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Report Highlights:

This report assesses the agricultural biotechnology sector in the Netherlands, and covers related production, trade, and policies. It includes topics related to genetic engineering and innovative plant, animal, and microbial biotechnologies. On July 5, 2023, the European Commission (EC) adopted a new proposal to regulate plants obtained by certain "new genomic techniques (NGTs)" and their use for food and feed. Over the past eight years, the Dutch Government position towards the application of "NGTs" has been roughly in line with the content of the current EC proposal. The Dutch Government support for the application of "NGTs" is based on the use of these technologies as an important propagation tool for the Dutch plant breeding sector and a vital technology for sustainable agricultural production systems and the bioeconomy.

EXECUTIVE SUMMARY

The Dutch Government and agricultural sector have a pragmatic approach towards the import of genetically engineered (GE) agricultural products. The Netherlands is one of the largest importers of soybeans and soybean derivatives, which serve as an important input for the Dutch European livestock sector. However, domestic crop trials and commercial cultivation of GE crops are effectively prevented by cumbersome regulations and the threat of protests from environmental groups.

The Dutch livestock sector does not utilize any GE animals nor do Dutch agricultural research institutes keep them for research purposes. Besides the public's aversion, also the lack of confidence of Dutch scientists in the potential of the technology is a limiting factor of the commercial uptake of technology. The Ministry of Agriculture, Nature, and Food Quality has stated that the Dutch Government does not oppose the EC proposal to ban food derived from cloned animals, but only if the regulation is practical and in line with international obligations.

The Dutch Ministry of Agriculture, Fisheries, Food Security and Nature (MinAg) policy objective is to reach the goals set forth in the Farm-to-Fork (F2F) Strategy via a circular agriculture model with robust crop culture systems, less dependency on pesticides, and the safe use of biotechnology. In the innovation agenda of the Dutch "Top Sectors" (Dutch language) policy, genome editing is identified as one of the key technologies that may be utilized to improve plant pest resistance, nutrient utilization, and biomass yields.

On July 5, 2023, the European Commission (EC) adopted a new proposal to regulate plants obtained by certain "new genomic techniques (NGTs)" and their use for food and feed. The EC proposes two categories of "NGT" plants:

- Category 1 – "NGT" plants that could also ***occur naturally*** will be treated like conventional plants and therefore exempted from the requirements of the "GMO" legislation.
- Category 2 – "NGT" plants that could ***not occur naturally*** will be treated like GE varieties following the authorization procedure required in the "GMO" framework.

Over the past eight years, the Dutch Government's position towards the application of innovative biotechnologies has been roughly in line with the content of the current EC proposal. This is because these techniques can be used for more precise and faster breeding, by which more robust and resilient plants can be bred. On April 11, 2025, the Dutch Cabinets Vision for Biotechnology 2025 – 2040 (Dutch language), was made public. The main objective of the vision is described as following: *"We strive for proportionality and a future-oriented approach in (European) legislation and regulations with transparent, efficient, and predictable approval procedures, so that we offer prospects to developers and investors of biotechnological innovations and can optimally utilize these innovations in our society while maintaining a high level of safety."* The vision of the Dutch Cabinet at the EU level is formulated in the document: Biotechnology and Biomanufacturing (Dutch language). In the document, the government states to support the simplification of the regulatory framework and faster access of biotechnological innovations to the EU market. At the same time, the government stipulates that safety for humans, animals, and the environment must be guaranteed and that responsible use and sustainability of production must be considered. The Dutch policies are enforced by a National Support

Fund of €1.27 billion ($1.47 billion) allocated up to 2030. The three focus areas are (1) plant breeding, (2) microbial biotechnology for the application of converting raw materials into non-fossil energy, chemicals, and materials (biobased and circular economy), and (3) the production of non-animal meat and dairy products (cellular agriculture).

On June 3, 2025, the Dutch Government collapsed, and a care-taker government is in place. The Parliamentary elections are scheduled for October 29, 2025. The main Dutch political parties pay little attention to agricultural biotechnology in their new election programs.

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CHAPTER I: PLANT BIOTECHNOLOGY

PART A: PRODUCTION AND TRADE

a) Product Development

The Netherlands is home to one of the world's leading plant propagation sectors. Given the cumbersome regulations for developing and approving genetically engineered (GE) crops, Dutch plant breeding companies have focused on innovative plant biotechnologies. In the Netherlands, there are no GE crops under development that will be on the market within the next five years. The database (in the Dutch language) of the National Institute for Public Health and the Environment (known as the RIVM) reports that the most recent license granted for market introduction (listed as MA in the database) of a

GE plant was in 2019. The license was requested by a Japanese breeder to market a GE carnation variety. The flower breed contains an herbicide tolerance gene, and a gene which is expressed as a violet color. The license includes import and marketing but excludes the cultivation of the flower.

For cultivation (agricultural field tests, listed with the code IM-L), licenses were granted to produce transgenic apples (resistant against scab), and GE potatoes (resistant against phytophthora) in 2011. In 2015, the last license for cultivation was granted, for cis-genic apples (red flesh with a high content of antioxidants). Since 2015, no licenses have been granted for the cultivation of GE plants in the Netherlands. The licenses for the two GE apple varieties and one GE potato variety were used by Wageningen University and Research (WUR) for field trials (for more information see Chapter 1, Part B, sub-paragraph d) Field Testing). The WUR Research Group on Ornamentals, Tissue Culture, and Gene Technology focuses on developing and implementing the latest plant breeding techniques in ornamental plants. As the potential for GE crops to be commercialized is limited within the EU, the technique of genetic modification is primarily used for gene function analysis or for testing functionality.

b) Commercial Production

In the Netherlands, there are no commercial plantings of GE crops, nor is it expected that any GE crops will be commercially planted in the next five years. This expectation is based on limited producer interest, cumbersome regulations for approval, coexistence regulations, and the threat of protests and consumer resistance.

