Netherlands

Future Protein NL

Join us in solving global challenges together

Join us in solving global challenges

Get in touch

'**Future Protein NL**' aims to inspire and inform you about what is going on the Netherlands in the field of alternative proteins. It also is an invitation to get in touch with us and join us in solving the global protein challenge together. In order to meet with environmental and societal needs, alternative protein sources need to be developed next to animal-based meat, dairy, fish, and eggs. The Netherlands is a global frontrunner in the alternative protein sector, an expert in the field of agri-food, sustainability and knowledge sharing. The Dutch skillset includes protein production, processing, innovation and logistics, allowing the Netherlands to stimulate the shift towards a restored balance between animal- and alternative proteins.

As the magazine outlines, there are five main building blocks on which the ecosystem in the Netherlands relies: connectivity, innovation, a strong international company base, brands, and transitions. The system is supported by a strong foundation of education and skilled labour.

Are you ready to join us?

Regarding innovation:

- **Netherlands Enterprise Agency** (RVO)
  Anne Winkel
- **Top Sector Agri & Food**
  Willemien van Asselt
- **Foodvalley NL /**
  The Protein Community
  Jeroen Willemsen

Regarding expansion into the Netherlands:

- **Netherlands Foreign Investment Agency**
  Maarten Schans
- **East Netherlands Development Agency**
  (Oost NL)
  Susan van Boxtel

Regarding trade:

- **Netherlands Enterprise Agency** (RVO)
  Alwin Quispel
- **East Netherlands Development Agency**
  (Oost NL) Belqis Askaryar

Preface

Guido Landheer, Director of European, International and Agro-Economic Policy at the Ministry of Agriculture

“As small as our country is, the Netherlands is one of the world’s biggest alternative protein hubs. Allow me to explain five of the main drivers that characterise our ecosystem:

1. The Netherlands has been a protein-rich country for 150 years. We are currently in a transition towards restoring the balance between animal and alternative proteins. Many meat and dairy giants that have built our economy are embracing the transition by introducing alternative proteins to their assortment.
2. The Netherlands has a strong focus on collaboration and partnerships (including the Top Sectors). We are solving global challenges together.
3. We are creative minds with entrepreneurial savvy. Innovations are born and translated into practical products here.
4. The Netherlands has an excellent business climate. Our country offers start-ups as well as established businesses all the ingredients to successfully develop, innovate and scale successfully.
5. Some of the world’s best-known alternative meat, dairy, fish and egg brands are from the Netherlands. The Dutch consumers are the frontrunners in Europe in the consumption of meat, fish, and dairy analogues. The Netherlands provides you with all ingredients to grow your brand and reach consumers in Europe and beyond.”

H.R.H. Prince Jaime de Bourbon de Parme, Climate Envoy of the Netherlands

“The urgency to combat climate change never has been greater. The production of our food has a substantial impact on climate change, our ecosystems and loss of species.

As the second largest agricultural exporter, the Netherlands has a crucial role to play in climate proofing our food systems.

How can we pursue this? By seizing the opportunities of circular and regenerative agriculture, by reducing and re-using food waste and stimulating efficient use of water. But also by promoting adaptive and more diverse nutritious crops that are resistant to heat, able to grow on saltier water and that are beneficial for the soil.

As the Climate Envoy of the Netherlands, I am motivated to raise climate ambitions around the world, to identify opportunities, and work together as ‘team humanity’ towards our common goals.”

Preface

Going beyond the protein shift tipping point: connecting generations

Evi Vet (24) and **Jeroen Willemsen** (49) are determined to bring the protein shift beyond its tipping point. ‘Connecting generations is key to simultaneously harvesting the economic and ecologic gain of future-proof proteins’. Evi, the Dutch UN Youth Representative on Biodiversity and Food, and Jeroen, the Innovation Lead for Protein Shift at Foodvalley NL, also known as ‘the Protein Commissioner of the Netherlands’ met with us in Wageningen.

Interviewer: “What was your motivation for getting involved in the protein shift?”

- Evi: “I have always had an overwhelming love for nature and its beauty. I started by getting a bachelor’s in plant sciences, which focused on increasing production. When I switched to Nutrition and Health, I realised we must change the way we eat instead of producing and consuming more and more.”
- Jeroen: “My father sadly passed away at the age of 38. When I turned 38 myself, and I was watching my son sleep in his cot, I realised I wanted to make a difference for him in the world for at least the next 38 years. The protein shift felt like a theme where I could truly make an impact.”

