

## Helping farmers. Fighting climate change.

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Dr. Petra Laux

Head Business Sustainability Syngenta Crop Protection

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The multiple roles of agricultural inputs in managing carbon footprint from production to application

- Sustainable Operations our footprint
- Mitigating climate change on farm our handprint
- What can you do? How can we work together?



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## **Sustainability in Production & Supply Operations**





Energy efficiency

γγγ

- Carbon intensity of energy (renewables)
- Waste minimization & treatment optimization
- Supplier partnerships
- Supply chain design
- · Smooth customer demand fulfilment
- Process optimization
- Logistics optimization
- ...and many more!



Syngenta Group In Syngenta, we strive to constantly improve the value we create for people, planet *and* profit, as part of our contribution to our ambition *to be the global leader in plant health innovation, helping growers to improve farm productivity and sustainability* 

Industry-leading R&D brings new products delivering sustainability breakthroughs to market, at scale

Every activity in our Operations – and that our supply chain partners do for us – has a footprint ... by measuring and understanding what contributes to that footprint, we can see and act on ways to reduce it



## **Success stories**





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## A case study Carbon intensity of energy used to make one of our fungicides at Grangemouth, UK



35% reduction achieved since 2016 due to a mixture of internal and external factors

We can see opportunities to go further, reaching a level of decarbonization aligned to our 2030 targets

![](_page_5_Picture_4.jpeg)

# Climate footprint of crop protection is lowest of all inputs and minimal relative to contribution to mitigate climate change

#### Minimal contribution of crop protection will decrease further due to lower use rates and precision application

![](_page_6_Figure_2.jpeg)

#### **Crop protection products improve agriculture's GHG balance**

![](_page_6_Figure_4.jpeg)

Crop protection helps growers use land efficiently– since 1960 agriculture tripled production on only 13% more arable land

Crop protection prevents 20-50% yield losses caused by diseases and pests

Crop protection enables climate friendly agronomic practices such as minimized tillage

Climate friendly arable farming is about land use efficiency, fertilizer emissions, and soil organic carbon

![](_page_6_Picture_9.jpeg)

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On agriculture's journey to climate-neutrality Syngenta works with growers to reduce emissions of greenhouse gases and remove carbon dioxide from the atmosphere

![](_page_7_Picture_1.jpeg)

Agriculture needs to reduce emissions AND remove more CO2 from the atmosphere.

IPCC special report on climate change and land Zomer et. al Global Sequestration Potential of Increased Organic Carbon in Cropland Soils

![](_page_7_Picture_4.jpeg)

## Climate neutral agriculture is only possible with technology breakthroughs

![](_page_8_Figure_1.jpeg)

#### Emissions in agriculture by source in Gt CO2e per year

#### **Technology explorations to inprove GHG efficiency**

- Corn varieties with improved digestibility
- Feed additives to improve enteric fermentation
- Cereals with increased nitrogen use efficiency
- Nitrification inhibitors for crop production
- Green hydrogen/ ammonia fertilizer
- Microbial nitrogen fertilizer
- Rice varieties and novel farming systems

#### We must evaluate all technology options to improve agriculture's GHG efficiency

Source: FAO

![](_page_8_Picture_13.jpeg)

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## Technology breakthroughs and regulation will create profitable farming systems that increase soil organic carbon

Global distribution of 5 Gt annual CO2 sequestration potential

![](_page_9_Figure_2.jpeg)

We need to develop localized farming systems to realize the global sequestration potential

Zomer et. al Global Sequestration Potential of Increased Organic Carbon in Cropland Soils

![](_page_9_Picture_5.jpeg)

## **REVERTE: bringing degraded pastureland back into productivity in Brazil**

	Accelerate innovation for farmers and nature	<ul> <li>Invest in soybean / com seeds for poor soils</li> <li>New financial solutions for farmers and digital assurance mechanism</li> <li>\$100m business opportunity</li> </ul>
	Strive for carbon neutral agriculture	<ul> <li>1 m ha degraded soil regenerated in 5 years (= 25% of the yearly Amazon deforestation rate)</li> <li>200.000 ha of Cerrado biome restored</li> </ul>
Reverte	Help people stay safe and healthy	<ul> <li>100% farmers with new agronomy solutions integrated</li> <li>100% farmers trained in safe use of products</li> </ul>
The Nature Conservancy	Partnering for impact	<ul> <li>The Nature Conservancy</li> <li>EMBRAPA</li> <li>ILPF – Crop Livestock Forest Integration</li> <li>ITAU financing partner</li> </ul>

![](_page_10_Picture_2.jpeg)

## Digital technologies optimize farming systems across the value chain

Digital technologies capture farming practice data...

**Example: Syngenta's Cropwise Operations product** 

![](_page_11_Figure_1.jpeg)

... And turn these into insights and recommendations Example: Syngenta's Cropwise Protector product

Digital technologies are an essential input for climate-neutral agriculture

![](_page_11_Picture_4.jpeg)

### What can academia do? How can we work together?

Research on enabling capabilities and data sets that do not have a clear business case but the potential to create commercially viable technology breakthroughs

- 1. Breeding programs and novel feed for low-methane enteric fermentation (think cattle) to directly reduce CH4 emissions
- 2. Develop **zero methane rice production** systems
- **3.** Technology to quantify at scale and with high-fidelity metrics related to climate change such as biodiversity, soil organic carbon, net GHGbalance of farming systems in various geographies, jointly publish resulting data as open access data set
- 4. Models and algorithms that industry partners can build on to help growers optimize farming systems for climate impact
- 5. Develop climate neutral alternatives to synthetic nitrogen fertilizer such as nitrogen-fixating microbes or green ammonia
- 6. Develop **cash-cover crops** to enable double cropping in the northern hemisphere.
- 7. Adapt research from other industries to agriculture such as computer vision or autonomous machines.
- 8. Communicate the possibilities of science to policy makers and NGOs as we build a climate neutral land use sector.

Technology will be a major contributor addressing climate change – we need your research!

![](_page_12_Picture_11.jpeg)

![](_page_13_Picture_0.jpeg)

## Climate Action in agriculture is about efficiency.

Let's transition to climate neutrality with collaborative research, breakthrough technology, fit for future regulations, agricultural inputs, and digital tools!

![](_page_13_Picture_3.jpeg)

Bringing plant potential to life

![](_page_14_Picture_1.jpeg)