

Agriculture - Mixed farming

CLIMATE & EFFICIENCY INVESTMENTS



Decarbonising agriculture: A strategic imperative

Agriculture is vital for global food security but also responsible for **about one third of all human induced greenhouse gas (GHG) emissions**. Nearly half of these come directly from **farm gate activities**, especially livestock (the largest source of methane), fertilised soils (nitrous oxide), and land use change (carbon emissions).

Key emissions drivers

Scope 1 – Direct emissions

Generated on the farm through:

- Fuel use in tractors, harvesters, irrigation pumps, grain dryers, greenhouses, and livestock barns
- Enteric fermentation in ruminants (methane)
- Manure management (methane and nitrous oxide)
- Fertiliser application and soil management (nitrous oxide)

Scope 2 – Indirect emissions

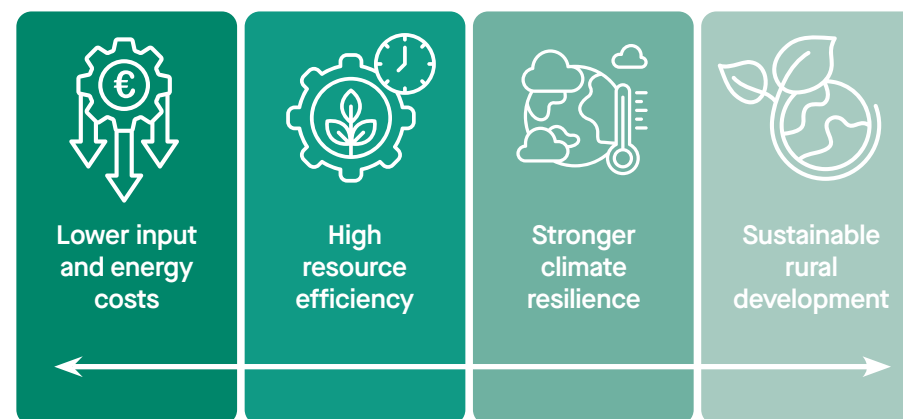
Result from purchased electricity powering:

- Irrigation and water pumping
- Grain drying and cold storage
- Ventilation/heating in livestock facilities
- On farm processing operations

These systems are essential for productivity but significantly increase energy related emissions.

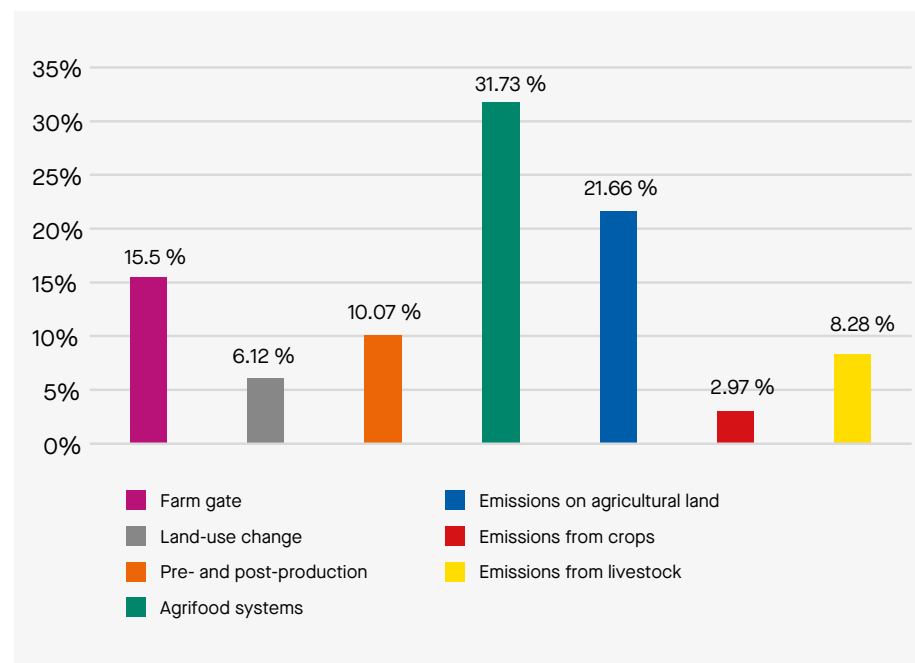
Why it matters

Decarbonising agriculture is critical for meeting climate goals and ensuring long term food security. Emissions reductions lead to:



Agrifood systems account for roughly one third of global emissions, with agricultural land contributing around 20% and farm gate activities another 14%. In the EU, agriculture represents 10.3% of total emissions, nearly 70% of which come from animal farming. Agriculture is responsible for 45% of global methane and 80% of nitrous oxide emissions, underscoring its central role in climate change. Additionally, one third of all food produced is lost or wasted, creating preventable emissions across storage, transport, and consumption. Reducing waste, improving efficiency, and adopting sustainable practices are critical to limit future agricultural emissions and support long term climate and food security goals.