Evi: “What was the protein shift ecosystem like before my generation entered the scene?”

- Jeroen: “An insane amount has happened in the past 20 years. When starting out, I had to bend over backwards to raise 1.5 million euros to set up a factory for a new generation of plant-based ‘meat’. Eventually, I managed to muster it and I was lucky enough to meet launching customers and visionaries like Jaap Korteweg (Founder of the Vegetarian Butcher) and Mark Kulsdom (Founder of the Dutch Weed Burger). I learnt that the power of transition lies in the power of game-changers and them working together based on a shared dream.”

Evi: “How can different generations contribute to the protein shift?”

- Jeroen: “Connecting the complementary experience and creativity of generations is key. My experience in food innovation was a perfect fit with Mark for example, who has a more modern and freer mindset. Jaap connected with younger people to create a strong social brand, this being yet another example. We succeeded in open innovation and chain connection, all while having the guts to design new business models.”

~ Continued on next page ~

“Connecting generations is key to simultaneously harvest the economic and ecologic gain of future proof proteins.”

- Jeroen: “Connecting generations has been a guiding example of how we, in the Netherlands, are working on the protein shift. I guess the Dutch people are not deterred by the usual ways of looking at innovation or business; entrepreneurship is in our genes. I believe in the power of technology and new products, but even more in the power of people: they are representatives of different generations who shape the future of protein together.”
- Evi: “So you managed to not only break food cultures and routines but to also improve the image of the sector. For instance, alternative dairy originated from the standpoint of an activist, but now, there is a whole generation for whom the ‘alternative’ proteins are the norm.”

Jeroen: “How do you think lasting transitions can be achieved?”

- Evi: “The government can focus on stimulating the protein shift increasingly more, but we must not underestimate the power of the consumer. My generation is more open to breaking habits and changing cultures. It gives me hope that their flexibility, imagination, and creativity can really contribute to the protein shift.
- Jeroen: “I agree. Not being burdened by a certain upbringing, in my case with an abundance of meat and dairy, makes adopting new routines easier. Transitions involve three things: head (perception), heart (attitude), and hands (behaviour). My belief, which has been strengthened by the COVID-19 and nitrogen crisis, is that the ‘new normal’ of a more balanced consumption pattern is already in the heads and hearts of your generation.”
- Evi: “Convenience and availability are important in changing the behaviour of young people. The price, promotion, and placement of products in supermarkets can greatly stimulate consumers into making a more sustainable choice, including buying alternative products. We also need to improve consumer knowledge on how to prepare our food, as many typical Dutch dishes are composed of animal-based meat.”
- Jeroen: “This is why we develop ‘meat successors’ which resemble meat. Although beans or tempeh are a great and very sustainable alternative to meat, it is still a big difference from what many consumers are used to. Meat successors allow meat-loving consumers to easily ‘plantify’ their dishes, without sacrificing taste and ease of preparation.”

Jeroen: “How can you increase consumer awareness on the connection between climate and food?”

- Evi: “These themes are closely intertwined. The production of our food greatly impacts global warming, biodiversity loss, and life under water, to name a few. The impact of food production on climate greatly varies between different diets. By switching our consumer patterns towards more alternative, protein rich foods, we can reduce our impact on the environment. It is my mission to make people understand and acknowledge this.”

“How can you succeed in making consumers understand the connection between the protein shift and global warming?”

Content

I. Introduction

This magazine, **Future Protein NL**, serves as a national proposition, encouraging collaboration, trade, innovation, and investments in the Dutch alternative protein sector. Proteins are the building blocks of life on Earth. In order to meet with environmental and societal needs, alternative protein sources need to be developed next to animal-based meat, dairy, fish, and eggs. The International Panel on Climate Change (IPCC) report (2021) strongly underlines the importance of exploring alternative proteins to stay within planetary boundaries and deal with resource scarcity. The transition from a diet consisting of mainly animal-based products to alternative products, thereby restoring the balance of protein consumption, is known as the 'protein shift'.

The Sustainable Development Goals (SDGs) of the United Nations (UN) underline the importance of solving global challenges together. The protein shift aligns with many of the SDGs, including Zero Hunger (2), Good Health and Wellbeing (3), Responsible Consumption and Production (12), Climate Action (13), Life Below Water (14), and Collaboration for the Goals (17).

