

Delivering sustainable farming practices through agricultural engineering



The
DOUGLAS BOMFORD
SUPPORTING AGRICULTURAL ENGINEERING *Trust*

The Challenges



Agenda

- The challenge
 - Farm incomes
 - Sustainability
 - Food security
- Policy framework
- Summary

Dr Mark Moore

Director, Government Affairs



CEMA

European Agricultural Machinery Association



Dr Mark Moore

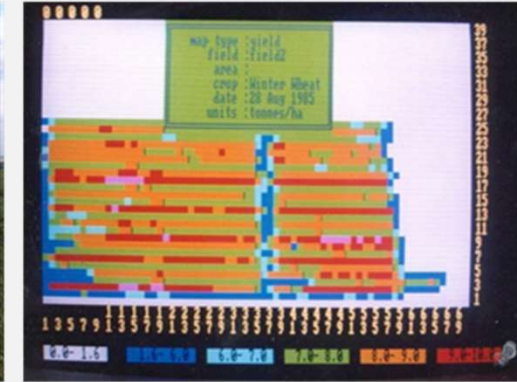
Director, Government Affairs



20+ years' experience of applying technology in Agriculture

Developed precision farming in the late 1980's/early 1990's, including participating in standards for machine communication and data transfer

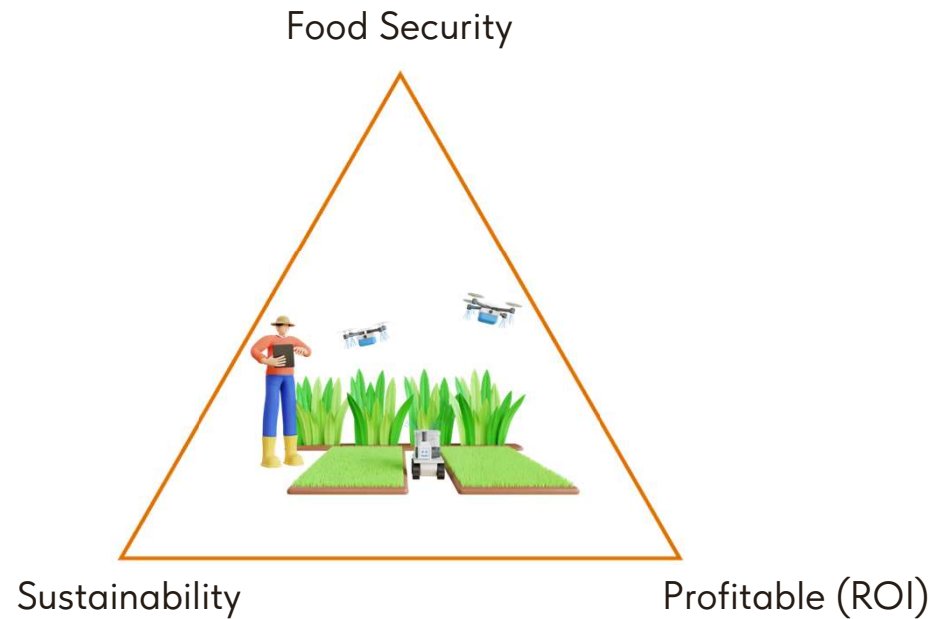
Worked with farmers and research organisations all over the world on the application of technology



The challenge

Food security vs Climate Change

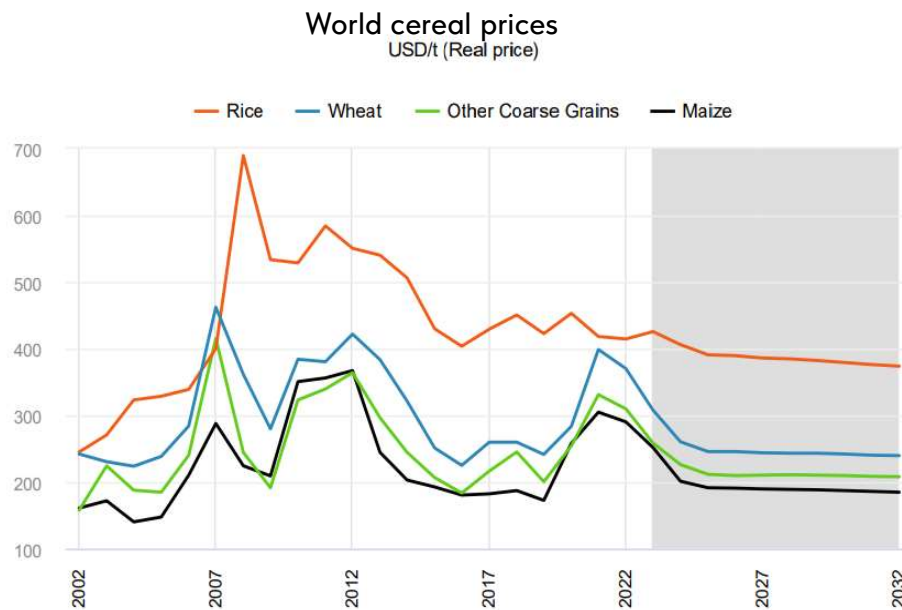
How do we produce more food in a sustainable that allows farmers (and others in the supply chain) to make a living?



