

How to balance sustainability & competitiveness in pig production



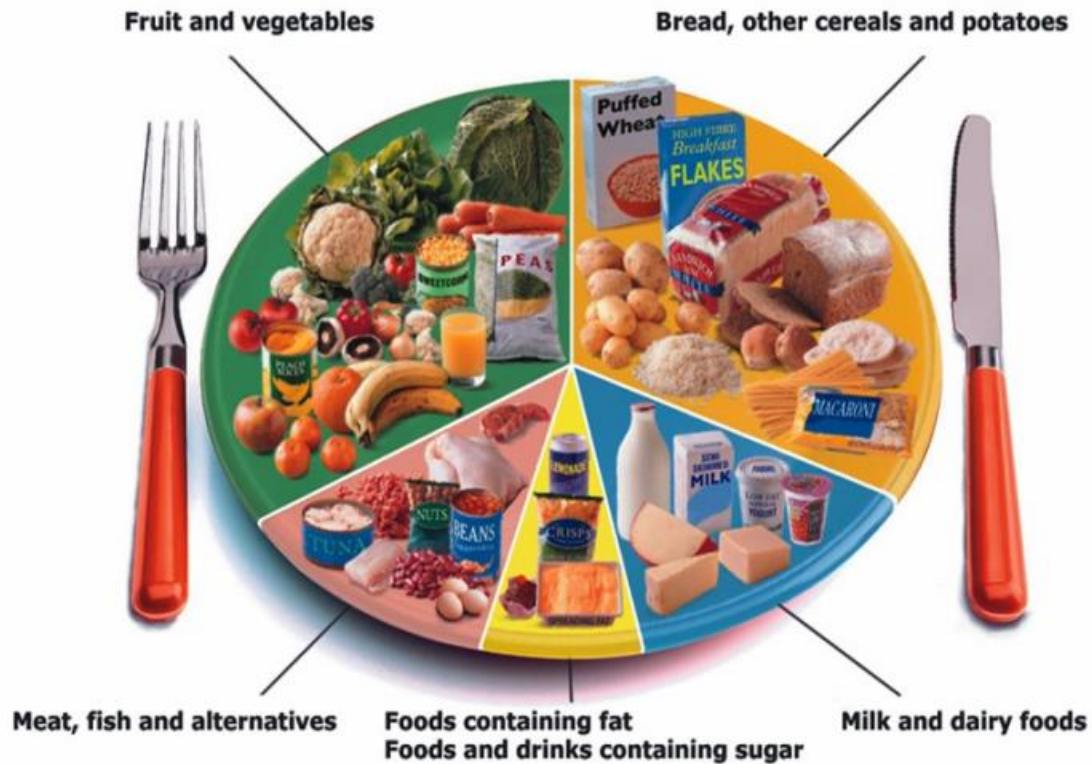
Dr. Maria WALSH

Global Swine Marketing Director

Pig Research Summit, 2024

dsm-firmenich 

Healthy diets: a balance of vegetable and animal sources



Source: EFSA, DRV summary report 2017; FAO / WHO / / UNU expert consultation 2002; Nat. Acad. Sci. Inst. Med. (IoM) 2005.

Protein needed to feed the 9.7 billion people on the planet by 2050:

FAO OUTLOOK UNTIL 2050: TIMES 1.6!

Million metric tons

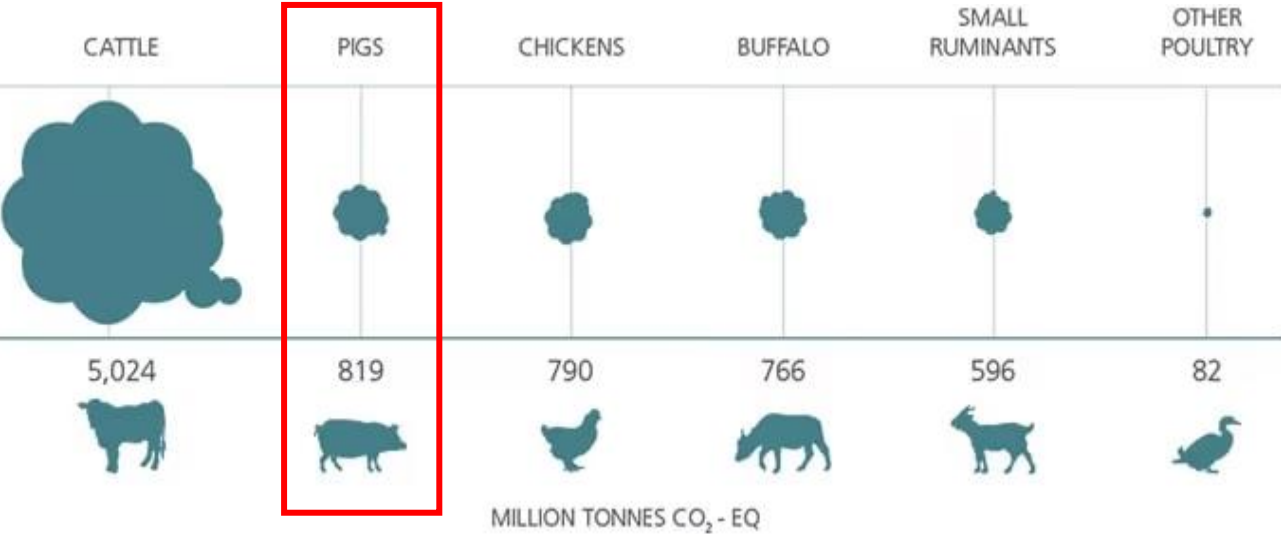
PROTEIN TYPE	2010	2050	VAR.
BOVINE	66.7	107.5	62%
POULTRY	98.9	201.9	104%
PIGS	109.3	150.3	38%
AQUA	59.9	113.7	90%
MILK	722.9	1119.7	55%
TOTAL	1057.7	1693.1	60%

Source: FAO Global Food Outlook November 2012/FAO World agriculture towards 2030/2050 - 2012 Rev/OECD FAO Ag Outlook 2013