The global market for alternative proteins is growing exponentially. By 2035 worldwide, the share of alternatives in the meat, dairy, fish, and egg market is estimated to be between 10% and 22%, depending on technological advancements and the support of consumers. Global consumption is expected to increase more than seven times, to 97 million metric tonnes* by 2035 (an estimated market of 290 billion US dollars).

The Netherlands has a highly developed and competitive agri-food sector. As a powerhouse for food, it is the second-largest exporter of agricultural products in the world, second only to the U.S. The strength lies in the innovative character, intersectoral collaboration and international perspective.

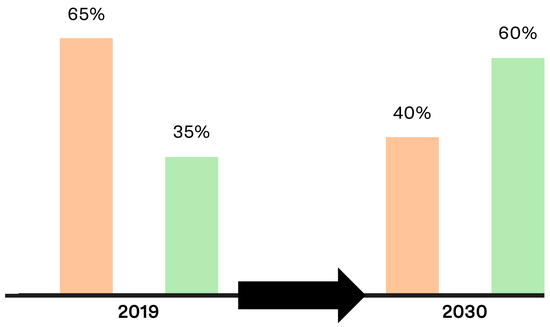
For this reason, the Dutch alternative protein ecosystem is in a strong position to strengthen the global protein ecosystem and contribute to the protein shift through innovative and sustainable solutions. International companies, established in The Netherlands, tap into this strong sector and contribute to the innovation landscape.

The Netherlands has been a 'protein-rich country' for over 150 years. As experts in the field of agri-food, sustainability and knowledge sharing, the country's skillset includes protein production, processing and marketing, innovation, technology, and logistics. Combining these valuable skills with innovative expertise and new mindsets will allow the Netherlands to move into a new phase. The infrastructure, knowledge, human capital and global network built in the meat, dairy and fish sectors are used and repurposed for future protein solutions. In other words: where animal and alternative protein solutions are complementary, not seen as competitors. To restore the balance, partnerships and collaborations between all parties are required: public and private, 'unusual suspects' and novel food parties, start-ups and corporates.

With a transnational perspective, the Netherlands is focused on solving global challenges together through an open, innovative, and inclusive culture.

The magazine encompasses all elements of the value chain, including primary production, processing, research and innovation, and trade. Through several examples and business cases, we aim to shed light on the Dutch Future Protein ecosystem. The magazine is an initiative of East Netherlands Development Agency (Oost NL), Netherlands Enterprise Agency (RVO), Top Sector Agri & Food, Foodvalley NL, and the Netherlands Foreign Investment Agency (NFIA), executed by Larive International.

2030 Goal for animal-based to plant-based protein shift



*Metric tonnes = 1,000 kg

Alternative proteins explained

Over **250 companies** in the Netherlands are working on the protein shift, creating alternative protein solutions with global impact. The protein shift is about restoring or maintaining the balance between animal and alternative or plant-based proteins while preventing protein overconsumption. Restoring the balance is a challenge, not only for the Netherlands but for other parts of the Western world like Europe, the US and Canada. As an example, in the Netherlands in 2019, 61% of proteins originated from animal-based sources. To reduce our resource use and the pressure on the ecosystem, the Council for Environment and Infrastructure advises striving to lower this percentage to 40% by 2030.

In 2021, it was reported 42% of Dutch consumers indicate eating less meat than one year ago and 49% believe eating meat daily is a thing of the past. The average protein intake of a Dutch consumer is some 50% higher than recommended. Restoring the protein balance whilst simultaneously reducing protein overconsumption makes the challenge even more so complex.

Consuming more non- or minimally processed plant proteins like legumes and nuts and less meat, fish and dairy, is the easiest and often most sustainable way of restoring the protein balance. The reality is that this is too big a step to take for many. As a result, 'transition products' have a role to help consumers in moving towards a more sustainable protein diet, towards the future of protein. Such transition products need to be aligned with (local) eating and drinking routines, products and dishes that people are familiar with, e.g., in terms of texture, ease of preparation, smell, place on the plate.

By re-thinking our food system, we are closely linking to the prospects of a circular economy. The Netherlands is home to some of the leading global voices for the circular economy, a system change that requires the involvement of all actors. The National Protein Strategy, which is further elaborated on later in this chapter, includes ambitions of working towards a more circular model whereby proteins are reused. For example, proteins extracted from residual products are discussed (both for human and animal feed). Although this magazine solely focuses on human food, animal feed is an essential element of the protein ecosystem and is therefore included in the National Protein Strategy.