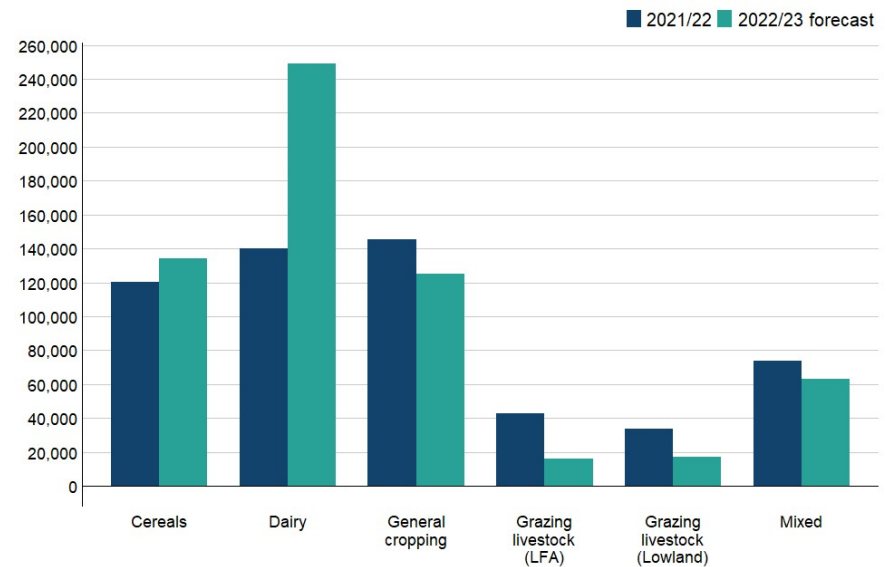
Profitability (ROI)

Price volatility will be a key factor influencing farm incomes

- Energy, grain and fertiliser markets continue to be affected by the war in Ukraine



Average Farm Business Income (£ per farm) by farm type, England 2021/22 and forecast 2022/23



<https://www.oecd-ilibrary.org/docserver/40ecc4c3-en.pdf?expires=1699261350&id=id&accname=guest&checksum=C28CB95C45ADC6857F5120CE00A44F30>
<https://www.gov.uk/government/statistics/farm-business-income/farm-business-income-in-england-202223-forecast#farm-business-income-by-farm-type>

Profitability (ROI)

Farmers are considering investing in Precision Farming technology and adoption rates are slowly increasing

- 81% of large farms (5,000+ acres) are most willing to adopt technology
- 76% of medium farms (2,000-5,000 acres)
- 36% of small farms (less than 2,000 acres)
- But:
 - The high cost of agricultural technology is a major barrier, followed by an unclear ROI

