

Seaweed and 'chemistry'

*Wim Hilbrands
DSM Innovation Center*

NUTRITION • HEALTH • SUSTAINABLE LIVING



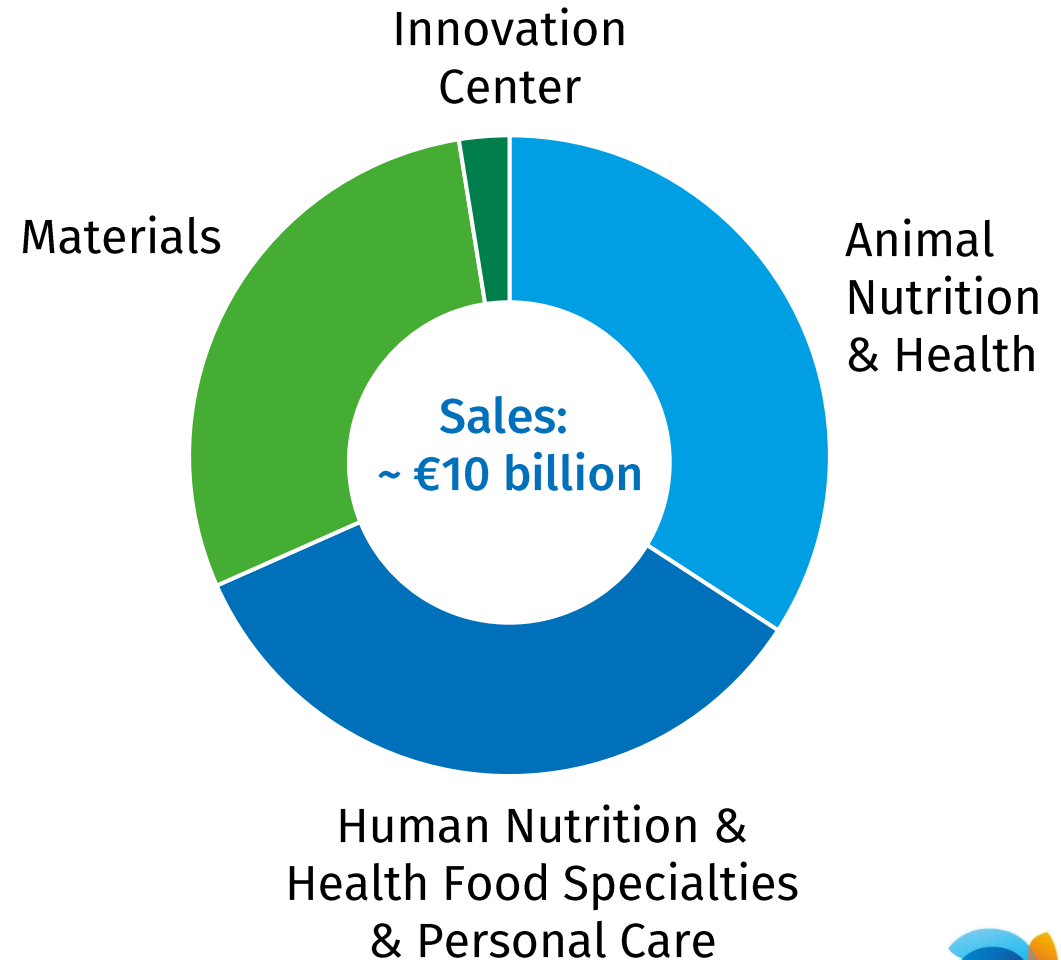
DSM

BRIGHT SCIENCE. BRIGHTER LIVING.