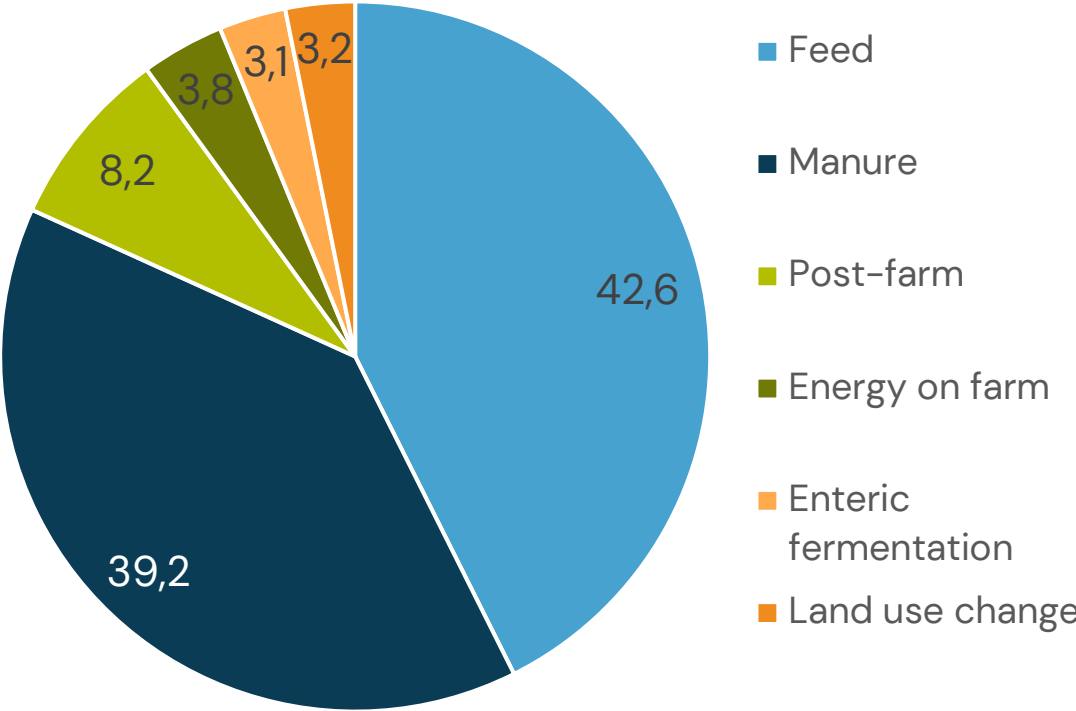


Global pork production is the second biggest producer of GHG emissions coming from the feed and manure

- Livestock production accounted for 14.5% of global GHG (CO2, CH4 and N2O) emissions
- Global GHG produced by **animal species**:




GHG emission intensity proportion (%) by sources from Global Pork Production




Source: FAO, Global Livestock Environmental Assessment Model (GLEAM), Result 2015, <http://www.fao.org/gleam>

Tangible change evolving in the animal protein value chain: Three main sectors that are driving this change



50-60%
Feed impact on animal protein production cost



50-80%
Feed impact on animal protein footprint



Change driven by the value chain



Regulators
Policy changes to address agricultural footprint and deliver on national commitments

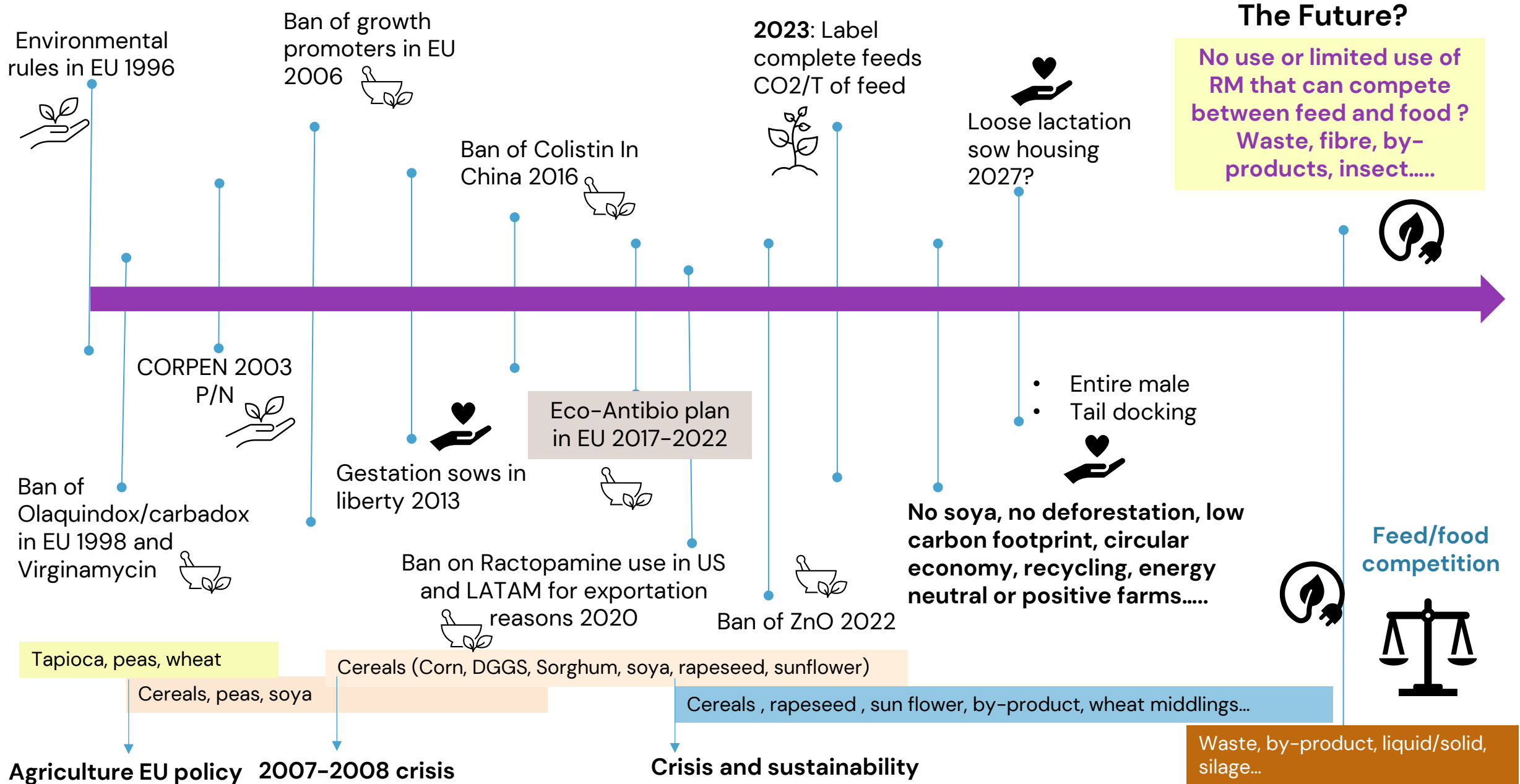


Investors & Banks
Pressure for ESG compliant reporting on animal footprint to manage risk & return; carbon bank initiatives; loan incentives