There are many definitions of alternative proteins (including analogues or successors). In this magazine, alternative proteins are defined as protein-rich sources, ingredients, intermediates or final products that can be applied as variations on meat, dairy, fish, and eggs. The three main sources are categorised as follows (human consumption only):

1. Proteins grown on land or in the sea, including plant-based proteins (beans, pulses, nuts, grains) and seaweed;
2. Proteins produced with the help of microbials, fungi (mycoprotein), algae, and/or cellular agriculture (cultured meat and dairy);
3. Insect-based proteins.

There have been substantial innovations in alternative proteins. Several waves, or generations, of alternative products, can be identified, whereby the similarity to animal-based products has increased with each generation. A future generation of new meat, dairy, fish, and eggs, will consist of a wide range of different products: those which resemble animal-based predecessors, but also a new appreciation for unique products celebrating the power of plants.

II. The alternative protein ecosystem in the NL

The Netherlands is a global frontrunner in the alternative protein sector. Both Dutch and international stakeholders are an integral part of the elaborate protein ecosystem in the Netherlands. The Netherlands has an open and international perspective. Foreign investors are actively welcomed and invited to become part of the ecosystem in the Netherlands and build with us of food systems of the future.

The alternative protein ecosystem in the Netherlands is depicted by its comprehensiveness and versatility: every element of the ecosystem is represented. The complex network consists of interrelated actors from the public and private sectors, whereby collaboration and partnerships are key to success. Over 250 companies are active in the sector, as well as many public and not-for-profit stakeholders. The Dutch Protein Shift ecosystem counts over 55 collaborative initiatives. The figure on the right provides a non-exhaustive overview of stakeholders active in the sector.

Several essential stakeholders are overarching the various parts of the value chain, including public sector stakeholders (local, regional, and national governments), investment and capital agencies, shared research and production facilities, and supporting actors. The Netherlands is home to several globally renowned research institutes, universities, and science-based companies performing fundamental and applied research.

The Netherlands is the birthplace of various extensively known innovations, products, and brands, both in innovative food and AgTech. Equipment manufacturers and experts in logistics play an important role in the production and processing part of the value chain. Most Dutch consumers purchase foods at supermarkets, which accounts for the major retail environment.

A depiction of the strong Dutch agrifood ecosystem, as captured by ScaleUpNation (note: not specific to alternative proteins).

Dutch ambitions

National Protein Strategy

To increase food sovereignty and decrease the dependency on the import of soy, the European Commission has called on its Member States to develop a national protein strategy. In 2020, the Dutch Ministry of Agriculture, Nature and Food Quality published the Dutch National Protein Strategy, which aims to increase self-sufficient levels of plant-based and innovative proteins over the next five to ten years. The main message of the strategy is five-fold:

1. Increased cultivation of Dutch protein-rich crops, including potatoes and legumes.
2. Research and innovation towards the development of plant-based protein sources for food and feed, including mycoproteins and cultured meat.
3. Research towards the usage of insects as feed and food, as well as in valorising residual streams.
4. Utilising residual flows to increase efficiency and reduce waste. The use in animal feed and the valorisation of consumer food waste especially, are considered as relevant categories.
5. Increase the share of plant-based proteins in consumer diets and move towards a better balance between animal and plant-based proteins in consumer diets.

Several concrete goals have been formulated, as depicted on the right.

- **The majority of plant-based ingredients for animal feed are produced in the EU.**
- **Cultivation:**
  - 100,000 hectares of legumes have improved soil fertility by 2030.
  - Farmers are rewarded for sustainable protein production (sustainable feed ingredients and/or cultivating protein-rich crops).
  - Close collaboration in local protein-value chains contributes to a durable economy.
- **Innovation**
  - The Netherlands is a strong innovator in the technology and innovation of proteins.
  - By 2025, the availability of tasty, sustainable, and healthy alternatives for food and feed has increased in the EU.
- **Circularity**
  - By 2030, most of the animal feed is based on residual streams and ingredients inedible to humans.
  - Consumer food waste can be safely fed to poultry and piggeries.
  - By 2022, EU legislation allows for the safe use of circular protein sources, including insects and animal flour in poultry and piggery feed. *This goal has been reached.*
- **Consumption**
  - A healthy and sustainable balance between animal-based and plant-based proteins in our diets.
  - By 2030, consumer food waste is reduced by 50% compared to 2015.

