Innovation in Animal Nutrition
Feeding the World within the Limits of our Planet
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World Population
Projected world population until 2100

1990: 5.3 billion
2017: 7.6 billion
2030: 8.6 billion
2050: 9.8 billion
2100: 11.2 billion

Source: United Nations Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2017 Revision*
Produced by: United Nations Department of Public Information
resource depletion

emission & pollution

risking the basis of our existence
1.7 earths are needed to support current humanity’s demand on the planet’s ecosystem
UN Sustainable Development Goals
People, Planet, Prosperity

end poverty
protect the planet
ensure prosperity for all
DSM takes a leading role advancing the sustainability goals of the United Nations

UN Sustainable Development Goals

DSM Sustainable Growth Areas

- Nutrition and Health
- Climate change and renewable energy
- Resources and circular economy

“The United Nations Sustainable Development Goals set out the global strategy for the world in order to tackle some of the most challenging issues. At DSM we proudly take a leading role in advancing the SDGs as part of our business strategy.”

Feike Sijbesma, CEO/Chairman Managing Board
Animal protein is part of a healthy balanced diet
Supporting the health & wellbeing of growing populations

- Feeding the growing population has been made possible by strong growth in global food production (innovation in breeds, fertilizers, farming practices, feed additives...)
- Improved quality of nutrition contributes to increased health and longevity
- Livestock turns edible crops into highly nutritious protein rich food
- Livestock converts to food resources that cannot be used otherwise (by-products, marginal land)
- Livestock manure contributes to crop productivity
- Agricultural sector is a key component to the socio-economic status and key contributor to prosperity
Increasing scrutiny of impact on environment, human health and animal welfare - while demand for animal protein continues to increase

Data from www.fao.org/faostat/en/?#data
DSM Nutrition Mission:
Healthy diets for all within planetary boundaries

Our key nutrition goals

Advocate healthy, balanced nutrition
Increase the nutrient content & quality of feed & food
Enable the feeding of a growing population within the natural resources available
Reduce the eco-footprint of producing food (keep within planetary boundaries)
Healthy diets for all within planetary boundaries
Innovative solutions through six core platforms

- Tackling antimicrobial resistance
- Efficient use of natural resources
- Safe, quality nutrition and less waste
- Reducing our reliance on marine resources
- Reducing livestock emissions
- Lifetime performance

We work at species and country level to make tangible, measurable impacts
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Human activities are a driver of climate change

14.5% of greenhouse gases are from the livestock sector, of which 2/3 are beef & dairy cattle.

Food and Agriculture Organization (FAO), Tackling climate change through livestock.
3-NOP feed supplement reduces enteric methane by 30%

This reduction helps offset the greenhouse gas emissions we produce every day when driving our cars, heating our homes, and lighting our cities.

Brand naming in progress for global launch (3-NOP is the technical name)

Launching in coming years globally
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Veramaris
The sustainable solution for Omega 3 EPA&DHA for Animal Nutrition
Fish wild catch production reached its limits
Aquaculture is required to cover the increasing protein demand for human nutrition - but relies on fish oil from finite wild catch resource

- Aquaculture is required to cover increasing demand
- Salmon aquaculture relies on feeding fish oil as omega-3 source produced from wild catch fish.

**Global wild catch and aquaculture production**

17% of global wild catch is consumed for the production of fish oil and fishmeal
Our natural marine algal oil is a sustainable alternative solution for EPA and DHA supply - market launch in 2019

DSM and Evonik breakthrough – shortening the natural food chain
Replacing fish oil from 1.2 million tons of wild catch
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We work at species and country level to make tangible, measurable impacts
Safe, quality nutrition and less food loss & waste

Example: How our vitamin D nutrition program contributes to improving nutrition, welfare and industry sustainability

- Improving bone strength throughout the growth of the hen, reducing incidence of bone fractures & associated welfare issues
- Improving layer productivity: more eggs, better egg shell quality. Improving sustainability aspects: more out of less; contributing to less food loss & waste
- Improving nutritional value of the egg supporting healthy, balanced diets
- Improving breeder performance & chick quality: a more sustainable production
- Improving farmer livelihood
Food Loss & Waste is a major food sustainability issue. By improving egg shell strength we can help reduce food loss and waste (FLW).