Retailers
Seeking products and brands with strong connections to consumer values on health & sustainability

Change is nothing new for the swine industry..... But... the rate of change has sped up in the last decade



The swine industry is adapting to the changing demands of the downstream value chain



Step-up investment in sustainability & innovation throughout the value chain to accelerate sustainable food transition

Climate Track

Reduction initiative with data sharing and tailored programs per producer

Covers 100% of Danish pigs, and 65% of Swedish slaughter pigs

50%

Reduction in GHG emissions by 2030

Net Zero

Reduction in GHG emissions by 2050



Our vision is to be the most sustainable protein company on earth

'Raise the Good in Food'

First major carbon neutral food company in the world and has set ambitious SBTi's to reduce carbon emissions

30%

Reduction in GHG emissions by 2030

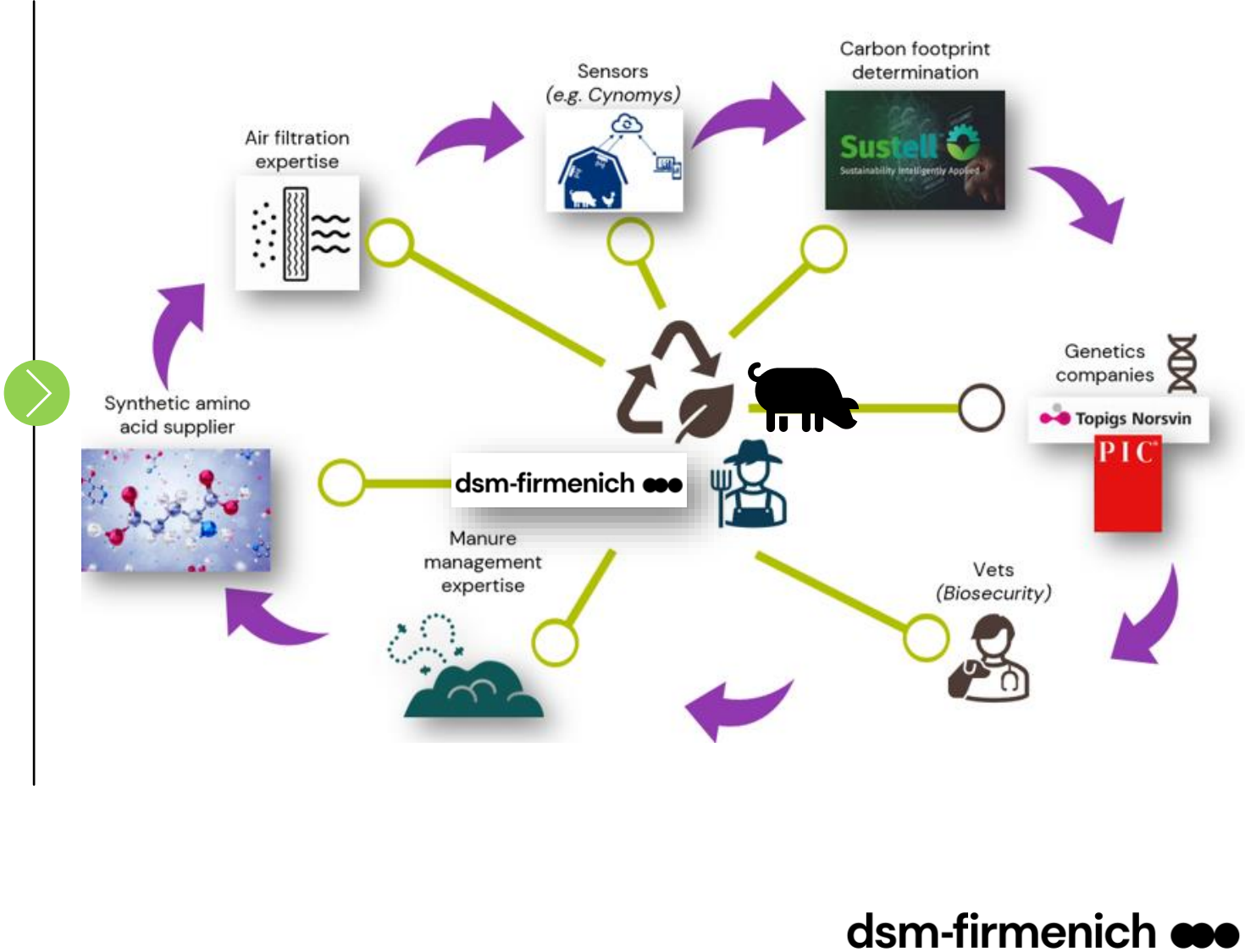
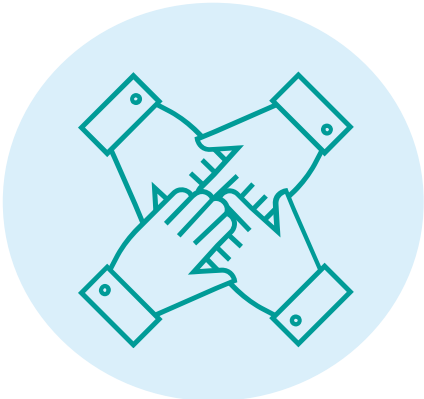
82%

Of GHG emissions are Scope 3

Focus on animal manure, emissions from third-party contracted growers and feed and crop production

To facilitate the move towards more sustainable & efficient swine production will require a proactive partner & an ecosystem working together

- The value chain & stakeholders are focused on the **true cost of animal production**
- To facilitate the move towards **more sustainable & efficient animal production** will require an ecosystem of partners from the **industry and academia working together**



Sustainable animal production: it seems so complex!

Where to start?