Dutch Position Towards Legislation for National "Opt-out" of Cultivation:
In the European Council meeting of June 12, 2014, the Dutch Government voted in favor of a Greek proposal, which allows Member States to ban EU-approved GE crop varieties for cultivation on their territory without scientific justification (referred to as the Opt-out legislation). On March 11, 2015, Directive (EU) 2015/412 was officially released. With regard to this cultivation "opt-out" option, the Dutch Government will determine if it allows cultivation on a GE-crop-specific basis. The EU Directive is enforced by the Ministry of Agriculture, Fisheries, Food Security and Nature (MinAg). The MinAg's judgment for opting out a specific plant species will be made based on a scientific assessment framework and in consultation with a commission of experts.

The Dutch Rathenau Institute (Dutch language) organized a stakeholder's dialogue on the set-up of this assessment framework. In a letter (Dutch language) to the Dutch Parliament dated October 14, 2016, the Dutch State Secretary of Agriculture presented the results of the dialogue and the resultant assessment framework. The framework assesses GE crop varieties on the following elements: (1) freedom of choice for farmers and consumers, (2) compliance with the Dutch coexistence regulations, (3) compliance with pesticide regulations, (4) economic implications for conventional and organic farmers, (5) acceptance by society, and (6) the prospects and advantages the GE crop offers for improving sustainability, food security and consumer benefits.

c) Exports

The Netherlands does not produce or export domestically produced GE crops or products. However, the Netherlands trans-ships imported GE crops and products to other EU Member States and re-exports GE

materials to non-EU countries. The trans-shipped and exported GE materials are documented and labeled as required by EU legislation.

d) Imports

The Netherlands imports large quantities of GE crops and derived products, predominantly soybeans. Given the absence of cultivation, the Dutch do not import GE seed. Moreover, imports of GE processed consumer products are small, as these products must be labeled. The Netherlands is one of the largest soybean and soybean meal importers in the world. Soybeans and derivatives are imported from the United States and Brazil, and soybean meal is imported from Brazil and Argentina (see table below). The share of these shipments which contain GE material is not registered but estimated to be more than 85 percent.

Imports of Soybeans and Meal, the Netherlands (1,000 MT)						
	2019	**2020**	**2021**	**2022**	**2023**	**2024**
Soybeans	4,115	4,537	4,162	4,005	3,566	3,579
-United States	1,594	1,582	1,268	1,765	1,410	1,215
-Brazil	1,799	2,344	2,392	1,801	1,643	1,616
Soybean meal	2,678	2,579	2,486	2,755	2,291	2,906
-Brazil	1,950	1,826	1,593	1,743	1,598	1,882
-Argentina	269	319	365	520	130	380

The import of soybeans, maize, and rapeseed from North and South America is reliant on the approval of genetically engineered (GE) events by the European Commission (EC). For more information see the "GMO" Register of the EC. Due to the tight supply of non-GE and organic soybeans, the Dutch Government signed the European Soya Declaration, which supports European soybean production. For more information, see NL7021: The Netherlands Signs the European Soya Declaration, dated July 24, 2017.

With the goal of reducing the EU's dependency on imported vegetable proteins, the European Commission (EC) requested EU Member States develop a national protein strategy. On December 22, 2020, the Dutch MinAg presented a National Protein Strategy (Dutch language) by which it aims to enhance the cultivation of protein-rich crops over the next five to ten years. In the report, the Dutch Government stated that biotechnology can be a tool for improving the productivity of protein-rich legumes. For more information, see NL2021-0002: Dutch Ministry of Agriculture Launches National Protein Strategy, dated January 19, 2021. For more information about the Dutch policy related to plant biotechnology see PART B: POLICY.

Dutch Position Towards Legislation for National "Opt-out" of Use:
The directive for opting out of cultivation was followed by a European Commission (EC) proposal for opting out of use. On April 22, 2015, the EC published a proposal that would allow EU Member States to restrict or ban the use of GE feed or food on their territory. On June 5, 2015, the Dutch Government informed the Dutch Parliament of their position. The Cabinet strongly criticized the proposal on two basic grounds. The main arguments were that the proposal was not science-based and that the implementation would have negative effects on the economy. The Dutch Government made the distinction between opting out of cultivation and opting out of use since cultivating crops is a local

activity while restricting the use of crops and derived products has repercussions for trade and impacts the cultivation of crops in other countries. Given the importance of international trade to the Dutch economy, the Dutch Government's position on this subject is not likely to change.

e) Food Aid

The Netherlands is not a food aid recipient country, nor does it provide food aid. Financial aid is given either directly to the recipients, through EU institutions, or through Non-Governmental Organizations (NGOs).

f) Trade Barriers

The *slow approval process* for new GE events and impractical EU regulations for the allowed *Low-Level Presence* (LLP) of GE materials in shipments to the EU has significantly affected U.S. exports to the Netherlands -- specifically for corn, corn gluten feed (CGF), and Distiller's Dried Grains with Solubles (DDGS). *Mandatory labeling* of the presence of GE ingredients in food has led processors to avoid using products of GE crops varieties. This affects the sourcing of vegetable oils, which has resulted in the elimination of soybean oil as a food ingredient.

PART B: POLICY

a) Regulatory Framework

As an EU Member State, the Netherlands has implemented harmonized legislation (for more information see the EU Biotechnology Annual, published by USEU/FAS Brussels on December 08, 2023) regarding agricultural biotechnology in the following Dutch legislation:

- Decision Genetic Modified Organisms / Environment (Dutch language)
- Regulation Genetic Modified Organisms (Dutch language)

Table of terms			
Legal Term (official language)	**Legal Term (in English)**	**Laws and Regulations where term is used**	**Legal Definition (in English)**
ggo (genetisch gemodificeerde organismen)	Genetically Modified Organisms (GMO)	-Decision Genetic Modified Organisms / Environment -Regulation Genetic Modified Organisms	Organism, other than human beings, whose genetic material has been altered in a manner not possible through natural reproduction or recombination

The following three Ministries are responsible for implementation and enforcement of the regulatory framework for agricultural biotechnology in the Netherlands:

The Ministry of Health, Welfare and Sport (VWS) - The coordinating ministry in the policy-making process in the field of medical and agricultural biotechnology. The VWS is also the central competent authority with responsibility for GE legislation in food.