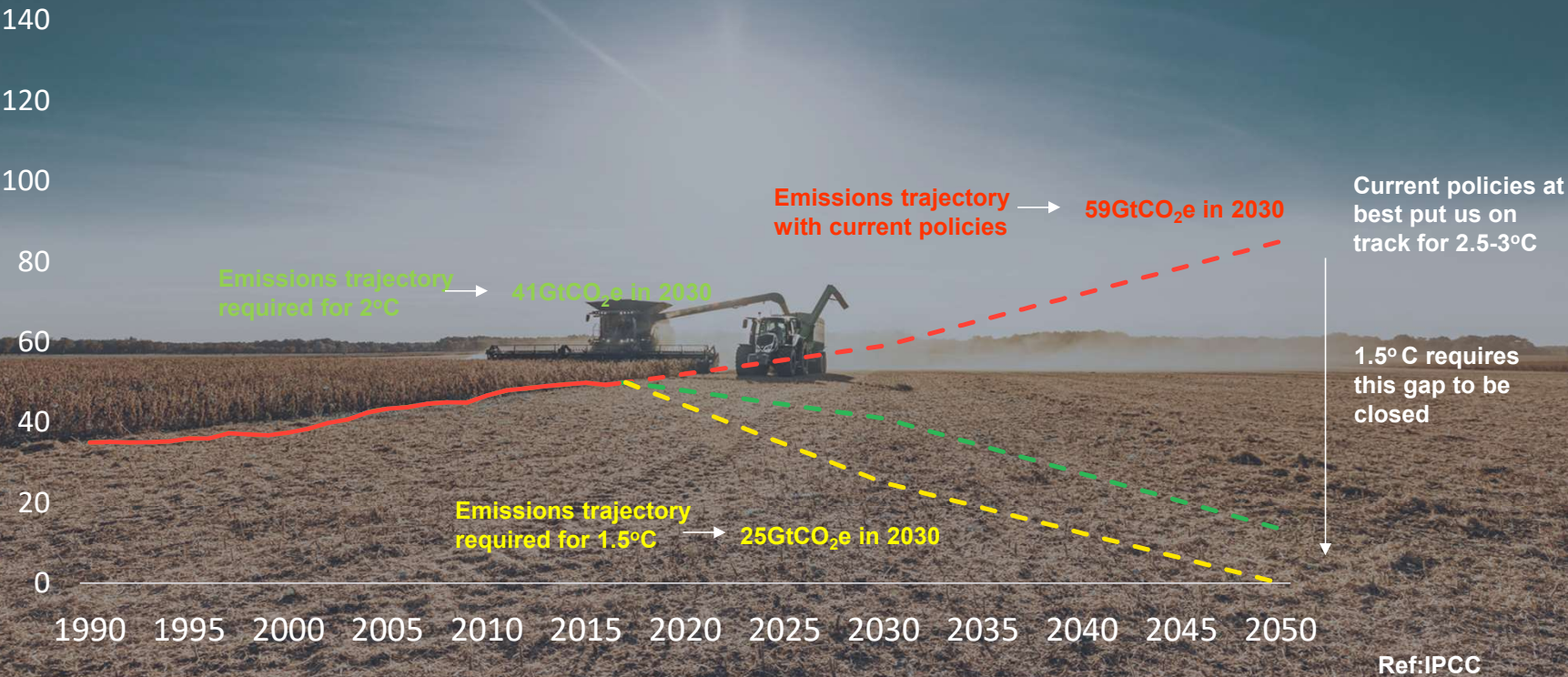


Source: Farmers Global Insights Survey, McKinsey, May 2022; McKinsey analysis

<https://www.mckinsey.com/industries/agriculture/our-insights/agtech-breaking-down-the-farmer-adoption-dilemma#/>

Sustainability

Without rapid decarbonization we are heading towards 2.5-3°C

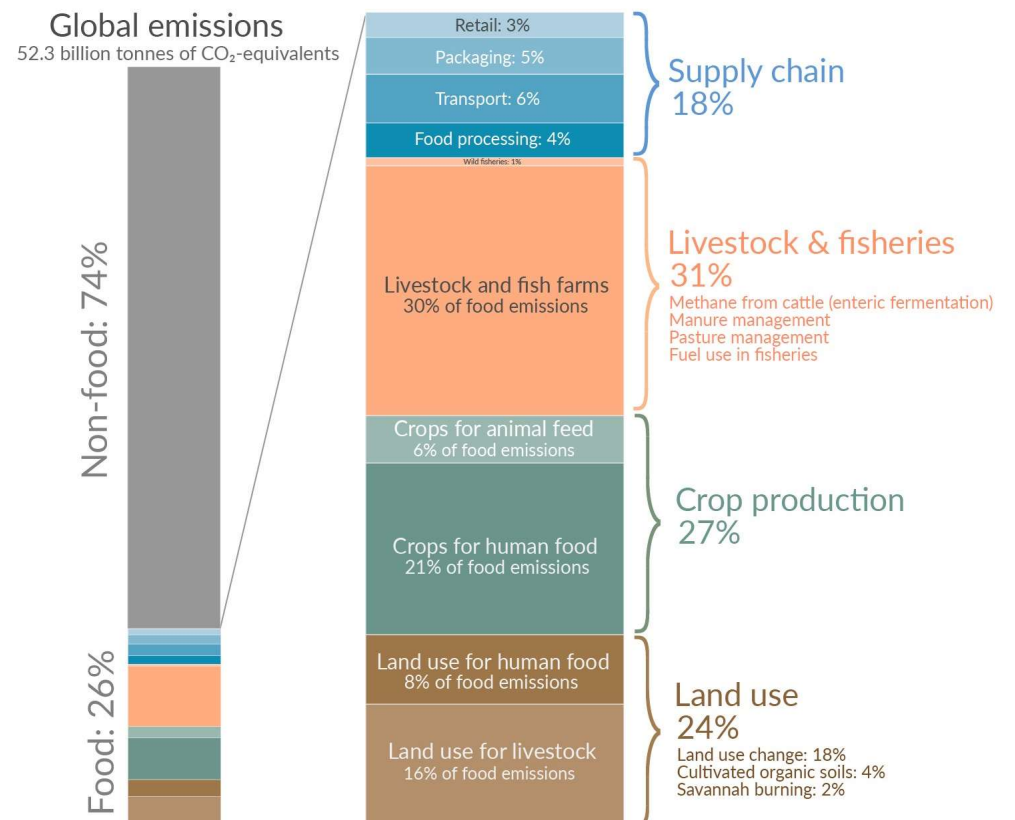


Sustainability

Global greenhouse gas emissions from food production

Agriculture emissions are bigger than you think

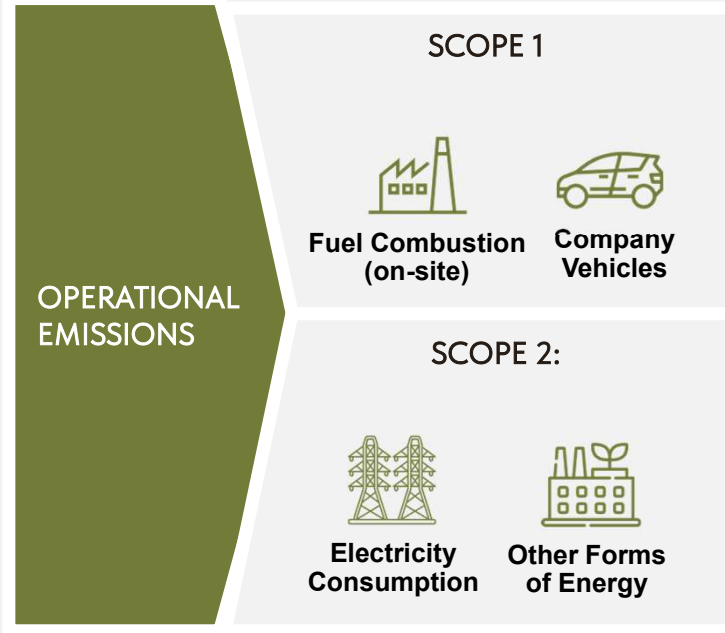
- One-quarter of the world's greenhouse gas emissions result from food and agriculture
- Agriculture and soil management account for 74% of US Nitrous Oxide emissions
 - N₂O is 300 times more harmful than CO₂
 - It also depletes the ozone layer
- Agriculture contributes to 36% of US Methane emissions
 - Methane is 80 times more harmful than CO₂