1. **Precise & credible measurement** of feed & farm footprint
Need to know your starting point to be able to make a change
2. **Set targets** to aim for that are meaningful & achievable
The industry is already doing this e.g Danish Crown -50% GHG by 2030
3. **Assess what current strategies** are available to make a tangible difference **starting with feed** (62% of footprint)
 - *Reducing CP levels – synthetic amino acids & protease*
 - *Use more **local alternative raw materials** – typically higher in fiber, indigestible protein, antinutrients, mycotoxins*
 - *Understand the **quality & risk** through analysis of raw material composition & screen for MTX risk*
 - ***Tailoring feed enzyme strategy** to raw material quality to get the maximum value for the pig – cheaper feed – no compromise in performance (digestibility improvements)*
 - *De-risk with **appropriate mycotoxin protection** based on analysed MTX levels*



Sustainable animal production: it seems so complex!

Where to start?

4. Assess what current strategies are available to make a tangible difference already – **pig performance & emissions**

- *Supporting gut health – improved performance & reduced mortality*
- *Reducing ammonia & nitrous oxide emissions with feed additives (e.g. Benzoic acid)*



Making swine production more sustainable has always been on our minds at dsm-firmenich

We have a long history of dedicated nutritional approaches to unlock the digestive potential of raw materials while minimizing N emissions

Reduce reliance on food grade RM and soy

Unlocking digestive potential of alternative raw materials with enzymes such as **ProAct®**, **HiPhorius™** & **WX**

Protection from feed antinutrients

Identification & irreversible protection from known & emerging mycotoxin via **Mycofix®**

Improving animal efficacy

Maximizing digestibility of co-products via feed enzymes and nitrogen retention via **VevoVitall®**

Reducing N emissions

Acidification of the urine by feeding **VevoVitall®**

Ronozyme®

VevoVitall®

Hy-D®

Mycofix®



With Sustell... we can make the invisible.. visible
and measure the magnitude of change our performance
solutions can make to your carbon footprint & profitability



Environmental Product
Declarations & Premix Carbon
Calculator

We start by transparently sharing our
products' reduced footprints on 16
different metrics



Intelligent Sustainability Service

We calculate the full environmental
footprint of animal protein using
primary feed and farm data, combined
with expert knowledge and tailor-
made, practical solutions to unlock the
value of sustainability



Innovative and complete portfolio

We provide innovative feed additives &
nutritional solutions to address many of
the key environmental footprint drivers

Sustell™ 



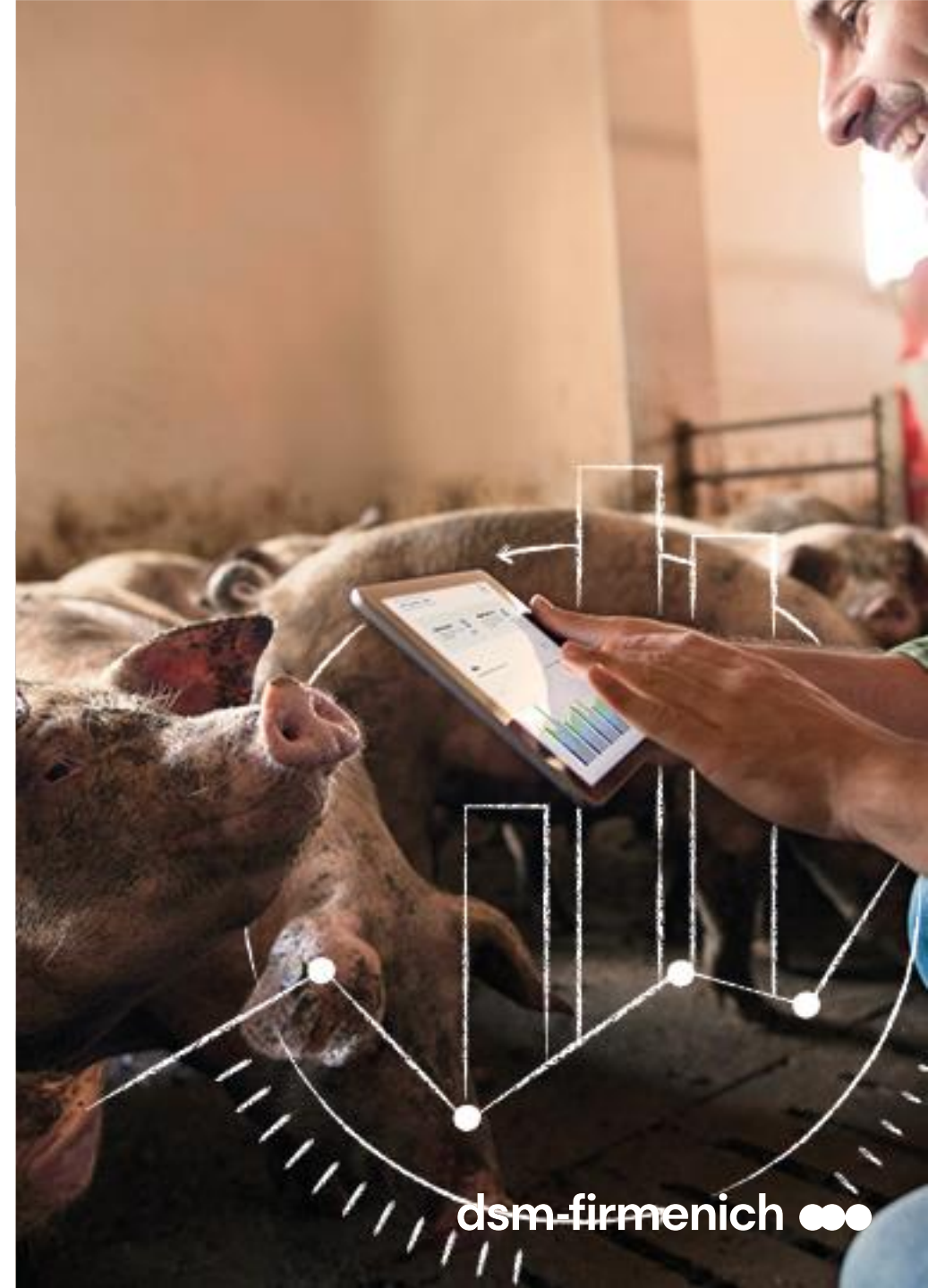
dsm-firmenich 

The impact of dsm-firmenich's performance solution portfolio on carbon footprint of feed and pig production