The Ministry of Infrastructure and Water Management (VROM) - Responsible for implementation and enforcement of legislation regarding living GE plants and animals, such as used in laboratory research and feed trials. The ministerial body responsible is the Bureau for Genetically Modified Organisms (BGGO).

The Ministry of Agriculture, Fisheries, Food Security and Nature (MinAg) - Responsible for GE legislation in the feed and seed area. Together with VWS, MinAg plays an important role in the implementation of the EU Traceability and Labeling legislation. MinAg has two bodies responsible for enforcement of the legislation regarding biotech feed and food:

- The Netherlands Food and Consumer Product Safety Authority (NVWA) is responsible for documentation and physical control of food and feedstuff imports entering through Dutch ports.
- The Netherlands Inspection Service for Agriculture (NAK) is responsible for inspection of crops and seed imports into the Netherlands.

The Dutch economy's dependency on trade is the one of the main factors which influences the regulatory decisions in the Netherlands. The Dutch economy not only benefits via trade-related services but also benefits from the close access to imported commodities which serve as inputs for the Dutch food processing and intensive livestock sectors. Regarding the regulatory framework for domestic cultivation of GE crops, however, Dutch politicians are more inclined to follow the sentiments of Dutch society. Current national co-existence regulations practically ban the cultivation of GE events. However, in the in the Plant Protection Vision for 2030 (in Dutch), it was stated that genome editing is an expeditious technique to improve the disease resistance of plant species.

Following Parliamentary elections on November 22, 2023, the Cabinet of Prime Minister Schoof was formed on July 2, 2024, comprising the Party for Freedom (PVV), the People's Party for Freedom and Democracy (VVD), New Social Contract (NSC), and the Farmer–Citizen Movement (BBB).

The Cabinet presented their Coalition Accord (Dutch language) on September 13, 2024. In the accord no reference is made to the application of biotechnology in the agricultural or food sector. But the Cabinet views innovation as crucial to achieving societal and agricultural goals. The Cabinet reiterated its commitment to national and international obligations following regulations related to nature, biodiversity, and climate. For more information see the GAIN Report - Dutch Government Presents Agricultural Plan, published on September 20, 2024.

In the spring of 2024, the Netherlands Institute for Technology Trends (STT, Dutch language), commissioned by the three responsible ministries (VWS, VROM, and MinAg), developed several future scenarios for the application of biotechnology. With input from relevant Dutch stakeholders, this resulted in the report Dots on the Horizon - Future Vision for Biotechnology 2030-2050 (Dutch language). This report is the foundation for the Dutch Cabinet's Vision for Biotechnology 2025 – 2040 published on April 11, 2025, made public on April 11, 2025. The latter report is the blueprint for Dutch policies supporting and regulating the biotechnology sector in the Netherlands. The main objective of the policies is described as following: *"We strive for proportionality and a future-oriented approach in (European) legislation and regulations with transparent, efficient, and predictable approval procedures, so that we offer prospects to developers and investors of biotechnological innovations and*

can optimally utilize these innovations in our society while maintaining a high level of safety." A new element in the Dutch biotechnology policies is security. The reports states: *"Biotechnology touches on economic security, knowledge security, geographical security, and physical security. Biotechnology can also be used by malicious actors to spread or make existing pathogens more harmful."*

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In relation to agriculture the report states that biotechnology will contribute to food security and sustainable food production. The policy goal is to support breeders to develop varieties that are more resistant to pests and weather extremes such as drought, wetness, and salinization, and contribute to the competitiveness of Dutch plant breeders as well as growers. The vision entails a system-approach to ensure robust agricultural production methods which are resilient to climate change. At the same time, the policy underlines the importance of freedom of choice so that people and companies can choose GE-free raw materials and products especially when it comes to food.

The vision of the Cabinet at the EU level is formulated in the document: Biotechnology and Biomanufacturing (Dutch language). In the document, the government states it's support for the simplification of the EU regulatory framework and faster access of biotechnological innovations to the EU market. Concurrently, the government stipulates that safety for humans, animals, and the environment must be guaranteed and that responsible use and sustainability of production must be considered.

On June 3, 2025, the Dutch Government collapsed, and a care-taker government is in place. The Parliamentary elections are scheduled for October 29, 2025. The main Dutch political parties pay little attention to agricultural biotechnology in their new election programs (all in Dutch). The political party VVD is the most outspoken party and mentions biotechnology as a key technology of which the Netherlands is a global player. The party is supportive of innovative food production such as precision fermentation, lab grown meat, and new genomic technologies such as Crispr-Cas. The VVD wants to streamline EU legislation and adequate investments to support start-ups. The BBB, or Farmer Citizens Movement, acknowledges the potential of innovative plant biotechnologies, such as CRISPR-Cas, and supports the technology if it can contribute to a lower use of pesticides. Also, the CDA party mentions biotechnology as a key technology in addition to green chemistry. The party supports the approval of CRISPR-Cas and cisgenesis for plant breeding. The PVV and NSC make no reference to agricultural biotechnology. The two main parties in the opposition are the alliance of the Green Party and the Labor Party (GL/PvdA), and the Liberal Democratic Party (D66). Although D66 is commonly supportive of innovation and supports the commercialization of cell-cultured meat and fermentation to produce alternative proteins, the party is also a strong supporter of organic and circular agriculture and has expressed concerns about animal feed imports and the Dutch "dependency" on GE soy imports. In the

election program of the GL/PvdA alliance, the party states to be a strong supporter of organic agriculture. In their previous program the party stated to adhere to the strict European rules for trans-genetic modification of agricultural crops and committed to enforce labeling of such crops.

b) Approvals

The Dutch GE approval procedure (Dutch language) follows the EU Directive 2001/18/EC and Regulation 1829/2003/EC. In general, the Dutch Government follows the advice of the European Food Safety Agency (EFSA) in the approval of GE plant varieties.

c) Stacked or Pyramided Event Approvals

The Netherlands implements EU legislation.