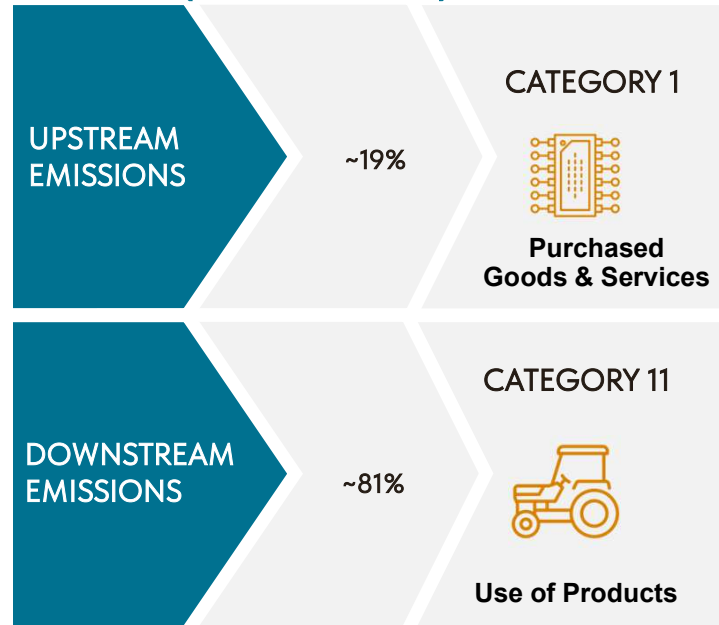
Sustainability Decarbonising Value Chains

SUB-TITLE

SCOPE 1 AND 2 (OPERATIONS)



SCOPE 3 (VALUE CHAIN)



SCOPE 4 (ON FARM)?



Sustainability

The global climate disclosure landscape is evolving

Leading reporting frameworks for Environmental, Social and Governance (ESG) ratings

- Communicating ESG performance to stakeholders
- Investment community



There is a transition from voluntary disclosure and transparency to mandatory, along with forms of carbon tax



April 2022. UK mandated Task Force Climate Related Financial Disclosures (TCFD) reporting for large companies
<https://www.fsb-tcfid.org>



On 5 January 2023, the Corporate Sustainability Reporting Directive (CSRD) entered into force
https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en



US Securities & Exchange Commission (SEC) proposes climate change disclosure rule – awaiting publishing
<https://www.sec.gov/news/press-release/2022-46>

Food security

UN population projections to 2100

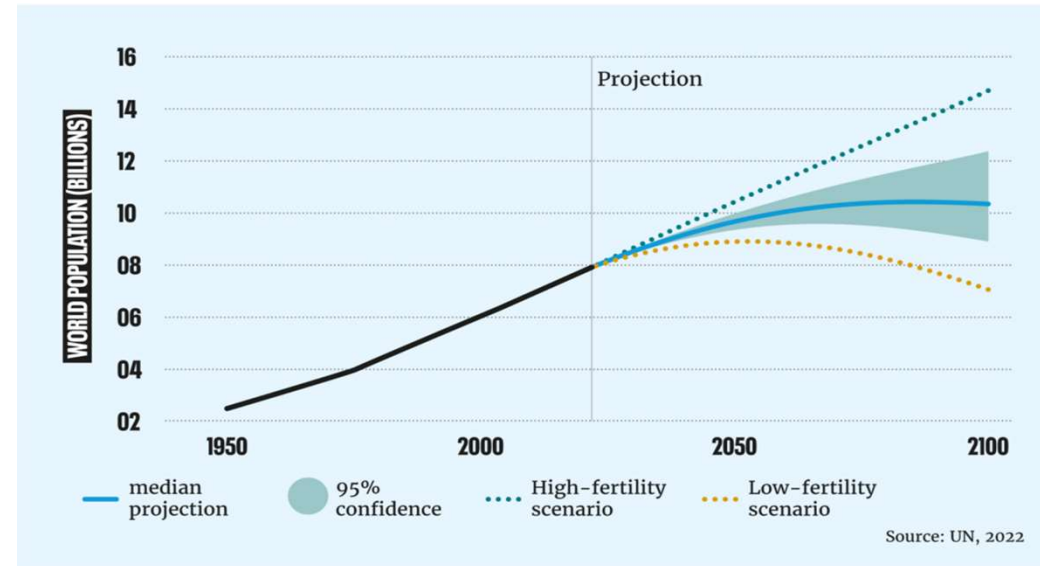
Global population is expected to reach 9b by 2050