DSM at a glance

Purpose-led science to address the world's challenges in nutrition, health and sustainable living

- Global company with 43% of sales to high-growth economies
- Intrinsically innovative with 21% of sales from products launched in the last 5 years
- Highly engaged workforce across the world of ~23,000 employees
- Purpose-led strategy aligned with the UN Sustainable Development Goals



Nutrition at a glance

2019 numbers

- # 1 Supplier of vitamins, nutritional lipids, carotenoids, nutraceutical ingredients and custom nutrient premixes
- ~15 million consumers served annually by our i-Health B2C business
- 46 animal nutrition and 15 human nutrition premix facilities
- >70% of our skin care portfolio is more than 90% of natural origin
- #1 Supplier of lactase enzymes for lactose-free dairy



World leading supplier of a full range of nutritional ingredients

Sales €6,028 million

Facilities on all continents
~14,500 employees



Materials at a glance

2019 numbers

- 100% Renewable electricity used in the manufacture of materials for Apple's products by end of 2019
- #1 supplier of fiber optic coatings
- > 1 million first responders and service personnel protected by Dyneema®

World leading supplier of
high-performance
materials

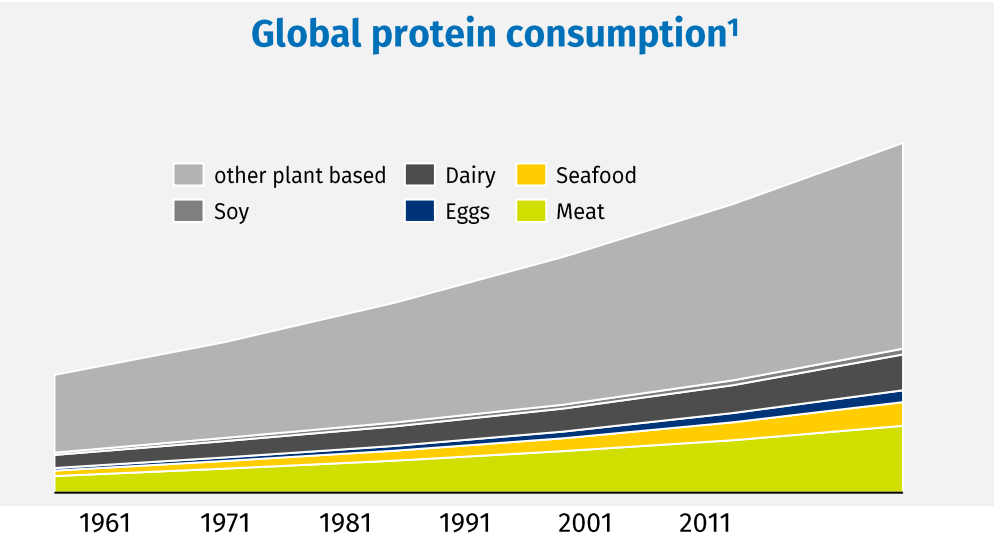
Sales: €2.746 million

Facilities on all continents
~4,500 employees



Continued protein consumption growth puts increasing stress on limited natural resources and planetary boundaries

Global protein consumption continues to increase ...