d) Field Testing

Experimental planting of GE crops is almost impossible in the Netherlands. Crop trials are effectively prevented by cumbersome regulations imposed by the government and by the threat of protests from environmental groups. Currently, there are no field trials of GE crops being conducted in the Netherlands. Information about the field trials can be found on the website of the Bureau for Genetically Modified Organisms (BGGO) (Dutch language) .

e) Innovative Biotechnologies

On July 5, 2023, the European Commission (EC) adopted a new proposal to regulate plants obtained by certain "new genomic techniques (NGTs)" and their use for food and feed. The EC proposes two categories of "NGT" plants:

- Category 1 – "NGT" plants that could also ***occur naturally*** will be treated like conventional plants and therefore exempted from the requirements of the "GMO" legislation. The proposal indicates that the EC will also establish a public database listing the status of category 1 "NGT" plants.
- Category 2 – "NGT" plants that could ***not occur naturally*** will be treated like GE varieties following the authorization procedure required in the "GMO" framework. "GMO" labelling will be required.

For more information see the GAIN Report - European Commission Adopts New Regulation for Plants Obtained by Certain New Genomic Techniques, published August 11, 2023. The proposal is now in the trilogue phase (final negotiations between the EU Council and the EU Parliament, mediated by the European Commission). The current Presidency of the EU Council is held by Denmark until the end of 2025.

Position of the Dutch Government Towards the Regulation of "NGTs"
Over the past eight years, the Dutch Government's position towards the application of innovative biotechnologies has been roughly in line with the content of the current EC proposal. The Dutch Government support for the application of "NGTs" is based on the use of these technologies as an

important propagation tool for the Dutch plant breeding sector, and a vital technology to improve the sustainability of agricultural production systems. For more information see the Agricultural Biotechnology Annual of 2024 and the FAS GAIN Report Dutch Proposal to Legislate NBTs (New Breeding Techniques), dated September 29, 2017.

On September 8, 2023, the former Dutch Cabinet informed the Parliament on their position towards the recent EC proposal for regulating "NGTs" with an official policy document (Dutch language). The Cabinet stated that the Dutch Commission Genetic Modification (COGEM) concluded (Dutch language) that the safety for humans and the environment are safeguarded by the EC proposal, and that plants obtained by site-directed mutagenesis and cis-genesis are comparable with plants obtained by conventional techniques and can be exempted from the "GMO" legislation. But COGEM also concluded that the safety of plants obtained by intra-genesis is not equivalent to plants obtained by conventional breeding. Based on a second study published on November 11, 2023, COGEM determined that the differentiation between plants that are and are not comparable to conventionally bred plants lacks scientific substantiation and requires adjustments and more clarification. The results of this study are communicated by the former Cabinet with a letter (Dutch language) to the Dutch Senate on June 12, 2024.

In the Introduction Document presented to the new and currently caretaker Minister of Agriculture, Fisheries, Food Security and Nature, Femke Marije Wiersma, it states that the Netherlands has so far supported the EU "NGT" proposal. This is because these techniques can be used for more precise and faster breeding, by which more robust and resilient plants can be bred. Opportunities that arise from this also include reducing the use of crop protection products and making crops more adaptive to climate changes.

Position of Dutch Scientists Towards the Regulation of "NGTs"

On September 16, 2024, a group of researchers of the Wageningen University & Research (WUR) published an article in which an overview is provided of the possible impacts of patent rights and Plant Variety Rights on the availability of technology and gene varieties at the European level. It was concluded that plant patenting must be more transparent and the protection and freedom of plant breeders using native traits have to be guaranteed. The researchers propose to do this through a further extension of the exemptions provided for breeders under the patent regulations.

On June 11, 2025, a group of researchers from Finland, Sweden, Norway, Germany, Belgium, and the Netherlands (Wageningen University & Research) published an article outlining their study of the 20/20 rule of the "NGT" proposal (the rule that Category 1 "NGT" plants are considered equivalent to conventional plants if they differ from the parental plant by no more than 20 insertions, which cannot be longer than 20 base pairs). The scientists concluded that updating the 20/20 rule to broader limits would better facilitate plant breeders to develop plants for climate resilient and sustainable agriculture, while still ensuring that these plants are equivalent to conventional ones.

Dutch Government Support for Research on Innovative Biotechnologies

Since 2011, the Dutch Government has had its "Top Sectors" (Dutch language) policy in place. "Agri & Food" and "Horticulture & Plant Propagation" are two of the eleven sectors selected. The focus of the

"Top Sectors" policy is on innovation and the application of new technologies. Genomics, bioinformatics, seed technology, and genome editing are listed as a key technology for the horticulture and propagation sector. The goal is to make plant breeding more precise and expeditious (precision breeding). As the use of plant breeding methods is species-specific, research is conducted on a variety of methods such as CRISPR-Cas and targeted recombination.

The Dutch Cabinets Vision for Biotechnology 2025 – 2040 (Dutch language), made public on April 11, 2025, is the blueprint for Dutch policies supporting and regulating the biotechnology sector in the Netherlands. The policies are enforced by a National Support Fund of €1.27 billion ($1.47 billion) allocated up to 2030 with the following financial instruments, projects, and institutes:

- Biotech Booster ($286 million) funds the commercialization of biotechnology innovations in the Netherlands. In total more than 70 projects are funded. One of the projects, Super Mendelian Microfactories, is applying CRISPR-Cas to modify the genes of yeast.
- Crop XR ($56 million). CropXR is an institute dedicated to developing more resilient crops through innovative 'smart breeding'. For this, researchers collect and combine various types of datasets to construct models. These first models are based on the plant Arabidopsis, a plant that is very suitable for research. Subsequently, these models can be translated to other crops.
- The Center Animal-free Testing (CPBT) ($145 million) for more information see the section Animal Biotechnology.
- The Cellular Agriculture Fund ($70 million) for more information see the section Microbial Biotechnology.
- The Biobased Circular Growth Fund ($393 million) for more information see the section Microbial Biotechnology.

f) Coexistence

In 2004, the Dutch agricultural sector and environmental NGOs agreed on coexistence regulations that were accepted by the Dutch MinAg. The regulations include a liability fund to which all farmers, except organic, need to contribute if GE crops are planted in the Netherlands. Despite the coexistence regulations, GE crops can be banned on a municipal and regional level. Currently, for instance the Dutch city of Nijmegen and the Province of Friesland banned GE crops from being cultivated within their borders.