Making the invisible... visible with Sustell

MODELLING CASE STUDIES:

- Benelux

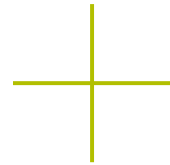


Combining products and solutions to unlock the value of sustainability

For Benelux

Baselines

- **Representative diets formulations** based typical formulations of specific regions
- **Representative farm conditions** based on our technical swine expertise



Products

Ronozyme® WX

Ronozyme® ProAct

HiPhos/HiPhorius™

VevoVital®



Solution



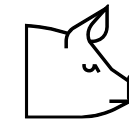
Environmental
footprint
measurements

Decarbonization Roadmaps



At the feed level
(per kg of feed produced)

e.g. for feed suppliers



At the farm level
(per kg of liveweight produced)

*e.g. for integrators,
animal producers*

Feed footprint

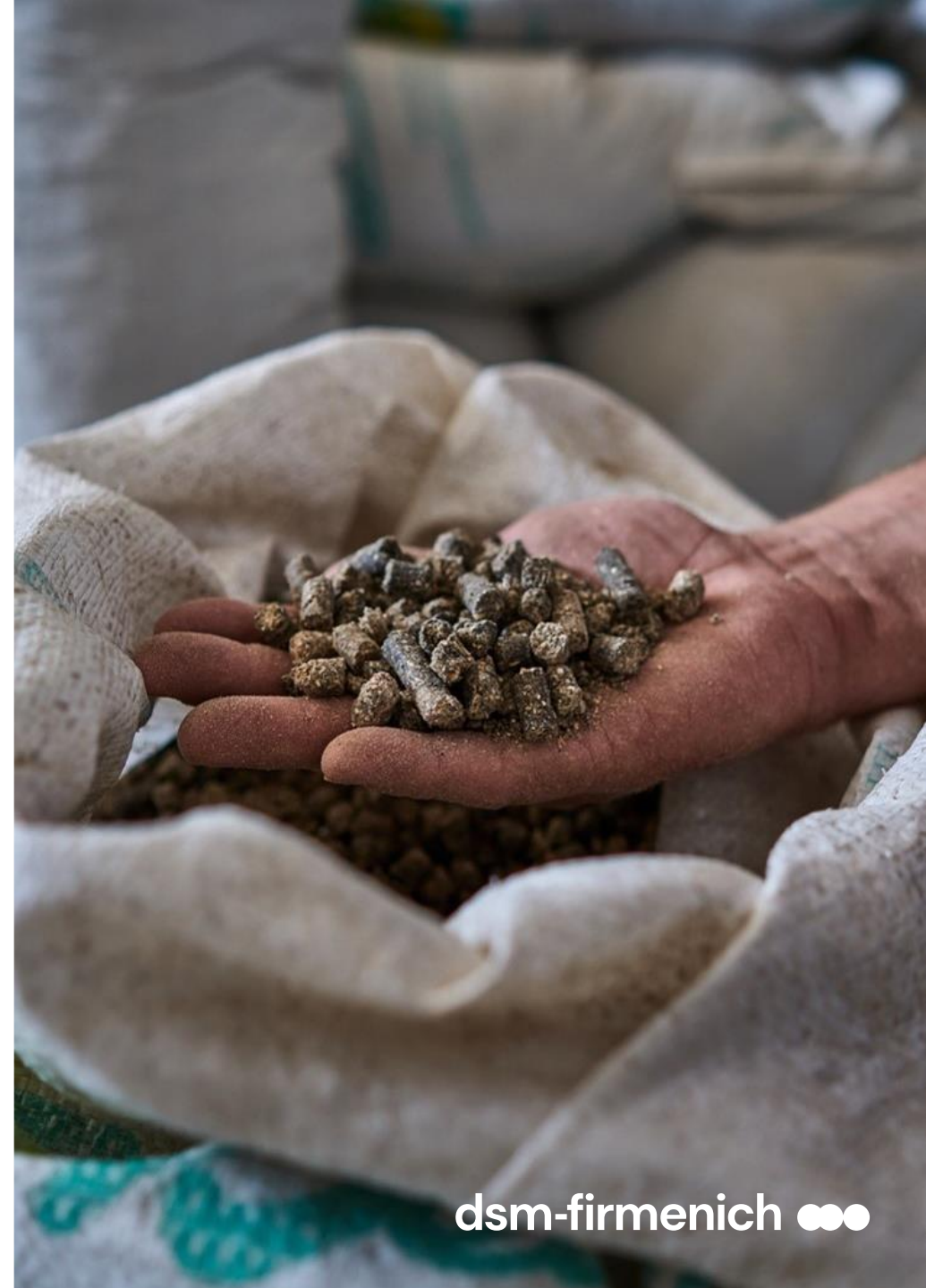


Grower – Finisher feeds

- **CASE STUDY – BENELUX**

Representative diet with 2 phases – grower and finisher – (Crude protein: 13.3% & 15.6%)

- **Wheat-corn-based diets with additional alternative raw materials**
- **Feed additives added included**
 - VevoVital – 0.5% in grower, 0.3% in finisher
 - Ronozyme HiPhorius – 0.015% in grower/finisher
 - Ronozyme WX (2000 CT) – 0.010% in grower/finisher
- **Ingredients are assumed to be sourced locally**
(Netherlands, Spain)

