse
- **Cordgrass** : spartine
- **Buffer** : tampon
- **Potato-stach lattice** : treillis base d’amidon de pomme de terre
- **Plant establishment** : installation de végétation
- **Stems** : tiges // **Roots** : racines
- **Scarcity** : pénurie
- **Dyke breaches** = brèches dans les digues