Dutch ambitions

National Protein Strategy, continued

We meet with three experts on the **National Protein Strategy**, all working at the Ministry of Agriculture, Nature and Food Quality. Esther van Nes and Stefan Breukel both work at the Directorate of Plant-based Agrochains and Food Quality. Esther is Policy Maker specializing in food waste and sustainable food consumption, Stefan is Supply Chain Manager Plant-based Sectors specializing in crop cultivation. Margo Stam works as Senior Policy Maker at the Ministry and specializes in cultured meat.

Why did the Dutch government decide to develop a specific National Protein Strategy?

- Stefan: “In 2020, the European Union (EU) advised all of its Member States to develop a national protein strategy, as the EU wants to reduce their dependency on the import of proteins. Therefore, the Dutch Ministry of Agriculture, Nature and Food Quality developed the National Protein Strategy. The National Protein Strategy is closely linked to the circular agriculture ambitions of the Netherlands.”
- Esther: “Indeed, to decrease dependency on imports of proteins, the Netherlands has designed plans to increase its own production of protein-rich crops, but this is only one of the solutions. A more efficient system consisting of a more plant-based diet can also reduce the dependency on import.”
- Margo: “To find alternative ways of producing our proteins, I am specialized in cultured agriculture (meat and dairy). Cultured meat is not an alternative protein, but an alternative production process. It is, therefore, an important element of the protein shift, as it greatly reduces the impact on the environment. Fewer animals are needed to produce great quantities of high-quality meat and dairy.”

What are the specific goals that you are working on?

- Stefan: “We are finding ways to increase the cultivation, processing, and new and tasty foods to stimulate consumption of legumes. Legumes greatly contribute to soil quality and biodiversity. To stimulate the protein shift, the entire value chain, from farm to plate, must collaborate. At present, we are collaborating with value chain partners to develop a Green Deal Protein Crops to further advance the business case for each part of the value chain.
- The National Protein Strategy is relevant to many other governmental affairs and can function as the missing link between circular agriculture, the earning capacity of farmers, and environmental health. By increasing the cultivation of legumes we can strengthen the viability of the arable sector.”
- Esther: “We closely collaborate with the Circular Food Center on circular animal proteins. Where possible, we work together with the Netherlands Food and Consumer Product Safety Authority to give companies permission to conduct research. For example, we are researching how certain types of vegetable kitchen waste can be safely processed into animal feed, something that is not allowed by European law. I also work on creating a sustainable diet, with a balance between animal-based and plant-based proteins. We are now working towards a 50/50 protein division (50% animal-based, 50% plant-based) as advised by the Netherlands Nutrition Centre. We are closely collaborating with the Netherlands Nutrition Centre and several municipalities working towards healthier food environments.”
- Margo: “The cellular agriculture stakeholders are all collaborating. Researchers, societal organisations and entrepreneurs are working together very well to jointly advance technology and to prioritize cellular agriculture in the Netherlands.”

How does the National Protein Strategy relate to international ambitions?

- Stefan: “We are in contact with agricultural attaches in different parts of the world. Furthermore, we meet other countries with similar ambitions and the Netherlands, to find ways we can strengthen each other.”

Solving global challenges together

Top Sector, Invest in Holland

The Netherlands aims to solve global challenges together. For this reason, the Dutch government invests in its nine key sectors ('Top Sectors') to maintain and stimulate competitiveness and innovative power. **Top Sector Agri & Food** celebrates global excellence in innovation in both agriculture and food. We met Willemien van Asselt, the Director for International Relations and Cooperation at Top Sector Agri & Food.

- "The Top Sectors connect and align public and private stakeholders in a joint four-year knowledge and innovation agenda to reach a common goal. The Top Sectors work according to the Innovation Helix approach: the government, the private sector, knowledge institutes, and societal organizations collaborate on an integrated approach that generates innovations and increased knowledge, builds international cooperation both within the EU as well as outside, drives a human capital agenda and addresses regulation restraints to secure and build the sector's position. As part of the Topsector International Programme, there is attention for access to well-trained talent, trade promotion and innovation cooperation in order to contribute to the sustainable food systems and SDGs."

How do you work on alternative proteins in the Netherlands?

- "The Top Sector Agri & Food advances the protein shift in its mission-driven innovation agenda. The subprogrammes of this agenda are directly linked to the National Protein Strategy and address innovation questions like finding new protein sources (inclusive of the valorisation of waste streams), increasing product quality, building new product chains and building knowledge to stimulate the consumer towards acceptance of new protein sources. By doing so, we stimulate a diversity of protein sources to ensure a successful transition towards more sustainable diets but also a more circular agriculture."

And internationally?