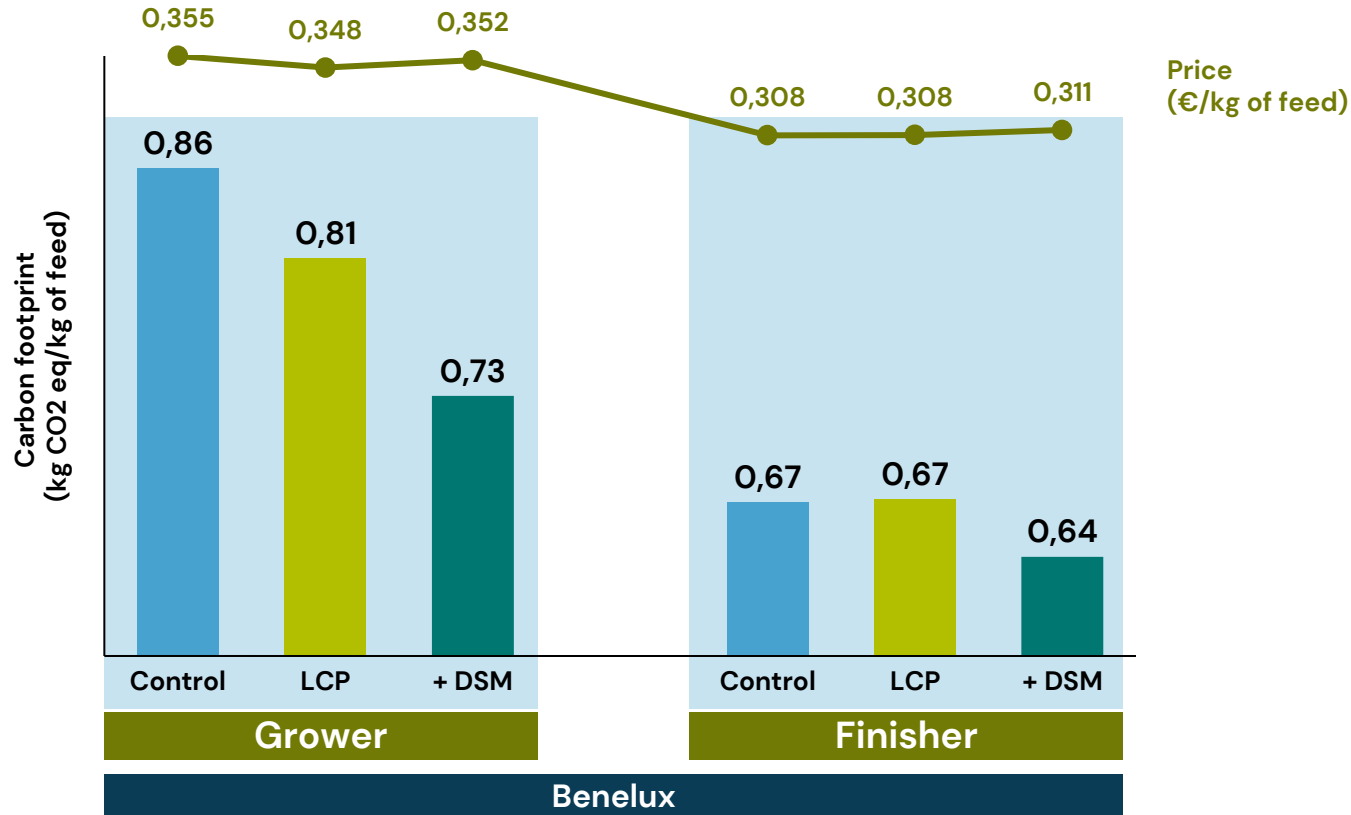


CASE STUDY – BENELUX

Overview of all feed carbon footprint



Grower & finisher feeds



Up to
15%

reduction in the feed carbon footprint by reducing the crude protein content and adding dsm-firmenich ingredients while keeping the feed cost stable

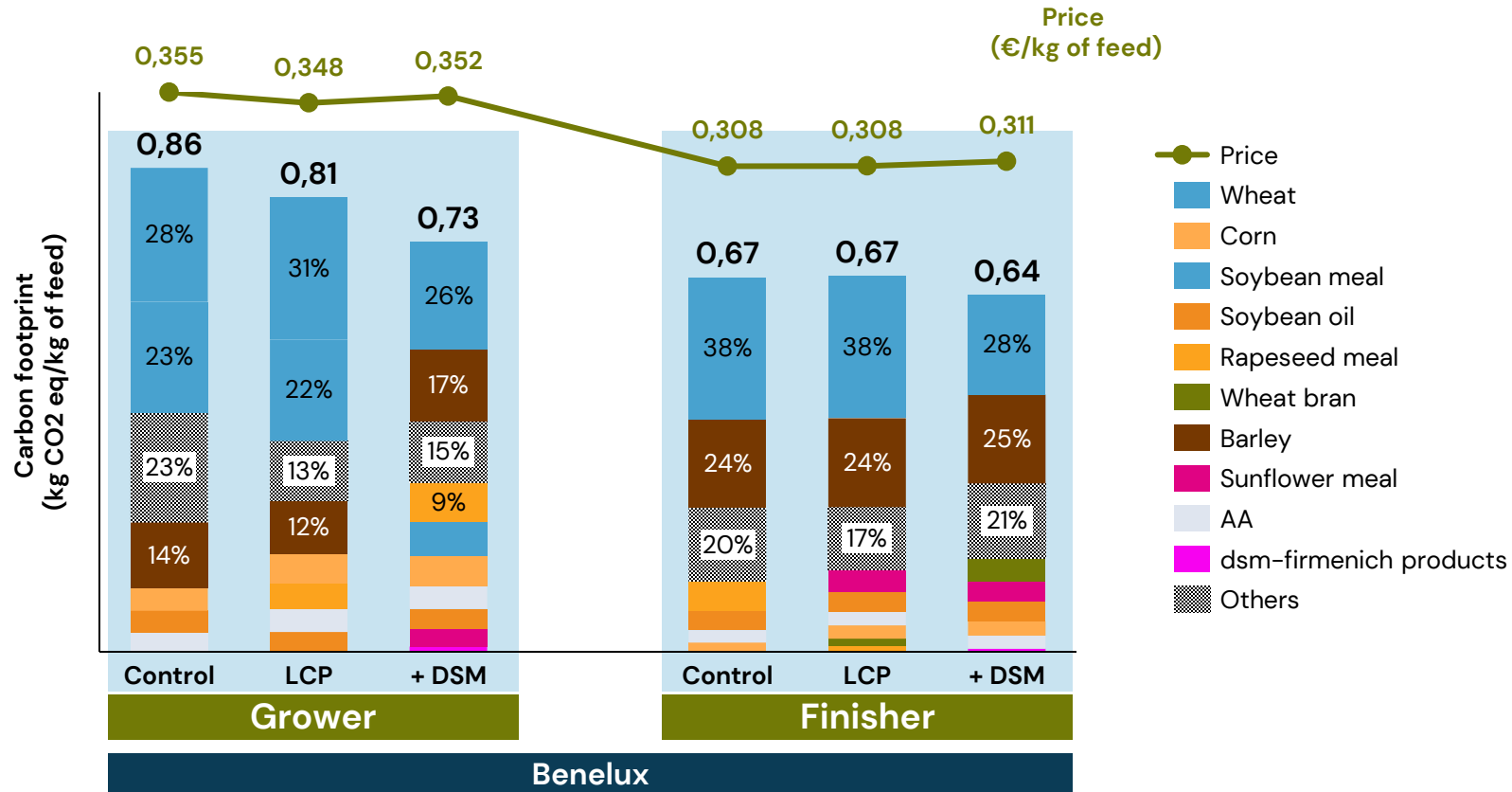
***Low crude protein (LCP):** diets reformulated to reduce CP by 1% compared to the control by including synthetic amino acids and alternative raw materials
 ****+DSM:** LCP diet with feed additives included (VevoVitall, HiPhos & WX)
 *** **Nutritional specifications** of all 3 diets were maintained identical