- More effective nutrition leads to improved egg shell strength
- Highly significant reduction in broken eggs
- Tremendous value to the food chain in helping to reduce FLW

Percentage change vs. traditional nutritional use of vitamin D$_3$

Source: Average results of experimental and field trials
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We work at species and country level to make tangible, measurable impacts
Efficient use of natural resources - improving protein & calorie retention and mitigating emissions

- Nutritional value of crops declining (+ANFs) & with poor sustainability record (soy)
- Need for improving the digestibility of mainstream feed raw materials
- Need for upgrading lower digestible, local feed raw materials & by-products (broadening raw material base). Reducing feed-food competition
- Reduce emissions: nitrogen & phosphate pollution (manure management); CO$_2$, N$_2$O and CH$_4$

69% 

2006 

2050

Required increase in food calories to feed 9.6bn people by 2050

30% of livestock-consumed DM is derived from residues & by-products from the agri-food chain. By-product consumption is expected to grow as the population increases & more processing takes place.

Source: World Resources Institute 2017; Mottet at al, Global Food Security 14 (2017) 1.8
Efficient use of natural resources via enzyme technology

- Reduce pressure on soy land use & biodiversity loss
- Improve nitrogen retention
- Reduce nitrogen pollution (manure management)

- Increase sustainable use of local feed raw materials
- Less reliance on global commodities & increase raw material flex
- Circular economy
- Reduce feed-food competition

- Optimize diet formulations & cost
- Reduce diet cost & improve margins
- Reduce GHG emissions
- Affordable meat, milk, eggs & fish

- Reduce reliance on finite mineral resources
- Safeguard phosphate reserves
- Reduce phosphorus pollution (manure management)
- Phytate-free nutrition

Our broad DSM feed enzyme portfolio delivers innovative and effective solutions to extract more nutritional value out of today’s feed ingredients.

The depth and breadth of our enzyme portfolio has been designed to address the varied needs of our customers, while tackling the societal issues of sustainable livestock production.
Feed protease reduces protein use & nitrogen emission
Key for operating within planetary boundaries

Nitrogen flow to the environment is a major issue for some farming operations.

Nitrogen flow is monitored and in some geographies, boundaries are set.

Livestock production within planetary boundaries is receiving increasing focus throughout the value chain and associated stakeholders.
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AGP-free nutrition: re-thinking & adapting all aspects of animal protein production

Strong market drive to reduced use of antibiotics in animal production

- Avoidance of AGPs in animal protein production requires a holistic approach including adaptations in management systems, nutrition and health practices
- With our broad expertise in micronutrients and in nutrition generally we are very well positioned to close the vacuum created by avoiding antibiotics
- We have a comprehensive and promising innovation pipeline to close gaps & enable the change in industry practice
Targeting bacterial cell wall debris: Novel approach supporting AGP-free nutrition

Novel feed enzyme improves broiler performance by reducing gastro-intestinal imbalance caused by bacterial cell wall debris

- Bacterial cell wall debris (peptidoglycans) is ubiquitous in the gut.
- Peptidoglycans can act as intestinal antagonists and stimulate mucin secretion.
- Imbalance between the production and disposal of bacterial cell wall debris can compromise gastrointestinal function (e.g. reduction of gut motility, bacterial overgrowth).
- DSM developed a novel feed enzyme degrading the peptido-glycans of the bacterial cell wall debris, improving broiler FCR by 4 pts (Yegani, 2018).
- Improved gastrointestinal functionality has a value beyond direct impact on performance, e.g. animal welfare.
Our DSM nutrition mission

Healthy diets for all within planetary boundaries

We want to contribute to healthy, enjoyable and accessible food and nutrition solutions for all, produced and consumed respecting the limits of our planet.

In doing so, we work with our partners to nudge consumers towards healthy and sustainable diets, dealing fairly with all stakeholders involved.

DSM is committed to promoting equitable access to healthy food and nutrition, to using and enabling low carbon technologies and to protecting the earth’s resources.
Thank you for your kind attention.