- "We promote multilateral cooperation within Europe via the Horizon Europe programme and connection to the Circular biobased industry. Bilaterally we have several instrument available to initiate and help position the sector abroad or set up innovative international partnerships through seed money projects and larger topsector PPP projects (pre-competitive) that run for 3-4 years."
- For additional information about the Top Sector Agenda and approach, please visit www.kia-landbouwwatervoedsel.nl (in Dutch) or Topsector Agri & Food.

INVEST IN Holland

In the Netherlands we acknowledge and appreciate the added value of expertise and insights that companies can bring in from abroad. The Dutch Ministry of Economic Affairs has tasked **Invest in Holland** - a collaboration between the Netherlands Foreign Investment Agency (NFIA) and the Dutch regional development agencies - to help these companies expand in the Netherlands. Invest in Holland welcomes companies that can bring these new insights and expertise to the Netherlands, so they and the Dutch alternative protein cluster can grow.

Shaping the future of food together

Foodvalley NL, The Protein Community, BO Akkerbouw

Foodvalley NL, founded in 2004, is the independent international platform for ground-breaking innovations that enable the transition to a sustainable food system. Since 2004 Foodvalley develops and strengthens the ecosystem: an international network of organisations and companies that jointly work on the future of food.

Jeroen Willemsen, Innovation Lead Protein Shift at Foodvalley NL, explains:

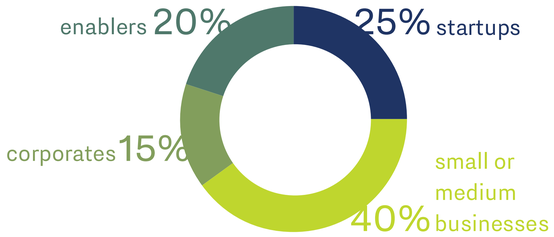
- "Only together we can realize our vision: in 2050 ten billion people all over the world, have access to tasty, affordable, healthy, and sustainable food, with respect for animals and our planet."

Foodvalley sets the agenda, keeps the pace, and guides organizations and companies – from start-ups, scale-ups and corporates to investors- through the transition. Foodvalley identifies and values innovations and opportunities at an early stage and connects them with international partners, unique knowledge and facilities, top-notch talent and access to global markets and funding.

Foodvalley focuses on three Innovation fields: Protein Shift, Circular Agrifood, Food & Health in which we organise inspiring Innovation support services: Entrepreneurship, Global connections, Talent, Innovation insights and Shared facilities. In this way, innovations scale up more quickly and companies grow and develop swifter.

The Protein Community (TPC) connects alt-protein start-ups and corporates worldwide. By accelerating their innovations and business growth by coupling them with inspiring international partners, capital, unique facilities, and providing knowledge, and in-depth events. TPC is a cooperation between the Dutch provinces of Gelderland and Overijssel, Oost NL and Foodvalley NL.

Community diversity



TPC currently counts over 110 members, innovative start-ups and SME's represent some 65%, 15% are corporates like DSM, Kraft-Heinz, Unilever and Upfield, while the remaining 20% are enablers, such as system suppliers or knowledge experts.

- "The Netherlands is unique in its ability to collaborate and to connect stakeholders. We are an innovative country characterised by the ability to upscale alt protein innovations. Innovations and research are important, to make an impact on a large scale, you e.g. need experienced production partners, logistics, packaging facilities and financers. By using the collective power of the community, we shorten the time to market for innovations, from new protein-producing technologies to plant protein ingredients or consumer-ready products." Willemsen adds another observation: "Besides Dutch companies, we now see many international food companies acknowledging the strengths of the Netherlands, such as Beyond Meat, Meatless Farm, Enough, Oatly and Redefine Meat opening production or R&D facilities here."

BO Akkerbouw is the Dutch interbranch organization for arable crops. The sector is responsible for a joint added value of 15 billion euros. BO Akkerbouw has twelve member organizations, which together represent around 20,000 businesses including around 13,000 farmers. We met with Director André Hoogendijk.

