Farming practices and the green transition
RaboResearch Food & Agribusiness

A global network...

One of the largest F&A research hubs in the world and the world’s leading F&A financial services provider

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F&A coverage from farm to fork, across rural and wholesale sectors

Broad knowledge of innovation, strategic development and risk-reward balances along the value chain

Vast global network with access to all players in the market

Global team of experts with real-time insights into local markets

of local experts
Today's context
Agri commodity prices are falling but are still elevated

Source: Macrobond Agri Commodity Markets Research September 2023: Falling in the Fall, Rabobank Research 2023
Note 1. Spain farmer income not available before 2017
Farm input costs as key factor of farmers' incomes

Global fertilizer affordability index dropped, but remains positive

Source: Rabobank Research 2023
Note 1. The affordability index is the relative price of a basket of commodities in comparison to the price of a basket of fertilisers. When it drops below zero, fertilisers are not so affordable anymore for farmers
Farm & crop margins are decreasing from recent years’ peaks, but still above average.

Source: Rabobank, 2023
Farming practice in transition
EU regulations, investor, retailers and society put pressure on the food-value chain and farmers.

**Binding** and **sector-specific** measures and obligations.

**Voluntary schemes** open to all companies for the decarbonization of the supply chain.

**Increasing climate sensibility** in consumption choices.

**Reduce emissions** to meet the target by the **Paris Agreement**.

\[ \text{Note: Paris Agreement says below 2 degrees, and preferably below 1.5 degrees C.} \]
Farming practices supporting the green transition

On-farm GHG mitigation measures today and the next decade

Mitigation potential per category (relative reduction potential per category)

- Low carbon farm inputs
- Fertilizer inhibitors
- Variable application
- Direct seeding
- Ag machinery efficiency improvements
- Increased organic matter & soil health practices
- New seed varieties

Biofuels (B100)
Biofuels (B20)
Landscape elements

Net zero technologies (fuel cell, hydrogen)
Fertilizer production (CO2)
Field-based (CO2, N2O)
Fuel-based (CO2)
Directly linked to ag machinery

Short-term (<5 years)  Mid-term (5-10 years)  Long-term (>10 years)

Direct seeding
Reduced tillage
Biofuels
Landscape elements

Note: The y-axis shows the different levers relative to their impact on total farm-related emissions, including upstream fertilizer emissions to farm level and on-farm fuel use. Relative emissions reduction potential (in black) are compared to their replacement/status quo and not the total farm-related emissions. E.g. Biofuels are compared to 100% mineral oil. Fuel efficiency improvements vary by engine size, local fuel efficiency regulation for ag machinery, etc. Low nitrogen fertilizer is compared to natural gas based ammonia. Biofuels refers to all types of creased biodiesel, biomass, recycled hydrogenated vegetable oils, and FAME.
The green transition brings extra risks and costs for farmers. Cost- and risk-sharing among the value chain is needed.

But also…

Other economic sectors

Governments / Public Entities

Banks

Multinational corporations
Is regenerative agriculture a promising green transition pathway?
Holistic concept with simple principles, where sustainable conservation is key

Main regenerative agriculture practices

Source: EIT Food 2020, company websites, Rabobank 2023
Regenerative agriculture is compatible with other sustainability concepts and the EU Green Deal goals.
Supply chain commits to regen ag, offering premiums to farmers

Sample of regenerative certifications
Technology is key

Technologies that enable more sustainable practices:

<table>
<thead>
<tr>
<th>Hardware + Software</th>
<th>Hardware + Software</th>
<th>Biological Inputs</th>
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</thead>
<tbody>
<tr>
<td>Precision agriculture</td>
<td>Software + hardware for precision irrigation</td>
<td>Farm-level decision support tool</td>
</tr>
<tr>
<td>remote sensing + software</td>
<td></td>
<td>Alternative weed management hardware + software:</td>
</tr>
<tr>
<td>Software + hardware for precision irrigation</td>
<td></td>
<td>Unmanned vehicles (drones) + detection software</td>
</tr>
<tr>
<td>Breeding technologies</td>
<td></td>
<td>Breeding technologies</td>
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</tbody>
</table>

Technologies that enable measuring outcomes:

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<thead>
<tr>
<th>Hardware + Software</th>
<th>Data management services</th>
<th>Software + sensor hardware</th>
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<tbody>
<tr>
<td>Software + hyperspectral remote sensing hardware</td>
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Thanks for your attention!

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