



NEW ZEALAND
FOREIGN AFFAIRS & TRADE
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Innovations in Dutch AgriTech

MARKET INTELLIGENCE REPORT

Summary

- The Netherlands is one of the largest exporters of agricultural products in the world, second only to the United States, and comprising a traditionally large dairy and horticulture sector. Recently the Dutch agricultural sector has been forced to adapt practices, driven by excessive nitrogen emissions in the country as well as rising prices for energy, logistics, and raw materials. In addition to plans to reduce livestock numbers and the volume of agricultural production, the sector has turned to technological innovations to bring down emissions and become more sustainable and cost-efficient. This report provides further context and sets out some of the key innovative developments in the sector including the use of automation and new lighting technologies in horticulture, vertical farming, and output reduction measures for the livestock industry.

Report

Facts and figures

Despite only contributing 1.4% to the Dutch economy[1], the Dutch agricultural sector is a major export industry, with about 73% of all agricultural production or technologies exported.

The Netherlands dominates EU agricultural exports. Of the €133.7 billion of total agricultural exports from the EU in 2022[2], €79.8 billion was exported by the Netherlands. The product groups with the highest export value are dairy and eggs (EUR 11.9 billion), ornamental flower products (EUR 11.5 billion), meat (EUR 11 billion), beverages (EUR 8.1 billion), and natural oils and fats (EUR 8.1 billion). Of the Netherlands €79.8 billion agricultural exports over half (€42.5 billion) was from the processing and re-export of imported goods. This reflects the Netherlands' position as a logistical hub with good connections to the rest of Europe.

Greenhouses are a crucial part of the Dutch agriculture sector, dominated by energy from natural gas fuelled by the country's historically low natural gas prices, and driven by large gas fields in the Groningen province. Due to extraction-related damages in the Groningen province, all gas extraction is due to be halted from 2025 onwards. Around 58% of electricity used is produced onsite by co-generation (most greenhouses have a combustion plant on site) while 42% is purchased. Energy from renewable sources (mainly geothermal) has been growing rapidly in recent years. A benefit of renewables is that any excess energy produced can be put back into the energy grid in order to supply other users.

[1] According to 2019 from the Central Bureau of Statistics (CBS). While modest, this is still higher than the European average of 1.1% and is especially high given the large industry and service sectors in the Netherlands.

[2] A 17.3% increase from the year before, according to CBS and Wageningen University & Research (WUR).

Challenges

Rising energy prices are an issue for the greenhouse horticulture sector. Early 2022 predictions of a large drop in productivity and land area were averted by decreased European energy prices. However, the historically low natural gas prices in the Netherlands are unlikely to return due to the eventual closure of the Groningen gas field, as well as the loss of supply from Russia.

The sector also faces a shortage of **labour supply**. The sector relies to a large extent on migrant workers and due to rising wages at home and work opportunities in other sectors, labour supply has fallen. The expected drop in labour demand due to seasonal production cycles also makes it harder to retain workers.

Due to these **increased costs in Europe**, parts of the sector, especially labour- and energy-intensive sectors such as (greenhouse) horticulture, are relocating to markets where labour and energy costs are more affordable (e.g. North Africa).

While providing the sector with opportunities in the long term, newly introduced legislation requires the sector to accelerate its energy transition and sustainable business models, leading to pressure in the short term while businesses adapt and invest in new technology.

For meat and dairy sectors, nitrogen emissions remain a core issue. The Netherlands needs to urgently reduce emissions in order to comply with EU limits. The government has agreed a buyout scheme for farmers to reduce their emissions in exchange for compensation based on the farm's value. According to some government estimates, these measures aim to reduce total livestock numbers in the Netherlands by 30% by 2030. The sector is increasingly looking toward technological innovation in an effort to become more sustainable and avoid reducing livestock numbers.

Innovation and Solutions

The Netherlands remains an innovative country in the field of agriculture. Wageningen University & Research (WUR) is a world-leading agricultural technology research institute. An example is the WUR Horticulture Centre in Bleiswijk, which is both a commercial greenhouse and an academic research centre. The WUR Centre focuses on sustainable agriculture and innovative ways of growing both crops and ornamental flowers. Examples of innovations include vertical farming, new LED technologies, natural gas-free greenhouses, and remote operation of greenhouses.

Vertical farming shows some promise for a variety of crops, as well as efforts in insulation and green energy. The WUR Centre aims to operate a fully electric greenhouse by 2030. This means that no natural gas is used for heating, instead relying on LED-lighting. For dehumidification, a heat pump is used. All excess water is recirculated, so no water is lost and no residue enters the sewer system. Chemicals for plant protection are minimised, using natural pest control instead.

Plant empowerment is a cornerstone for the Centre, focusing on a combination of chemical balances and integrated crop control, as well as humidity and temperature optimization through computer monitoring. This leads to the most efficient crop yield.

An innovative system for the glasshouse horticulture sector is the use of WKK (Warmte

Kracht Koppeling), a system which **produces heat and electricity at the same time**, and runs on a combustion engine or a gas turbine. The process produces heat as a by-product, which can then be used for the production of heated water, steam or hot air.

An example of a proposed solution to address labour shortages in the sector is a year-round contract for labourers, which move to other sectors during the sector's low season. The overall decrease of labour migration flows is expected to continue for now, meaning growers will continue to look to **technological solutions such as picking and planting robots for greenhouses**, as well as automatic application of crop protection. The WUR Centre is looking to operate a completely autonomous greenhouse in the future, which is managed via AI.

For the meat and dairy sector, reduction and extensification are considered the main policy priorities. However, there are some technical solutions that are being watched with interest. The government has committed EUR 172 million under the Dutch government's Climate Agreement. In addition, EUR 280 million is freed up from the Nitrogen Fund. Many innovations are tested through the Dutch **Fieldlabs** framework, where businesses and educational institutions jointly develop, test, and implement relevant solutions. Within this framework, farmers are able to test new solutions for reducing their output under a special regulatory system, and with government monitoring and funding.

One such solution is **ammonia scrubbing machines**. Ammonia is one of the main contributors to nitrogen emissions. The machines separate minerals in stables from excrement and are designed to significantly lower ammonia. In practice however, farms do not always create the optimal conditions for the system, or do not operate the system in the most efficient way. It requires a closed system, and for the cows to be inside as much as possible, as well as long-term financing. Other solutions being tested are alternatives for fertilizers, organic manure, and soil improving substances.

Opportunities for New Zealand

The Central Bureau for Statistics (CBS) and WUR expect further growth in the value of the Dutch agriculture sector, even as export numbers fall. Due to the large amount of public investment available for sustainable solutions in agriculture, we expect innovation in this space to increase in the coming years, especially in sustainable and green energy, labour, and automation.

The Netherlands, led by its Top Sectors, continues to be a promising avenue for tech businesses looking to break into the sector. The WUR Centre also ties into this. The Netherlands regularly hosts trade delegations from all over the world as farmers and growers come looking for the latest innovations, the best seeds and supplies. Much of this innovation is driven internally through active Dutch government investment in collaborations in the 'triple helix' of science, commerce and government. Given the

priority placed on the horticulture sector in the Netherlands, there are opportunities for research collaboration. WUR coordinates a number of projects of interest to New Zealand public or private sector partners looking to invest in horticultural science. Wageningen University and Massey University in New Zealand already have a long standing partnership which holds potential for further growth.

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