An international research team of scientists (WUR and Universities in Bayreuth, Göttingen, Düsseldorf, Heidelberg, and Berkeley) urged the EU to allow the use of novel breeding techniques and modern biotechnology in organic farming. If not, they feared Europe's Farm to Fork strategy will likely fail to deliver on its promise of moving towards realizing the Sustainable Development Goals.

In the Introduction Document presented to the caretaker Minister of Agriculture, Fisheries, Food Security and Nature, Femke Marije Wiersma, it states that the Dutch organic sector wants their products to remain free of "NGTs". Although the Netherlands is in general in favor of the proposed "NGT" regulation, the previous Dutch Cabinet supported the position of the organic sector and the proposal for labelling propagation material of "NGT" crops.

g) Labeling and Traceability

The Netherlands implemented EU legislation on labeling and traceability into the Dutch Food Law (Dutch language). Products containing 0.9 percent or more GE content, per ingredient, must be labeled as a product of biotechnology. Products without GE ingredients can be labeled as "produced without gene technology" (in Dutch: bereid zonder gentechniek) if the product complies with the Novel Foods Food Law Decision (Dutch language).

h) Monitoring and Testing

The NVWA is actively testing feed and food imports for the presence of GE materials. The Dutch regulations for labeling, sampling, and testing are based on EU legislation. The marketing of crop varieties produced with innovative biotechnologies creates a problem for the Dutch authorities in that these events are not officially listed. Given the absence of a database with genome edited varieties, the authorities have no information on which crop and genome sequence they must sample and test.

While a database with a complete list of genome edited plant varieties is absent, the EUginius database began to add information on varieties produced with innovative biotechnologies. The EUginius database is an initiative of the German Federal Office of Consumer Protection and Food Safety and the Netherlands' Wageningen Food Safety Research (WFSR). The database provides detailed information on relevant issues regarding the presence, detection, and identification of "GMOs."

i) Low Level Presence (LLP) Policy

The Dutch regulation for LLP is based on EU legislation. It follows the "technical solution" guidance that defines zero as an allowance of 0.1 percent, as outlined in EU Regulation 619/2011. This regulation lays down the methods of sampling and analysis of official control of feed regarding the presence of GE materials for which an authorization procedure is pending or the authorization of which has expired. Besides an LLP regulation for unapproved GE varieties in feed, the Dutch Government supports a technical solution for the zero tolerance for unapproved GE events in food.

j) Additional Regulatory Requirements

The Netherlands implements EU legislation.

k) Intellectual Property Rights (IPR)

The Netherlands implements EU IPR legislation and does not have its own IPR laws that would protect patents on plant biotechnology. The main concern of the Dutch Parliament related to genetic engineering is the dominant position of the multinational seed companies in the food sector. The Dutch Government's response is that, if needed, EU and international patent laws should be changed to assure biological material is freely available for the development of new varieties.

On November 3, 2016, the European Commission published a Commission Notice on certain articles of Directive 98/44/EC stating that products derived from essentially biological processes (conventional breeding) cannot be patented.

On June 8, 2023, former Minister of Agriculture Piet Adema updated the Dutch Parliament on the position of the Dutch Government towards IPR of "NGTs" with a letter (Dutch language). In this letter, the Minister explained that "NGTs" can be patented through initiatives of the International Licensing Platform for vegetable varieties and, since 2023, by the Agricultural Crop Licensing Platform for field crop varieties. Furthermore, is the patenting of "NGTs" registered by the Patent Information and Transparency Online (PINTO). In the letter, he states that the patent can only be granted for a plant that is developed by patented technology and not for a similar plant that has been developed by conventional breeding methods.

l) Cartagena Protocol Ratification

The Netherlands is a signatory of the Protocol and it entered into force in September 2003. In the Netherlands, the VROM is responsible for the implementation of the Cartagena Protocol on Biosafety (CPB). The Netherlands has enforced the Protocol through the implementation of EU directives in the "GMO" Act.

m) International Treaties / Forums

The Netherlands is a member of the International Plant Protection Convention and the Codex Alimentarius. Through the National Institute for Public Health and the Environment (RIVM), the Netherlands has contributed to the work undertaken by the Organization for Economic Co-operation and Development on risk assessment and risk management. In general, the Dutch Government takes the position that the regulations related to the trade and processing of GE crops must be workable for the private industry and enforceable by the authorities.

n) Related Issues

No other related issues to report.

PART C: MARKETING

a) Public / Private Opinions

The Dutch Farmers Organization (known as the LTO) (Dutch language) is pragmatic and in favor of innovative biotechnologies. The LTO states that farmers want to be less dependent on chemicals and invest in robust agricultural systems, with the DNA of the plant as a basis element (see also the LTO report Ambitions Plant Health 2030 - Dutch language). The LTO argues that innovative biotechnologies are an important tool to breed resistant varieties, and must be deregulated, considering certain preconditions: the freedom of choice for the farmer (coexistence and breeders' rights) and consumer, and the enforcement of a scientific approval process to determine the safety for the environment and humans. The LTO reiterated its standpoint in a reaction to the EU "NGT" Proposal in a press release (Dutch language) on July 5, 2023. The Dutch plant breeding and propagation sector (known as Plantum - Dutch language) is supportive of the use of innovative biotechnologies, and states that the technology must be made available for both large and small companies. The organization also states that the

freedom of choice must be guaranteed for organic farmers as well as for farmers who want to use plants produced with “NGT”s. The Netherlands is one of the main producers of vegetable seeds globally.