CASE STUDY – BENELUX

Overview of the feed carbon footprint



Grower & finisher feeds



***Low crude protein (LCP):** diets reformulated to reduce CP by 1% compared to the control by including synthetic amino acids and alternative raw materials

****+DSM:** LCP diet with feed additives included (VevoVital, HiPhos & WX)

Farm footprint



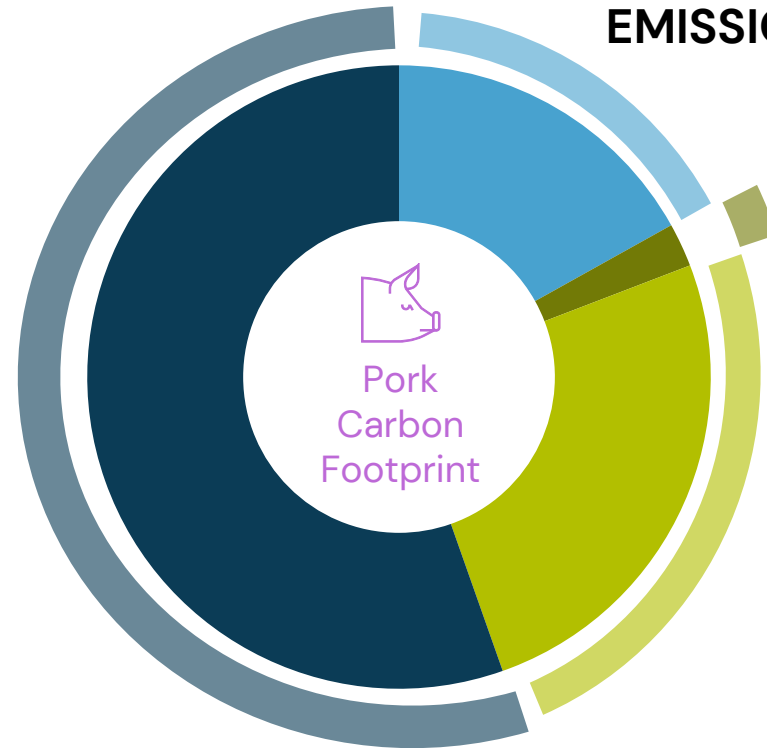
Sustainability considerations on farm

Example of a swine fattening system



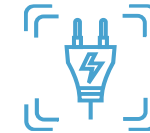
FEED & NUTRITION

- Crop cultivation
- Other raw materials production
- Transportation
- Feed mill processing
- Feed Conversion Ratio



EMISSIONS

- Manure storage and treatment
- Emissions from the barns



ENERGY

- Electricity, gas & other fuels usage on farm
- Water usage on farm



ANIMALS

- Sows gestation
- Piglets mortality
- Weaning of piglets

Assumptions

Pig performance

5% improvement in average daily gain in response to VevoVital inclusion @ 3-5 kg/MT

Pig health

-1 pts reduction in mortality in response to VevoVital inclusion @ 3-5 kg/MT

Emissions

-20% reduction in ammonia emissions & -15% reduction in nitrous oxide in response to VevoVital inclusion @ 3-5 kg/MT

Enzyme matrix

Energy, amino acids, Ca, P contribution from HiPhos & WX



Description of the farm setup: Benelux



- Non-integrated Benelux farm
- Breeding and fattening of the pigs
- Manure management on-farm: pit storage
- Airwasher on-farm



Wheat-corn diet

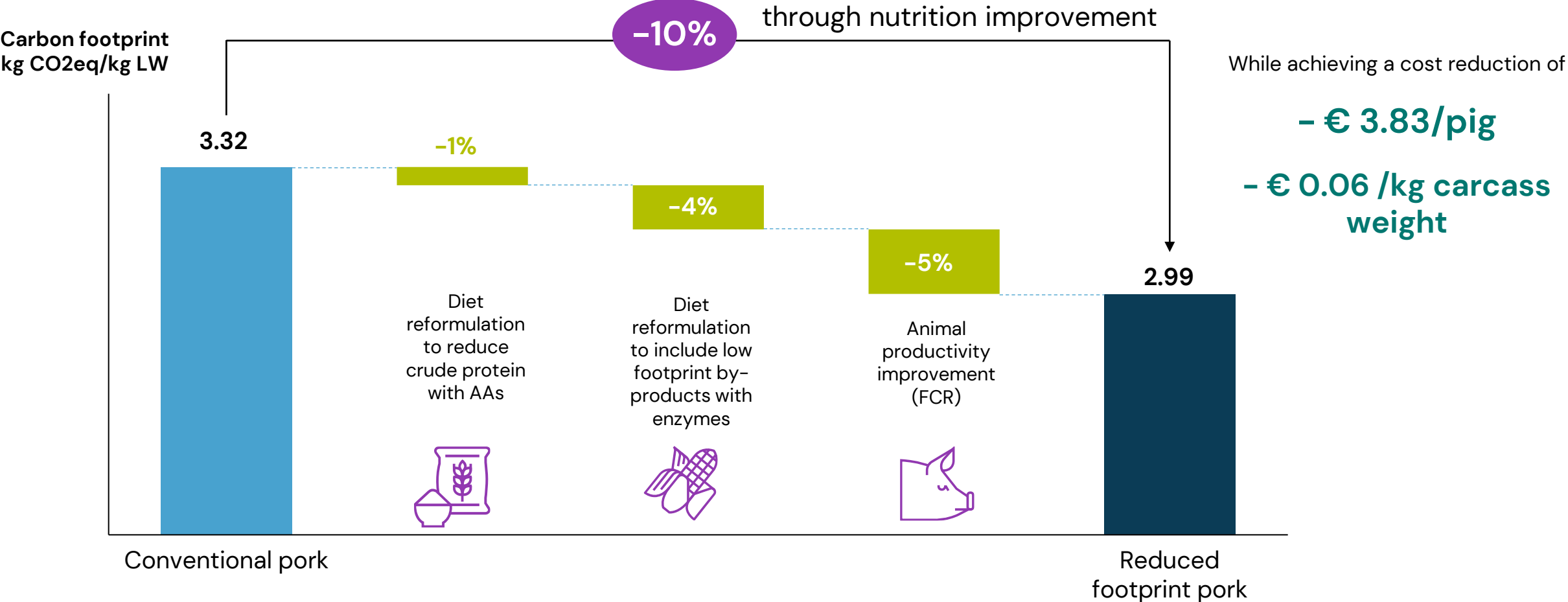
- **By-products: wheat middlings, wheat bran**
- **Grower:** 30-70 kg
Feed Intake: 97 kg/pig
- **Finisher:** 70-120 kg
Feed Intake: 146 kg/pig