FAO – by 2050 we will need to produce 60 per cent more food

World Vision – Hunger is worsening worldwide

World Food Programme (WFP) – 258 million people across 58 countries faced crisis or higher levels of food insecurity

- Food waste is a problem mainly in industrialized countries
 - Per capita waste by consumers is between 95 and 115 kilogrammes a year in Europe and North America
- Can the planet sustain 9b people on an animal rich diet by 2050?
 - It takes 1,500 litres of water to produce a kilogramme of cereal and 15,000 to produce one kilogramme of meat



Food security

The resilience of food production

2008 – food crisis caused by droughts and other weather-related events

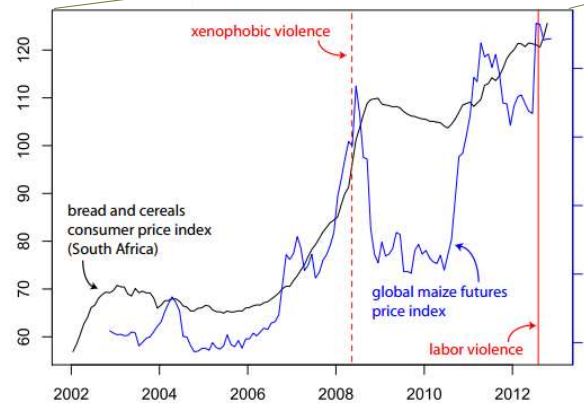
2011 – high process caused by very dry conditions in the United States and Europe, and high oil prices increasing demand for biofuels

- The World Bank warned the global economy was “one shock away” from a food price crisis
- Food prices continue to be high, especially in Africa

2021 – war in Ukraine, Covid 19, and the influence of climate change

FAO Food Price Index

The FAO Food Price Index (FFPI) is a measure of the monthly change in international prices of a basket of food commodities



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Food security

Ukraine

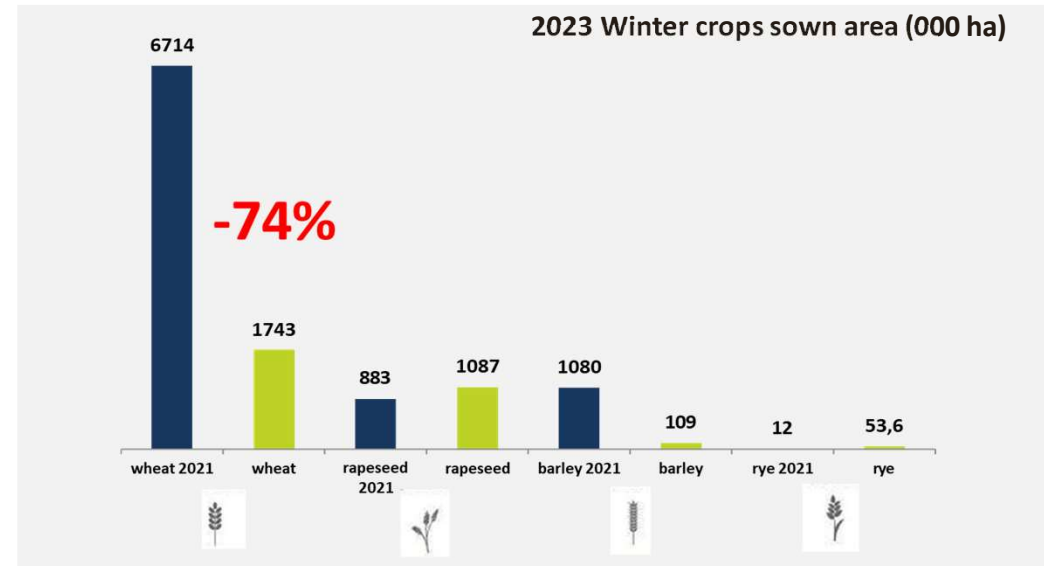
Ukraine is one of the world's top agricultural producers and exporters and plays a critical role in supplying oilseeds and grains to the global market

Russia's invasion of Ukraine has caused a significant increase in food prices on global markets

Grain prices have risen but have fallen back recently

The war has increased the risk of hunger for one-fifth of the global population – around 1.7 billion people

- Ukraine exports 19mt of wheat each year and is ranked 7th among global producers
 - Main destinations – Egypt, Indonesia, Pakistan, Nigeria, Ethiopia
 - 2024 – There is a potential shortfall of 14mt
- Ukraine is ranked 1st for Sunflower, and 6th for Maize and Rapeseed
 - These will be planted in Spring 2024