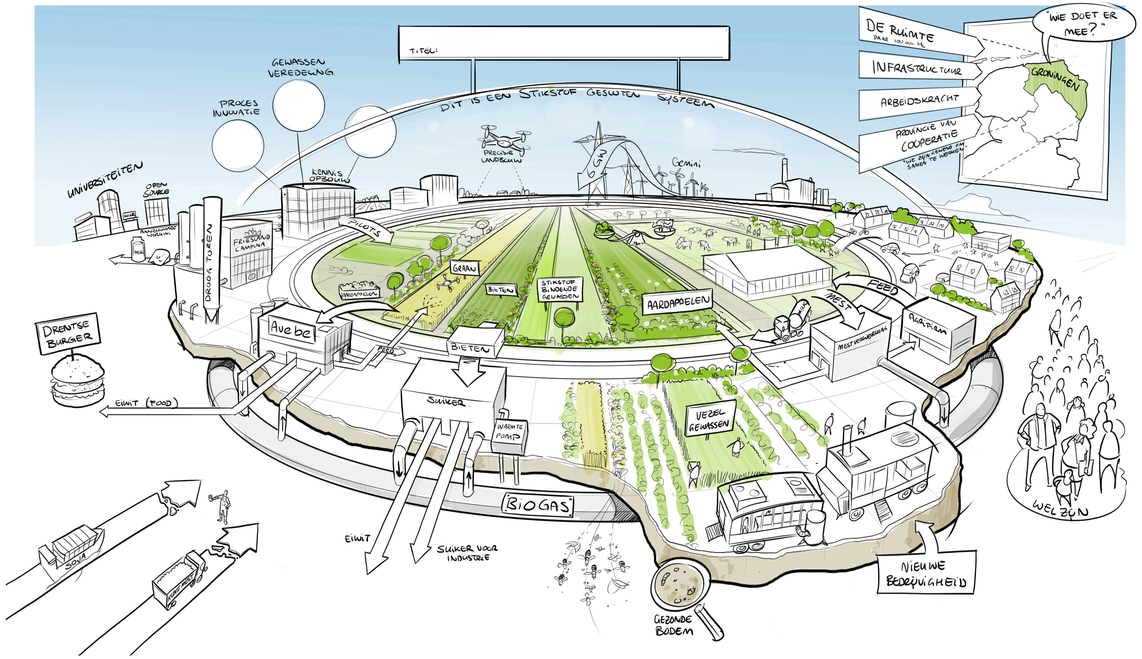
- "The Dutch arable farming sector is incredibly strong and most definitely something to be proud of. As BO Akkerbouw, we deal with interdisciplinary research and innovation themes that individual farmers or companies should not have to handle on their own. As BO Akkerbouw, we connect the producing farmers with relevant stakeholders inside and outside of the sector, including the government. We contribute to the Climate Agreement and we strongly focus on research and innovation.
- The protein shift is a theme which is important for us and our members to focus on, as it has a long-term effect on our sector and food system as a whole. Growing protein-rich crops and extracting proteins from sugar beets and potatoes is part of our Climate Agenda. It contributes a more resilient food system and strengthens biodiversity."

Protein shift on applied scale

Fascinating

The Netherlands is a well-known agricultural region. With thousands of farmers producing milk, sugar beets, (starch) potatoes and other crops, the small country feeds the world. At the same time, this country is faced with the complex issue of sustainability: how can the vital agricultural sector contribute to a sustainable society and a healthy diet for everyone while remaining economically viable? The **Fascinating** innovation programme is an example of a successful collaborative project.

These questions are at the heart of the Fascinating innovation programme. This 10-year programme connects the private sector with researchers, more than 100 agri-food companies and governments to create “the agriculture of the future”. One of the focal points, in that future, is the sustainable production of nutritional crops for healthier consumer foods. In short: more nutritional value per hectare.



We spoke with Elzo de Lange, the Quartermaster of Fascinating, and Sven Stielstra, the Business Developer at Campus Groningen, to learn more about Fascinating.

Can you tell us more about the Fascinating project?

- Elzo: “The protein shift plays an important role in the earning capacity of the sector, greatly contributing to incomes, biodiversity and the use of raw materials. Fascinating translates healthy diets into nutritional crops and dairy, balanced with nature. A circular system, free of CO2 and nitrogen emissions and with improved soil quality. All major protein processors (alternative and of animal origin) are involved: FrieslandCampina, Agrifirm, Avebe, and Cosun Beet Company.”
- Sven: “Several universities (University Groningen and Wageningen University & Research) and stakeholders like the Agricultural and Horticultural Association North (LTO Noord), Province of Groningen, the regional cooperative Zuid-Oost Groningen and SMEs are actively participating in the project. Financiers like Invest-NL and the Investment and Development Agency for the Northern Netherlands (short NOM) have a special focus on investments that are aligned with the objectives of Fascinating. Investors and scale-ups that want to accelerate with high-end plant-based proteins, will find favourable conditions in the Netherlands.“

The program started in 2020. What are your next steps?