Key CO₂ equivalent Emission Drivers - Agriculture



Investments in integrated crop livestock models offer:

- Closed nutrient loops that cut fertiliser expenses
- Diversified revenue streams
- Improved soil fertility and lower emissions

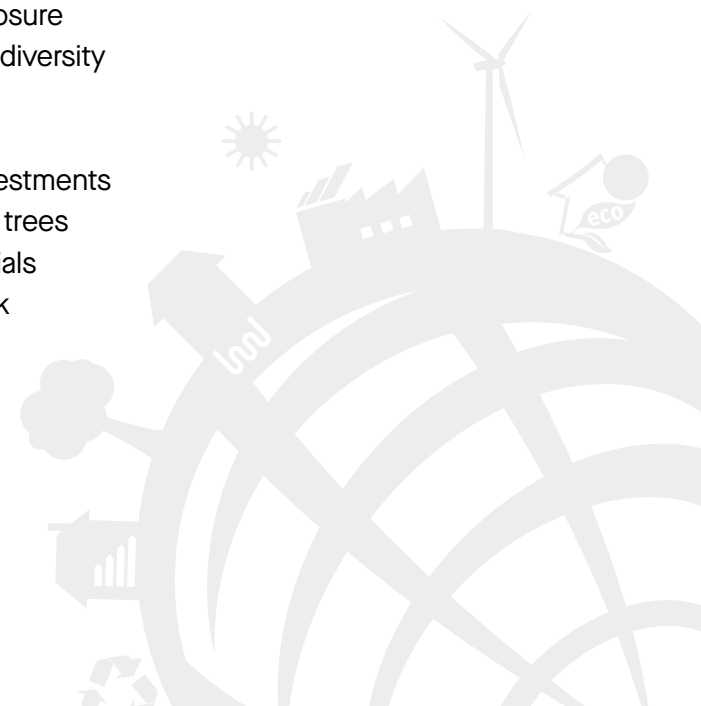
As a result, a resilient, balanced system with stronger financial stability and higher crop performance can be achieved.

Climate resilience with nature-based solutions can help farms adapt to stabilise yields over time, save on resources, and build long-term resilience.

What are the cost-saving benefits?

- Decreased need for chemicals and fertilisers
- Improved nutrient and water intake
- Reduced climate-risk exposure
- Higher soil fertility and biodiversity
- Natural pest control

Some examples of investments include the integration of trees and other woody perennials into crops and livestock production (agroforestry), cover crops, intercropping, crop rotation, certified and climate-resilient seeds, and natural windbreaks.



Digital solutions and smart farming can improve farm performance and directly reduce the harmful effects on the environment.

What are the cost-saving benefits?

- Lower chemical and fertiliser costs
- More efficient field operations
- Accurate water need detection and early disease identification
- Better resource planning on the basis of reliable weather and field data

Some examples of investments include GPS guidance systems, drones or robots for monitoring, spraying and mapping, decision support tools (AI-based analysis), sensors and satellite-based monitoring (remote sensing).

Nature-based climate protection can help safeguard farms against weather extremes and is highly relevant for climate resilience and adaptation.

What are the cost-saving benefits?

- Protection from hail, frost, heat and wind
- Reduced crop losses during extreme events that could potentially save up to 90% yield losses

Some examples of investments include protection netting, windbreaks and shelterbelts, fog catchers, and frost protection measures.

To obtain additional information about these investments, contact the bank. Our advisers will help you find the best solution for your business.

Mixed farming



Mixed farming systems combine crop and livestock production, creating both complex emissions profiles and strong opportunities for integrated mitigation. By linking crop residues, manure, feed production, and soil management within one farm system, mixed farms can close nutrient loops, reduce reliance on synthetic fertilisers, and improve soil fertility. At the same time, they offer diversified income streams and greater resilience to market and climate risks.



Decarbonisation Roadmap

Mixed farming (animal and crop production)				
Investment measure	GHG reduction potential	Cost savings (%)	Pay-back period (years)	Benefits
No-tillage seeders		68%	10 - 11	No-tillage seeders consume less fuel and result in savings on machinery; they also require less input consumption if coupled with cover crops. The resulting increased soil health leads to better yields, usually after five years.
Battery electric vehicles (BEVs)		55%	5 - 6	Owning an electric car can save up to 50% to 60% on combined fuel and maintenance costs compared to a similar size petrol or diesel car. With far fewer moving components and minimal fluid change, electric cars minimise upkeep and running costs. This provides an energy-efficient, cost-effective, and environmentally friendly transport solution.
Self-propelled spraying machines		54%	Over 10	By optimising input use and reducing environmental exposure to agrochemicals, self-propelled sprayers support more sustainable farming practices, improve soil and water health, and contribute to long-term agricultural resilience.
Drip irrigation line		51%	Over 10	Drip irrigation lines deliver lower input costs and resilience against droughts. They save up to 60% water, improve yields by 20-50%, and boost precision and flexibility in watering.
Electric forklifts		50%	2 - 3	Electric forklifts offer multiple advantages over diesel models. They can cut energy or fuel costs by 50-70% and lower maintenance expenses thanks to fewer moving parts and reduced breakdowns. Instant torque delivery offers consistent performance with no power fade. Zero tailpipe emissions improve indoor air quality, protecting worker health and animal welfare. Daily charging from rooftop solar PV can further cut energy costs.
Commercial refrigerating appliances		50%	3 - 4	Energy efficient commercial refrigeration reduces electricity use by 30-50% compared to standard display and storage refrigerators, through high efficiency compressors and heat exchangers, LED lighting, and precise temperature control. These systems are designed for frequent door openings, with smart control systems enabling rapid temperature recovery to preserve freshness and extend product shelf life. Pairing these units with renewable energy sources can further enhance energy cost savings.
PV project finance		44%	9 - 10	By installing ground-mounted solar PV systems, farms can cut on-site energy costs and earn revenue by selling excess electricity. Potential advantages include a 60% boost in land-use efficiency through simultaneous energy production and agricultural use. The PV construction also protects against climate risks such as hail, wind, and heavy rain. Pairing the systems with battery storage unlocks additional income streams and stabilises the energy output.