HollandBIO is the Dutch biotechnology association, with members covering the medical, industrial, and agricultural biotechnology sector. In their press release of June 20, 2023 HollandBIO reacts generally positive towards the EC proposal on regulating “NGTs”. But the sector organization also states that the proposal appears to be seeking a political compromise in finding the criteria for classifying the “NGT” crop variety as either Category 1 or 2, as outlined in Annex I. HollandBIO is also critical towards the decision that “NGTs” which fall under Category 1 will remain “GMOs” according to the provisions of the organic sector.

b) Market Acceptance / Studies

Because GE crop plantings are absent, and GE labeled food products are scarce, Dutch consumers are not conscious of the developments in agricultural biotechnology. Food products containing GE ingredients are not seen in the marketplace because food processors have reformulated their products to avoid the need for a “GMO” label. If GE crops were planted and GE labeled food was on the market, environmental NGOs would likely object.

The Dutch livestock sector benefits from access to feed materials produced in third countries, mainly soybean meal, which is mostly GE. There is no resistance from consumers since meat produced with GE feed does not have to be labeled. Traders estimate the European non-GE soya market at about fifteen percent of the total feed grade market, with a lower percentage for the Dutch market. The share of organic feed grade soya is estimated to be less than five percent.

On June 11, 2024, COGEM published the report “Marketing patterns of genetically modified food in Dutch grocery stores”. The report concluded that food retail products with GE ingredients play a marginal role in the product portfolios of Dutch supermarkets. For four of the six product categories (flour, mayonnaise, margarine, and corn and soy) no products with GE ingredients were found. Surprisingly the study concluded that whether or not products in the supermarket are labelled with 'contains GE ingredients' does not appear to be important from the perspective of the supermarket. This conclusion is based on the limited customer inquiries about this type of food. However, that could be because consumers are not conscious of the developments in agricultural biotechnology.

CHAPTER II: ANIMAL BIOTECHNOLOGY

PART D: PRODUCTION AND TRADE

a) Product Development

In the Netherlands, there are no GE or cloned animals under development that will be on the market in the coming five years. The application of biotechnology in animal breeding for recreation and sport is prohibited but permitted for biomedical purposes. For the application in agriculture, a clear position has not yet been taken, but animal welfare is an important consideration. In the Netherlands, research conducted on animal biotechnology for application in agriculture is limited.

As outlined in Chapter I, the Dutch Government developed the "Top Sectors" (Dutch language) policy. As a part of the policy, the Dutch Government developed an innovation agenda (Dutch language) for the application of animal biotechnology. The agenda focuses on the reduction of greenhouse gas emissions (by cows) and higher stress resistance (against, for instance, wet conditions), disease resistance, and the phasing out of lab tests on animals. Phenotyping and genotyping are mentioned as the main tools (not genome-editing). Genome editing is not listed as one of the skills mentioned by the Livestock Research Institute of the WUR. Its research is mainly focused on recording genetic properties for selection purposes and developing methods for improved genetic selection.

b) Commercial Production

In the Netherlands, there are no GE or cloned animals for commercial use. GE animals are only authorized for use as laboratory animals for medical research at universities and academic hospitals. Annually, 15 to 20 licenses are granted. The largest group of GE animals is mice. Neither the Dutch livestock sector nor Dutch agricultural research institutes keep GE animals (even for research purposes).

c) Exports

As domestic production of GE and cloned animals does not exist, the Netherlands does not export domestically produced GE or cloned animals or their reproductive materials. However, the Dutch livestock and dairy sector most likely imports and further trades semen and embryos from cloned animals.

d) Imports

The Netherlands has likely imported semen and embryos from cloned animals. The specific quantity of these imports is not available. There are no known imports of GE animals.

e) Trade Barriers

The EU "GMO" legislation applies to GE animals, and although no GE animal applications have been submitted to the EU, these regulations would inhibit trade of such products. The import of cloned animals for food use requires EU pre-market approval. Currently there are no trade barriers to the offspring of cloned animals. However, future legislation could introduce barriers.

PART E: POLICY

The Dutch Cabinets Vision for Biotechnology 2025 – 2040 (Dutch language), made public on April 11, 2025, is the blueprint for Dutch policies supporting and regulating the biotechnology sector in the Netherlands. In the document the Dutch Government states that for the genetic modification of animals for production purposes to apply the "no, unless" principle: it will not take place unless there are compelling reasons, and a thorough ethical analysis is in place. The report states that the development of biotechnology can contribute to reducing the use of laboratory animals by developing alternative research models. The policies are enforced by a National Support Fund of €1.27 billion ($1.47 billion)

allocated up to 2030. One of the institutes receiving funds ($145 million) is the Center Animal-free Testing (CPBT). The CPBT aims to accelerate the transition to animal-free biomedical innovations.

a) Regulatory Framework

Currently, the Dutch Government has regulations in place for the genetic engineering of animals, but not for the practice of cloning animals. The rules are laid down in the Animal Law (Dutch language) article 2.23:

- It is prohibited to modify the genetic material of animals solely for sporting performance or entertainment in a manner that ignores the natural barriers to sexual reproduction and recombination.

- It is prohibited without a permit: (a) to modify the genetic material of animals in a manner that bypasses the natural barriers to sexual reproduction and recombination; (b) apply biotechnological techniques to an animal or an animal embryo.

Organizations which want to use GE animals for medical research need to request a license from the Dutch Ministry of Agriculture, Fisheries, Food Security and Nature (MinAg). Licenses are granted only if the genetic engineering has acceptable outcomes for the animal's health and welfare, and there are no ethical objections to the proposed application. The Committee on Animal Biotechnology assesses all incoming license requests. The rules for biotechnology application requests are laid down in the Animal Biotechnology Decree and enforced by the NVWA.

In addition to a license granted by the MinAg, institutes or corporations wanting to make, reproduce, keep, or transport GE animals also need a license from the Minister of Infrastructure and the Environment, who assesses the project's potential adverse effects on humans and the environment. This requirement is based on the Decree on "GMOs".