- 2.5 millions fatteners per year
- 300,000 tons of animal liveweight produced
- Fattening from 30 to 120 kg
- Average mortality: 4%

Measurement combined with practical, science-based, proven solutions unlocks the value of sustainability

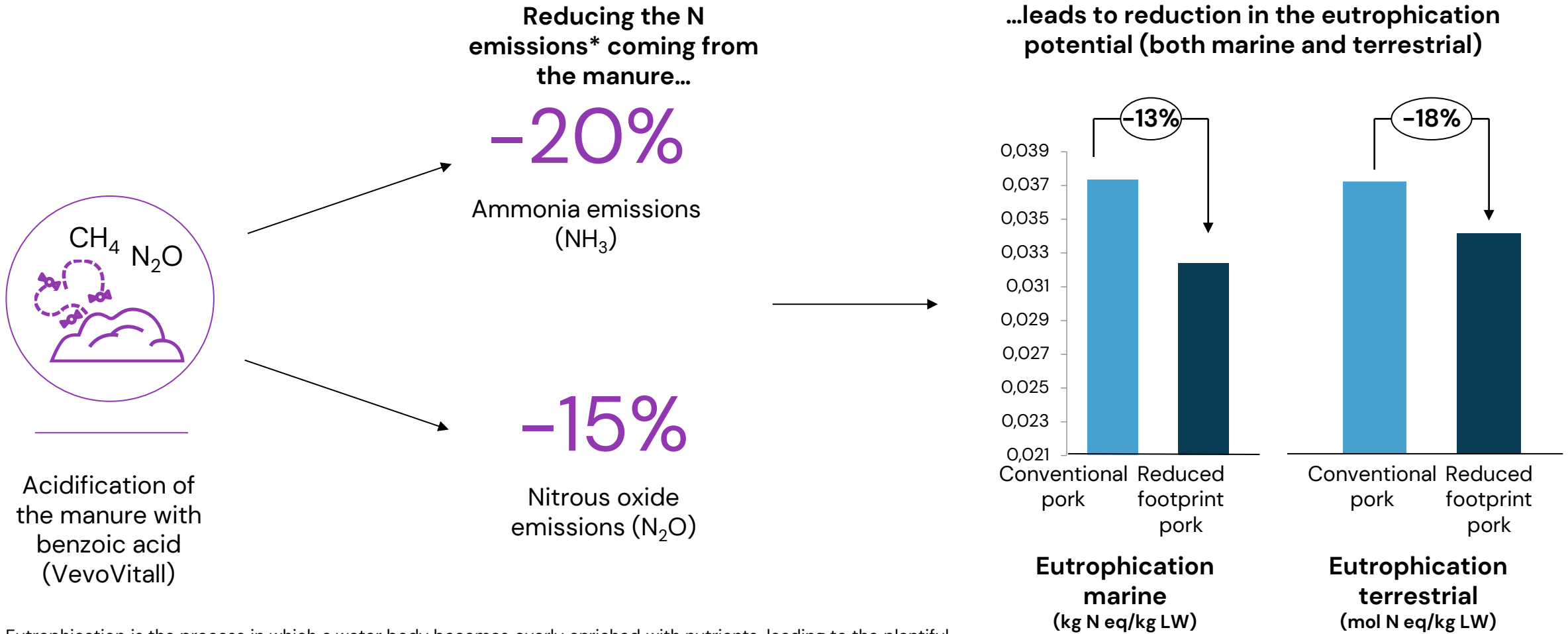
Example of decarbonization in a swine fattening system in Benelux



Based on dsm-firmenich data in 2023 for selected solutions, according to FAO LEAP Guidelines and ISO standards
Base case uses a current Spanish swine production system

Measurement combined with practical, science-based, proven solutions unlocks the value of sustainability

Example in a swine fattening system in Benelux – benefits of VevoVitall® on emissions



Eutrophication is the process in which a water body becomes overly enriched with nutrients, leading to the plentiful growth of simple plant life. The excessive growth (or bloom) of algae and plankton in a water body are indicators of this process.

*Average observed based on dsm-firmenich trials for 0.5% of benzoic acid

Conclusion

Diet reformulation

Through diet reformulation, reductions of up to -15% on carbon footprint were achieved at the feed level

Pig performance

With a combination of diet reformulation and improvement on pig performance, reductions up to -10% on the farm level were achieved

Emissions

On Marine and Terrestrial Eutrophication, which are directly linked to ammonia emissions, reduction up to -18% were achieved

Through nutritional interventions, our products contribute to make double digits reductions at the feed and farm level, supporting customers in their decarbonization journey.



Take Home Messages

- In response to global demands for sustainable pork production, the **swine industry is adapting** to address environmental concerns
- This requires a **proactive & collaborative ecosystem** to make it happen
- Sustainability does not have to be disconnected from **production & economic efficacy**
- Understand your starting point using **precise and credible calculation** of feed and farm environmental footprint – Sustell™
- Through diet reformulation, the use of nutritional solution & improvement in animal health & performance **it is possible to not only reduce environmental footprint.... But also production cost**



We bring progress to life™