An insight into seaweed production on the Dutch North Sea

Sustainable, large scale and multifunctional

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My presentation today
Seaweed as a future food

... Should we stop to eat meat and cheat ourselves with structured and processed plant-derived look-alikes? **Or should we change to well-recognizable seaweed as the highly nutritious alternative novel food?** ....

https://www.wur.nl/en/About-Wageningen/100years/show/Symposium-Food-for-Future-1.htm

Of course we should!  But why?
Global developments

• 95% of seaweed production from Asia
• Small & large scale farms
Former Minister of Agriculture Martijn van Dam celebrating and preparing the first seaweed harvest in The Hague (2017)
Why seaweeds?
The extraordinary potential of seaweed

Why Seaweed?

- **Versatile**: food, feed & biobased
- **Cleaner & healthier oceans**
- **No land or fresh water use**
- **Multi-use offshore**
Sea vegetables

Why Seaweed?

Global deskstudy on seaweed composition (Stichting Noordzeeboerderij, 2017)

North-Sea-Weed-Chain Sustainable seaweed from the North Sea; an exploration of the value chain (Groendijk et al, 2016)
Potential for The Netherlands
The Netherlands & Seaweed

Maritieme sector

Kansrike noordzee

Agrifood sector

- Toegeweegde waarde 2015: € 23.7 miljard
- Productiewaarde 2015: € 55 miljard
- Percentage BNP: 3.5%

- Uitvoer waarde: € 74 mrd
- Aantal bedrijven: 156.605
- Marktanteil wereld: 6.4%

- R&D uitgaven: € 0.8 mrd
- Toezegde waarde: € 53 mrd
- Werknemende personen: 737.000

Maritieme Cluster

Ontwikkeling Exportwaarde

Onderdelen en samenhang Maritieme Cluster

Schepen onder Nederlands beheer

Kansrike noordzee
The Netherlands
The best seaweed producer in the world

Hightech processing
Nutrients
Offshore technology
Logistical solutions

Trade and export
High quality products
**Global impact in 2050**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production 500 Mt-d (growth 14% p/a)</td>
<td></td>
</tr>
<tr>
<td>Carbon capture [Mt]**</td>
<td>135</td>
</tr>
<tr>
<td>Nitrogen removal [Mt]</td>
<td>1</td>
</tr>
<tr>
<td>Phosphorous removal [Mt]</td>
<td>10</td>
</tr>
<tr>
<td>Protein for people and animals [Mt]</td>
<td>50</td>
</tr>
<tr>
<td>Ocean area required [km²]</td>
<td>500,000</td>
</tr>
<tr>
<td>Land sparing [km²]</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Freshwater sparing [km³]</td>
<td>500</td>
</tr>
</tbody>
</table>

** Carbon capture – total carbon compensated estimated higher

**Employment**

- 10,000-50,000 jobs

**Ecosystem**

- P = 2000t
- N = 20,000t
- CO₂ = 270,000t (directe assimilatie in zee)
- CO₂ = 2 mln t (feed additives)

**Plant-based protein**

- 100,000 t food and feed

**Energy (biogas)**

- 2,500 GWh or 15% Electric use NL households

**Impact land & water**

- Water sparing = 100 km³
- Land sparing = 2000 km²

**Multi-use wind farms**

- 25% area of offshore wind farms is used for multifunctional sea(weed) farms.
Towards a sustainable seaweed sector

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
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<tbody>
<tr>
<td>2012:</td>
<td>Initial founding - SBIR project</td>
</tr>
<tr>
<td>2014:</td>
<td>Revived by Eef, Marcel &amp; Job</td>
</tr>
<tr>
<td>2014-2016:</td>
<td>Development &amp; growth</td>
</tr>
</tbody>
</table>

**FTE 2018:** 4,2 + 2 stagiairs

**Board**
- [Marcel Schuttelaar] – Schuttelaar & Partners
- [Job Schipper] – Hortimare
- Ton Menken – Menken van den Assem

**Management team**
- Koen van Swam
- [Eef Brouwers] *
- Marlies Draisma *Founders*

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**Seaweed Platform**

**Test Farm**

**Advise & support**

**Communication**

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[Noordzee Boerderij]
Members Seaweed Platform
Offshore Test Farm – Proefboerderij Scheveningen
Challenges to make seaweed the food of the future – top 3

- **Quality & taste**
  - Develop certification scheme to support & push producers to realize premium food products

- **Sufficient**
  - Allocate production area’s for seaweed farms to boost investments and production

- **Price**
  - Develop techniques for automation of farming practices and valorization of seaweeds
Thank you for your attention

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