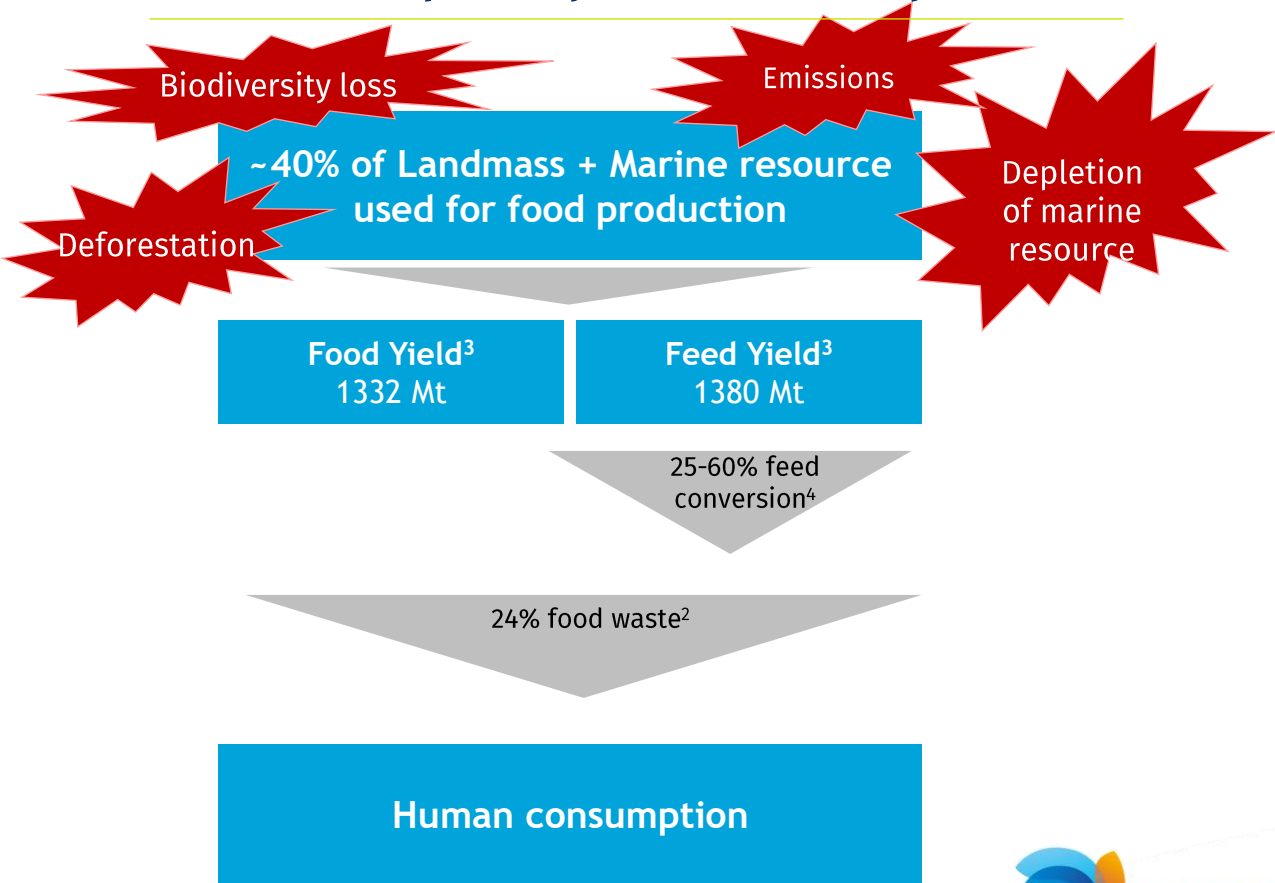
Drivers

Population growth

GDP growth

Changing preferences

... while traditional sources of protein are reaching limits of planetary boundaries already



Global protein macro-trends enable 3 major opportunities for DSM

- 1** Tap into plant-based protein consumption growth - making plant-based foods more healthy and tasty



Offer differentiated solutions based on DSM existing portfolio and targeted new functional ingredients in key markets

- Meat alternatives
- Dairy alternatives
- Health & Wellness

- 2** Make animal-based foods more sustainable through innovation



Bring animal feed solutions to reduce impact of animal protein consumption on planetary boundaries

- Improve feed-conversion
- Reduce GHG and nitrogen emissions
- Novel ingredients to replace animal origin feed (i.e. Veramaris)

- 3** Further explore opportunities in novel protein sources



Identify and connect to promising companies in novel proteins

- Leverage expertise through partnerships
- Relevant for both food (e.g. new plant sources, cultured meat, isolated microbial protein), as well as feed (e.g. single-cell protein)

Seaweed: an interesting but challenging source

- Abundant
- Cheap
- Does not need raw materials
- Does not impact land use
- Has number of valuable ingredients

- Harvesting rights?
- Invasion in marine ecosystem?
- Product consistency?
- Far from land
- Has a lot of water

Connection to DSM

Three main connections to DSM

Use of DSM materials in cultivation:

- Dyneema ropes
- Specific resins for adhesion

Use of DSM processing technology

- Biorefining / valuation side streams
- Upscaling
- Formulation

DSM's interest in the output materials

- Protein
- Hydrocolloids
- Colours / antioxidants / personal care / etc.



Critical success factors

Innovation ecosystem

Multiple party collaborations to combine expertises and crack the technological challenges

Entrepreneurship

Need for conceptual leadership and 'man on the moon' thinking

Endurance

Long term horizon with significant investment and risk

BRIGHT SCIENCE. BRIGHTER LIVING.™