Decarbonisation Roadmap

Investment measure	GHG reduction potential	Cost savings (%)	Payback period (years)	Benefits
Air-to-water heat pumps	●	44%	5 - 6	Air-to-water heat pumps provide heating, cooling and hot water year-round with low maintenance. These systems cut energy use by 40-50% compared to central district heating, individual oil/gas boilers, and separate AC cooling and water heating systems, reducing overall energy costs and carbon emissions.
Soil cultivators	●	30%	10 - 11	By disrupting surface compaction and incorporating organic residues, cultivators improve soil structure, water infiltration, and microbial activity, leading to increased nutrient availability and root development. Their precision depth control minimizes erosion and preserves subsoil integrity, supporting sustainable land management practices.
Biogas plant	●	27%	Over 10	With on-farm biogas plants, farmers convert crop residues, manure and other organic waste into biogas or bio methane, which is used to generate electricity, supply heat, or be compressed as biofuel. This process contributes to significant revenue by utilising waste for energy production and sales. The integration opportunities with greenhouse heating, livestock housing or community energy networks enhance utilisation and income streams.
Sprinklers	●	21%		Sprinklers reduce input costs and increase resilience against droughts.
Fuel-efficient tractors	●	20%	Over 10	Energy efficient tractors bring multiple benefits for farmers, with lower fuel consumption cutting operating costs and reducing carbon emissions. Modern, efficient tractors have advanced technologies that optimise performance, require less maintenance and repairs, and reduce breakdowns and downtime, resulting in higher productivity. Incorporating digital and precision technologies can further save resources and enhance efficiency.
Roller crimpers	●	20%	8 - 9	Roller crimpers reduce input costs, labour, and fuel consumption while enabling no-till planting systems. Environmentally, they minimise chemical runoff, preserve biodiversity, and improve the resilience of agroecosystems to climate variability. In addition, they enhance soil structure, reduce erosion, and promote microbial activity, contributing to long-term soil fertility and carbon sequestration.
Subsoilers	●	20%	Over 10	By improving soil porosity and reducing bulk density, subsoilers facilitate better nutrient uptake and moisture retention, leading to increased crop yields and reduced irrigation demand. Their use minimises surface runoff and erosion, contributing to improved soil conservation and long-term land productivity. Subsoiling also supports carbon sequestration by promoting deeper root systems and organic matter incorporation.

Decarbonisation Roadmap

Investment measure	GHG reduction potential	Cost savings (%)	Payback period (years)	Benefits
Cooling and freezing chambers	●	20%	4 - 5	Efficient bulk storage refrigeration cuts energy costs by up to 20% and extends the preservation of goods through improved insulation, better sealed doors and openings, and advanced compressors and heat exchangers. Smart control systems with optimised defrosting help prevent food spoilage, while leak prevention monitoring reduces maintenance costs. Heat recovery systems can capture waste heat and repurpose it for space heating. Pairing efficient units with renewable energy sources can further enhance total energy cost savings.
Ventilation system	●	20%	Over 10	High-efficiency fans with variable frequency drives (VFDs) and controls optimised for humidity, temperature, and air circulation can improve crop quality, animal health, and productivity by reducing heat stress and respiratory illness. Additionally, ventilation energy use can be reduced by 20-80%.
PV self-consumption	●	20%	10 - 11	PV self-consumption systems enable direct use of solar energy for on-site operations, reducing reliance on grid electricity and exposure to price volatility. Optional battery storage allows for energy shifting, making solar power available during evening hours when tariffs are typically higher. Electricity can be used for irrigation pumps, cooling/freezing chambers, processing equipment, packaging lines, and lighting.
Building insulation materials	●	15%	8 - 9	Energy-efficient insulation materials reduce heating and cooling costs, maintain the indoor temperature, improve livestock productivity, reduce spoilage of stored grain and feed, and extend machinery life.
Reduced soil tillage systems	●	5%	Over 10	Reduced soil tillage systems result in less mechanical disturbance, which preserves soil structure, increases organic matter, conserves water, lowers GHG emissions, and enhances biological activity.
LED lighting	●	2%	5 - 6	LEDs consume up to 80% less energy than incandescent bulbs, reducing greenhouse gas emissions and lowering electricity demand. Their long lifespan – often exceeding 25,000 hours – means fewer replacements and less waste in landfills.