The Dutch Government does not oppose the European Commission (EC) proposal to ban food from clones, but only if the regulation is practical and in line with international obligations. The Dutch Government has not decided about whether the prospective EU ban on products from clones should also include products of the progeny of clones. The position of the current Dutch coalition Government is not yet known, and it is unclear if the topic will be on the political agenda.

b) Approvals

The Netherlands implements EU legislation and does not have its own approval procedures for GE animals or cloning. For more information see the Agricultural Biotechnology Annual - European Union.

c) Innovative Biotechnologies

The Netherlands has not yet decided how to regulate innovative biotechnologies in animals. The Netherlands implements EU legislation. For more information see the Agricultural Biotechnology Annual - European Union.

d) Labeling and Traceability

The Netherlands implements current EU legislation. As part of or in addition to EU legislation, the Dutch Government wants to implement a traceability scheme for reproductive material. For more information see the Agricultural Biotechnology Annual - European Union.

e) Intellectual Property Rights (IPR)

The Netherlands implements EU legislation and does not have its own IPR laws that would protect patents on animal biotechnology. For more information see the Agricultural Biotechnology Annual - European Union.

f) International Treaties / Forums

The Netherlands is a member of Codex Alimentarius (Codex), and the World Organization for Animal Health (OIE). However, the Netherlands does not take an active position regarding animal biotechnology in these organizations.

g) Related Issues

No other related issues to report.

PART F: MARKETING

Animal Biotechnology Marketing

a) Public/Private Opinions

Government and livestock sector representatives are, in general, educated on the subject, but are not supportive of cloning and GE animals. Their policy is based on the public's aversion to the technique. Dutch citizens and consumers do not support the use of cloning and/or genetic engineering technologies by the livestock sector.

Between March 2021 and February 2022, the Rathenau Institute organized six seminars to consult the Dutch public about their viewpoint on the use of animals as organ donors. The main conclusion of the report: "The Animal as Donor" (Dutch language) was that Dutch citizens take ethical considerations into account in the application of animal donors. The main recommendation in the report for the Dutch Government was to continue to support the availability of animal-free donor options.

b) Market Acceptance / Studies

So far, authorization of GE animals is limited to the use for medical research by universities and academic hospitals. The research project, Social Aspects of Genome Editing in Animals, conducted by WUR and Utrecht University, is developing a comparative innovation approach to examine the conditions, if any, under which genome editing should be applied to animal breeding applications. On

August 31, 2021, the group published the report: Gene editing of livestock: Sociotechnical imaginaries of scientists and breeding companies in the Netherlands. In the report, the researchers concluded that livestock gene editing raises more concerns and questions from the Dutch public than the applications in plants. The researchers state that the different interpretation is possibly a response to the major controversies that occurred when GE crops arrived in Europe and based on the animal welfare dilemmas in the intensive livestock sector.

Besides the public's aversion, the lack of confidence of Dutch scientists in the potential of the technology is a limiting factor of the commercial uptake of technology. In the new Trend Analysis Biotechnology 2023, published on April 20, 2023, COGEM outlines that the Dutch universities and the livestock sector are hesitant towards the application of gene editing in animals due to the technical barriers. COGEM states that the limited number of monogenes (a single gene involved in the expression of a trait), and the time needed for crossbreeding as the main barriers for the uptake of the technology.

CHAPTER III: MICROBIAL BIOTECHNOLOGY

PART G: PRODUCTION AND TRADE

a) Commercial Production

The Netherlands is home to a relatively large processing sector, converting agricultural imports into food, feed, and fuels. Microbial biotechnology is an important component of the conversion processes applied by the sector. One of the most active Dutch companies applying microbial genome editing is DSM Food Specialties. The company produces food ingredients based on fermentation processes, such as nutraceuticals, yeast extracts, and vitamins. The database (Dutch language) of the National Institute for Public Health and the Environment (RIVM) reports that since 1994, DSM Food Specialties received 25 licenses for the contained use of GE micro-organisms. Other Dutch companies applying genome editing techniques on microbes are Isobionics (microbial biotech-derived flavors) and Veramaris (biotech-derived omega-3 fatty acids).

In the Netherlands, research institutions and companies producing meat and dairy replacers have united in the Cellular Agriculture Netherlands Foundation (CANS) to promote cellular agriculture. Examples of Dutch companies which apply cellular agriculture are The Protein Brewery (producing Fermotein®, an alternative for vegetable and animal proteins), the Fooditive Group (producing a non-animal casein with GE yeast, potentially used to produce mozzarella), Meatable (producing meat replacers and also listed in the RIVM database), and Mosa Meat (producing a lab-grown burger). In January 2025, the Biotechnology Fermentation Factory in Ede was opened. The facility, supported by NIZO, focuses on precision fermentation, and offers a shared infrastructure to reduce capital and operational costs while lowering technical and financial risks. For more information about the cellular agriculture sector in the Netherlands see Chapter 4.3 of the report Trend Analysis Biotechnology 2023, published April 20, 2023.

As outlined in Chapter I, the Dutch Government developed the "Top Sectors" (Dutch language) policy. As a part of the policy, the Dutch Government developed an innovation agenda for "white" biotechnology. This agenda is focused on the conversion of waste streams, production of food and non-food ingredients, and the production of meat replacers. Genome-editing is mentioned as one of the tools

to reach these goals. The main trend is the application of microbial biotechnology as a conversion technology in the biobased economy (Dutch language), for the production of biofuels, bio-chemicals, and biomaterials.

The Dutch Government funds (Dutch language) cellular agriculture with $70 million over a period of 8 years through the National Growth Fund. The funding will be allocated for research, commercialization, and education of qualified personnel. In the Netherlands, two of the leading institutes in the field of industrial biotechnology are the Delft University of Technology's Faculty of Applied Science, and the Bacterial Genetics group in the Laboratory of Microbiology at the Wageningen University & Research (WUR). An example of the research conducted by the Delft University is the use of CRISPR-Cas technology for the development of yeasts which grow without oxygen.

b) Exports

The Dutch biotechnology sector may be exporting GE microbes, specifically yeasts. As no harmonized code exists for the GE yeast variant, the quantity or value cannot be determined. However, the Netherlands was ranked as the eighteenth largest global exporter of yeasts (HS code 2102), with a value of $51 million in 2024. After Denmark, and before the United States, the Netherlands is the second largest exporter of enzymes (HS code 350790) with a value of $1.14 billion in 2024. The United States is the main export destination outside the EU, with a value of $99 million in 2024. DSM Nutritional Products is one of the main food ingredient producers in the Netherlands. The company received Generally Recognized As Safe (GRAS) recognition for several ingredients, including steviol glycosides, as a sweetener, and phytase enzymes, as a feed ingredient.

c) Imports

The Dutch processing sector possibly imports GE microbes. As no harmonized code exists for the GE variant, the quantity or value cannot be determined. After the United States, the Netherlands is the second largest importer of enzymes (HS code 350790) with a value of $947 million in 2024. The leading non-EU suppliers to the Netherlands are the United States ($77 million) and China ($14.5 million) in 2024.

d) Trade Barriers

The Netherlands implements EU legislation. For more information see the Agricultural Biotechnology Annual - European Union.