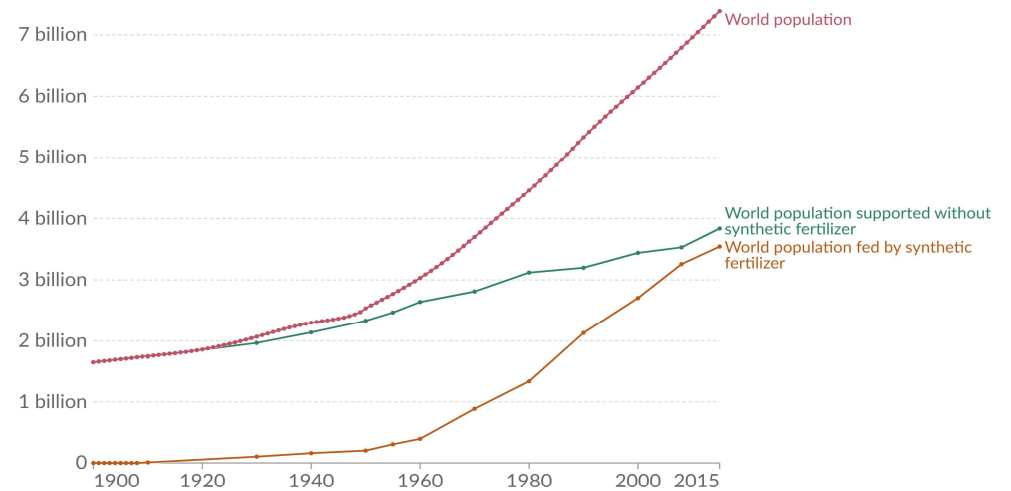
Source: Ministry of Agrarian Policy and Food of Ukraine

Food security

Fertiliser

Nitrogen fertiliser supports approximately half of the global population

How do we reduce reliance on N while maintaining food security and employing sustainable farming practices?



Data source: Erismann et al. (2008); Smil (2002); Stewart (2005)
[OurWorldInData.org/how-many-people-does-synthetic-fertilizer-feed](https://ourworldindata.org/how-many-people-does-synthetic-fertilizer-feed) | CC BY



Food security

Pesticides

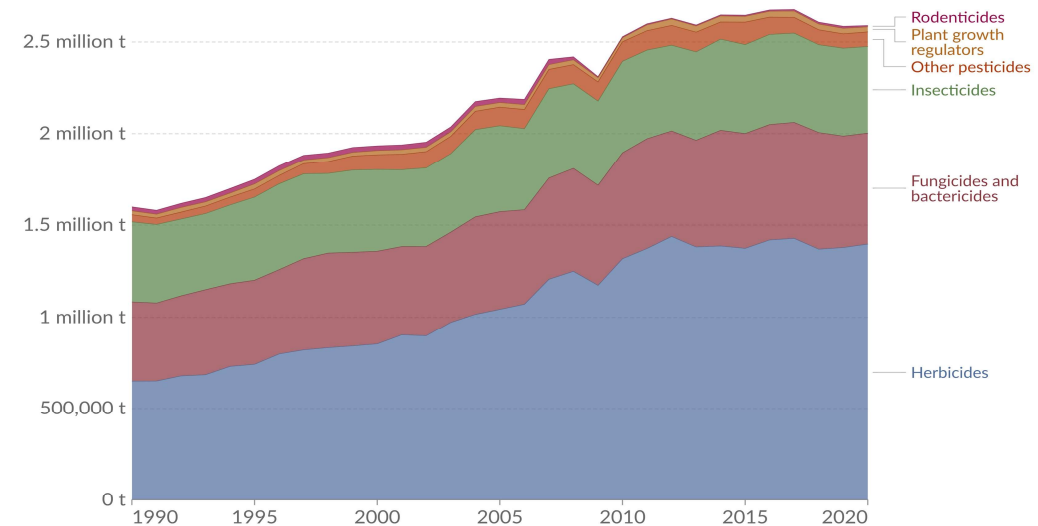
Pesticides play a critical role in reducing diseases and increasing crop yields worldwide

35 % of potential the global crop yield is lost to pre-harvest pests

- 78% loss of fruit
- 54% loss of vegetable
- 32% loss of cereals

However:

- 75% of insects in Germany have declined in the last 30 years
- ~ 40% of all flying insect species world-wide are threatened with extinction
- 80% of soils in the EU are already polluted with pesticides, which could affect their fertility and productivity