PART H: POLICY

The Dutch Cabinets Vision for Biotechnology 2025 – 2040 (Dutch language), made public on April 11, 2025, is the blueprint for Dutch policies supporting and regulating the biotechnology sector in the Netherlands. The report states that industrial biotechnology can play a crucial role, particularly in the substitution of fossil raw materials. With biotechnology, for example, low-value crops (such as grass) and side streams and residual flows can be processed into products suitable for human consumption. This creates a wider range of protein-rich products for consumers and increases food security. The vision further emphasizes that biotechnology can play a significant role in cellular agriculture, such as

precision fermentation and the production of cultured meat. The Dutch Cabinet's vision is that biotechnological approaches to food production can ensure a more robust food system with less land use and lower CO_2 emissions. The policies are enforced by a National Support Fund of €1.27 billion ($1.47 billion) allocated up to 2030 with the following financial instruments, projects, and institutes:

-The Biobased Circular Growth Fund (with a total budget of $393 million) is facilitating the transition of fossil-based materials to climate-neutral materials. An example is a project which uses sugar beets as feedstock to produce sustainable building blocks for a wide variety of biobased applications such as for polyesters, detergents, resins, and other biochemicals.

-Biotech Booster ($286 million) funds the commercialization of biotechnology innovations in the Netherlands. In total more than 70 projects are funded. An example is VITA which is developing a bioreactor to produce lab-grown meat.

-The Cellular Agriculture Fund ($70 million) aims to give the Dutch cellular agriculture sector significant boost in the pillars of education, research and upscaling, mainly focusing on lab-grown meat and dairy.

a) Regulatory Framework

The Netherlands implements EU legislation in its national laws (Dutch language). Three Ministries are responsible for the implementation and enforcement of the regulatory framework for microbial biotechnology: the Ministry of Health, Welfare and Sport (VWS), the Ministry of Infrastructure and Water Management (VROM), and the Ministry of Agriculture, Fisheries, Food Security and Nature (MinAg). Food ingredients produced with GE microbes that are new to market must comply with the EU Novel Food regulations. Commission Implementing Regulation 2018/456 lists the procedural steps that food business operators must follow to consult with the competent authority of the EU Member State where they first intend to market their product. The competent authority in the Netherlands is the VWS.

Currently, cell-cultured meat is an unauthorized novel food whose safety has not been assessed under the European Novel Foods regulation. On July 5, 2023, the Dutch Government, CANS, and HollandBIO agreed upon a Code of Practice, which provides a technically harmonized framework so producers, from their own responsibility, can carry out the tastings in controlled environments. For more information see the Novel Foods page of the EC and the Agricultural Biotechnology Annual - European Union.

b) Approvals

The Dutch approval procedure (Dutch language) follows EU Directive 2001/18/EC and Regulation 1829/2003/EC. For the contained use of GE microbes, a license from the National Institute for Public Health and the Environment (RIVM) is necessary. The approved GE microbes are listed in the RIVM database (Dutch language). For the marketing of food additives, aromas, and enzymes at the Dutch market the existing provisions (in Dutch) will continue to apply until the adoption of an EU positive list of authorized enzymes (which is currently being worked on). Consultation requests should be sent electronically to the novel food assessment body:

Medicines Evaluation Board (CBG-MEB)
Novel Food Unit
P.O. Box 8275 3503 RG Utrecht, the Netherlands
Email: novelfoods@cbg-meb.nl
Website: https://english.cbg-meb.nl/

At the EU level, guidance documents on the use of additives, enzymes, flavorings, and extraction solvents can be found on the EC's website for Food Improvements Agents. For more information see the Agricultural Biotechnology Annual - European Union.

On June 26, 2023, the VROM, presented the report "Biotechnology and Safety" (Dutch language) to the Dutch Parliament. The report lists the safety considerations for several applications of "NGTs", of which in the application of industrial fungi. Dutch scientists note that the stringency of the approval process should be proportional to the risk of the applications, which is currently not the case.

c) Labeling and Traceability

The Netherlands implemented EU legislation on labeling and traceability in the Dutch Food Law (Dutch language). Products containing 0.9 percent or more GE content, per ingredient, must be labeled as a product of biotechnology. Products without GE ingredients can be labeled as "produced without gene technology" (in Dutch: bereid zonder gentechniek) if the product complies with the Novel Foods Food Law Decision (Dutch language). For more information see the Agricultural Biotechnology Annual - European Union.

d) Monitoring and Testing

The NVWA is actively testing feed and food imports for the presence of GE materials. The Dutch regulations for labeling, sampling, and testing are based on EU legislation.

e) Additional Regulatory Requirements

There are no additional regulatory requirements for microbial biotechnology in the Netherlands.

f) Intellectual Property Rights (IPR)

The Netherlands implements EU legislation and does not have its own IPR laws that would protect patents on microbial biotechnology. For more information see the Agricultural Biotechnology Annual - European Union.

g) Related Issues

No other related issues to report.

PART I: MARKETING

a) Public / Private Opinions

On June 3, 2019, COGEM published the report "Perceptions of citizens about genetic modification" (in Dutch). The study determined, among other findings, that most of the Dutch respondents associated genetic modification with plants, followed by animals and humans. Microorganisms are rarely mentioned.

b) Market Acceptance / Studies

No other related studies to report.

Attachments:

No Attachments