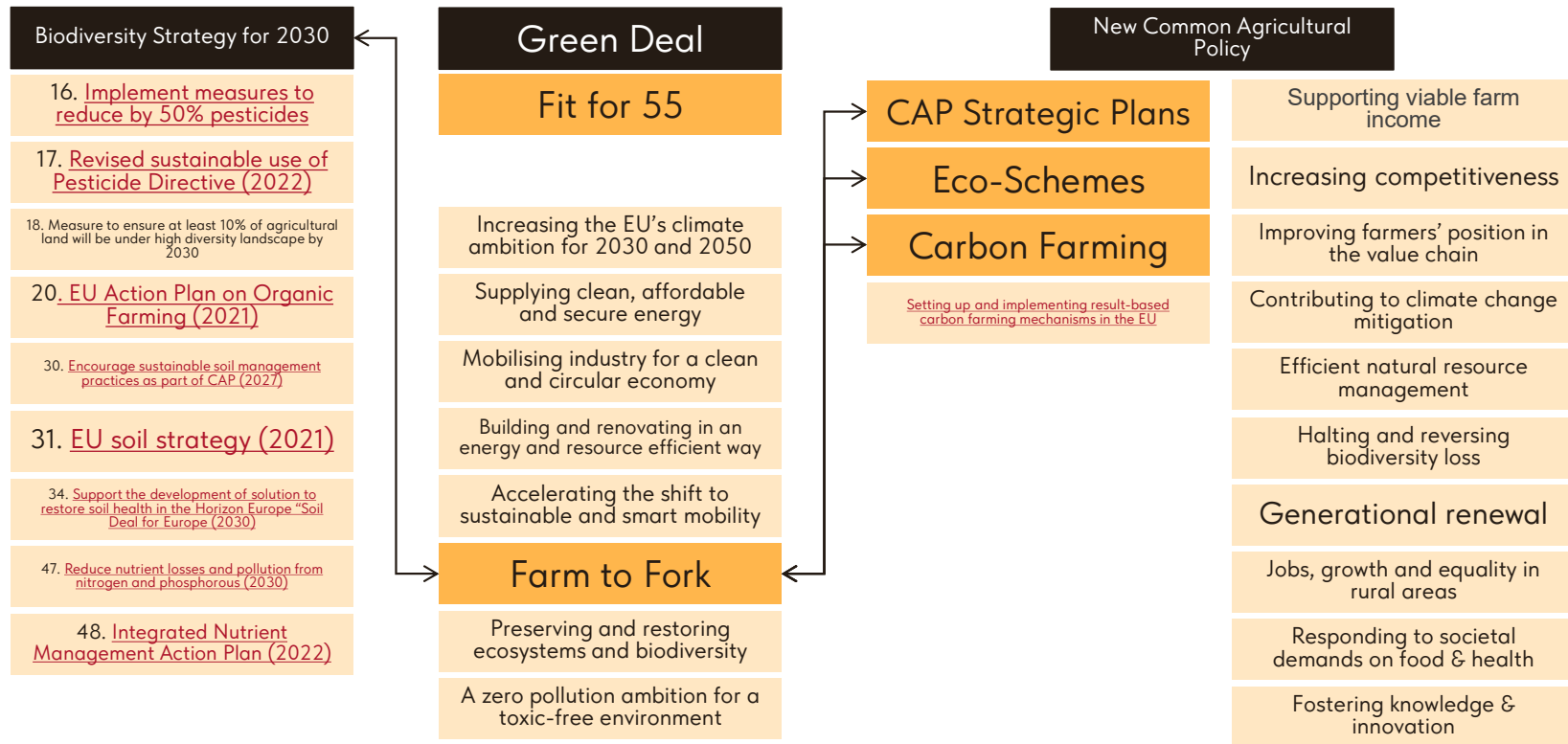
Data source: Food and Agriculture Organization of the United Nations

OurWorldInData.org/pesticides | CC BY



Policy

EU Agricultural Policy



Policy

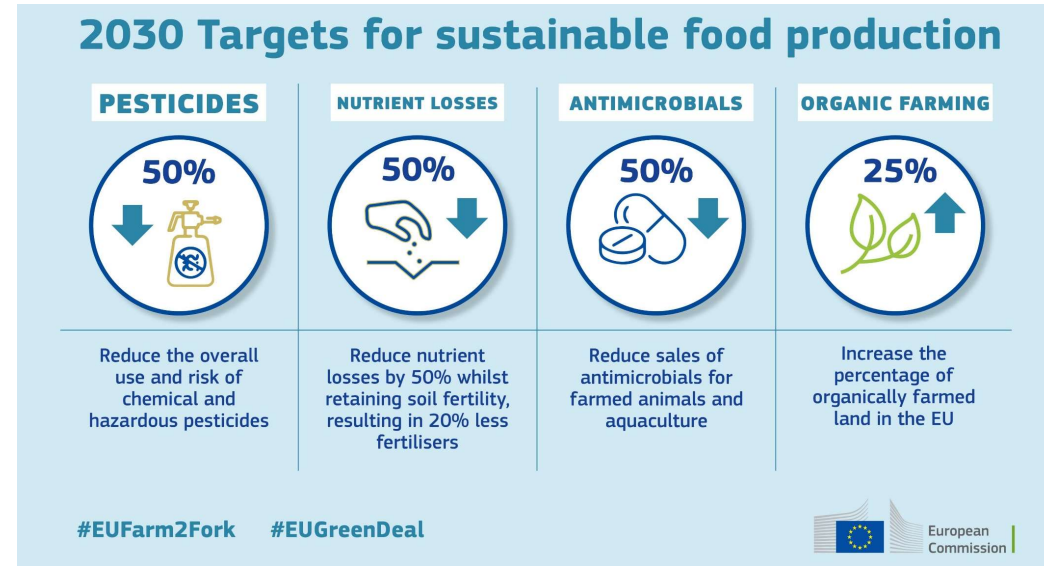
Farm to Fork (F2F)

F2F is a core component of the EU Green Deal, which aims to make Europe climate neutral by 2050

F2F outlines 2030 targets to reduce pesticide and nitrogen fertiliser use, reduce nutrient loss, reduce the use of antimicrobials, and increase organic farming

The Farm to Fork Strategy aims to accelerate the EU to a sustainable food system which will:

- Have a neutral or positive environmental impact
- Mitigate climate change and adapt to its impacts
- Reverse the loss of biodiversity
- Ensure food security, nutrition and public health, making sure that everyone has access to sufficient, safe, nutritious, sustainable food
- Not leave anyone behind – preserve affordability of food while generating fairer economic returns, fostering competitiveness of the EU supply sector and promoting fair trade



What is the status of EU policy?

The discussion between food security and climate protection is on-going

- Concerns over food prices and security of supply are causing policy-makers in Europe to rethink their climate policies, fearing a popular backlash
- Consequently, the European People's Party in the Parliament (EPP) and European farmers union (COPA-COGECA), have expressed concerns regarding the ambitions of the Green Deal and F2F
- Given this and the on-going war in Ukraine, the European Commission President Ursula von der Leyen seems to be scaling back the EU's sustainability ambition
- In the president's State of the Union September 2023 speech, an "olive branch" has been offered to promote inclusion and dialogue on the future of F2F
- The European Commission is sacrificing some ambitious sustainability elements in the Farm to Fork strategy to further competitiveness
- However, the medium-term outlook does not seem to have shifted and a full reversal of the climate commitments is not to be expected

The expectation from policy makers is agricultural technology will enable sustainable food production while ensuring food security

- The EU Commission recognises the aims of the European Green Deal and the F2F strategy cannot be achieved without smart technologies and digital transformation
- The offer of dialogue by the EU Commission to overcome the challenges provides opportunities to position DBT as a key supporter of agricultural engineering, mechanisation and technology

Good news !

Horizon Europe R&D

€95 billion research program

UK researches can now fully participate in the program



The challenge – summary



CEMA

European Agricultural Machinery Association

Standards smart technologies	Standards strategy for the safety of agricultural robots - Use cases	Cybersecurity framework	Machinery Regulation interpretation of new text	Full revision 167/2013: mandatory EU TA R&S / exceptional vehicles	Artificial Intelligence
Lighting installation: CEMA amendment at UNECE	Assessment of Euro 7 and Tier 5	New liability rules	OECD: CO2 / autonomous functions	Post-Brexit regulatory evolutions	Pesticides digital label compliance
PFAS – Precision Farming Application Systems	REACH - The Regulation on the registration, evaluation, authorisation and restriction of chemicals	Amendment to 167/2013: Tech req	Alternative fuels	Amendment to 167/2013: French items	AEF relationship
3rd batch of Am and revision 167/2013	UNECE SLR Simplification of the Lighting and Light Signalling Regulations	Machinery and carbon farming	Machinery Regulation Guidelines	Roadworthiness	...
Outdoor noise directive for woodchippers	Mobile machinery road circulation	agricultural data space	Data sharing Code of conduct - data act	SUR - Regulation on the Sustainable Use of Plant Protection Products	...

The challenge – summary

It is a very complex challenge to solve

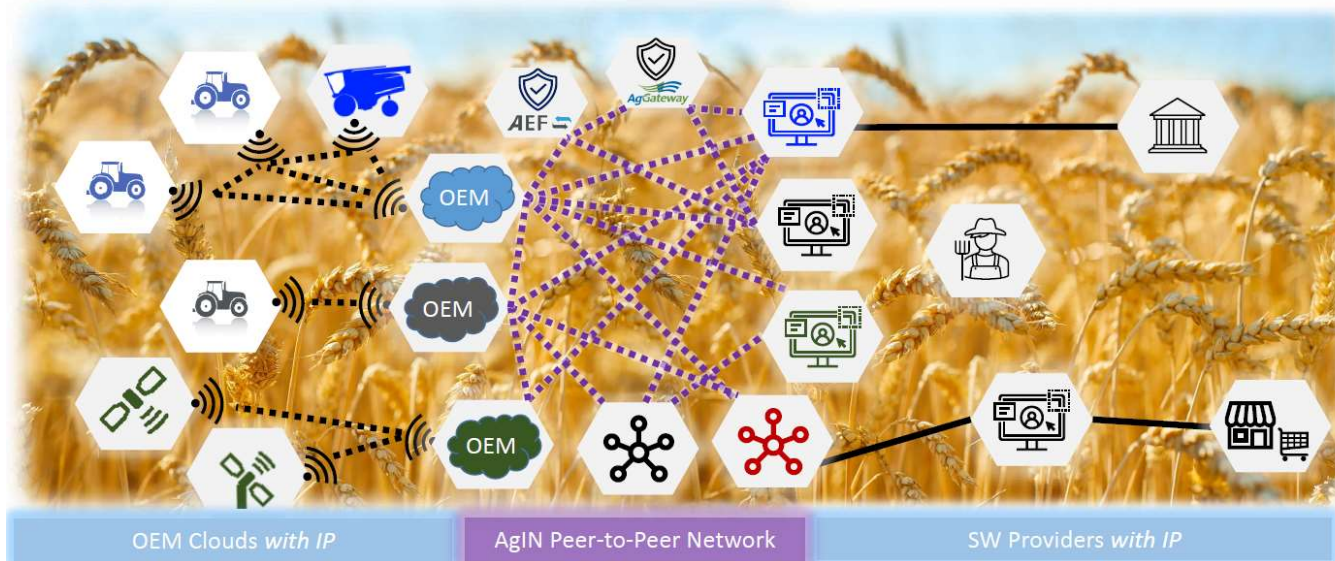
No one organisation will solve this. Collaboration across sectors will be critical.

Example – encourage projects to collaborate and not recreate another solution

AEF Agricultural Interoperability Network (AgIN)



AgIN Scope



The challenge – summary

It is a very complex challenge to solve

Industry and the supply chain is tasked with delivering the tools to enable farmers to implement policy