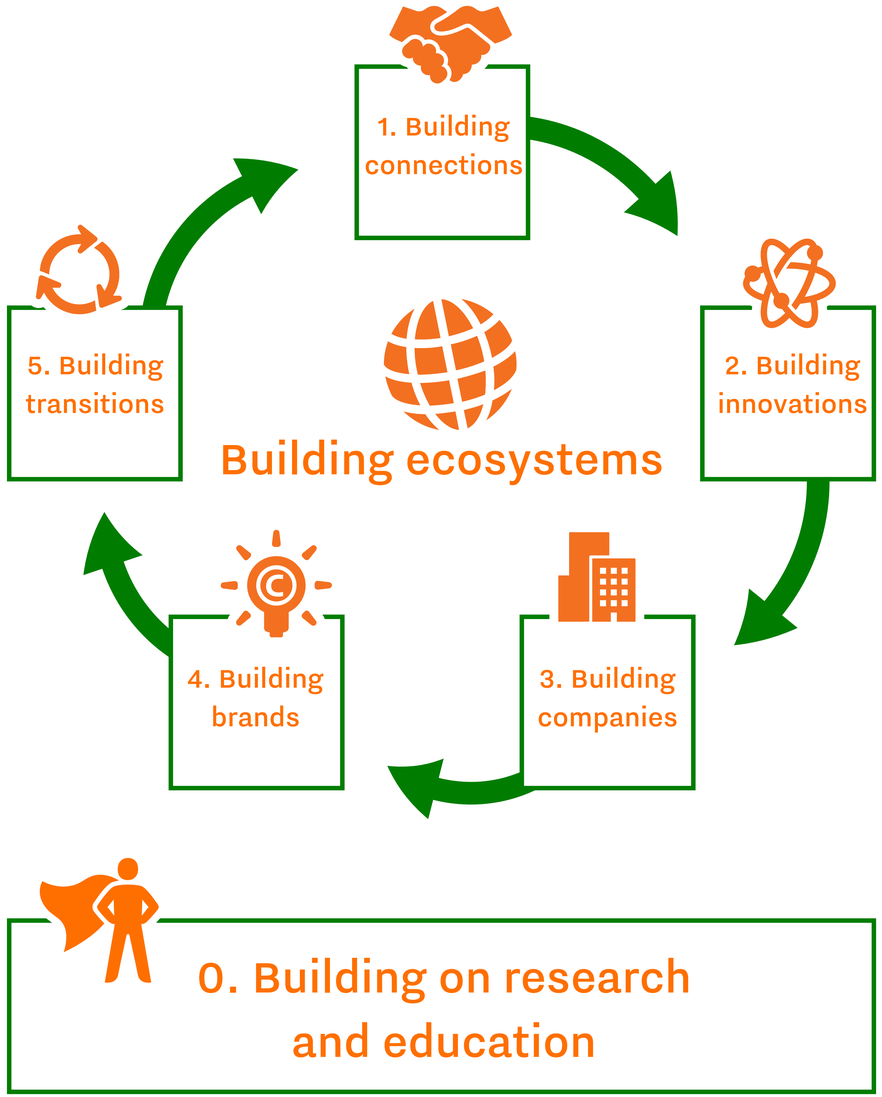
- Elzo: “For the coming three years, some 20 million euros are invested in a range of applied innovations that will contribute to our ambitions. This amount will increase to 100 million euros in the next 10 years.
- We are testing a broad range of promising new protein crops on different soils. Break-through process technology for extracting and drying proteins will also be demonstrated. Furthermore, we are developing an industrial-sized protein processing facility.”

Does Fascinating have an international focus?

- Sven: “Most definitely. Fascinating wants to feed the world with nutritional and functional proteins, related expertise, and innovative technology. Campus Groningen is the ecosystem to make this happen. National and international partners can co-develop their technologies and business here, using shared R&D and pilot facilities, excellent research groups, multiple housing options and a large pool of brilliant (young) people. In short, Campus Groningen facilitates parties from abroad to become part of Fascinating and the Netherlands AgriFood ecosystem.”

III. Our way of working

The Big Five of Future Protein NL



Our research has found that five main factors, as illustrated by the figure on the right, have contributed to the leading position of the Netherlands. These factors all have a strong foundation of high-quality education. The Dutch education system is well-reputed worldwide, with both excellent primary and secondary education, as well as high-quality higher education and training.

Building ecosystems

1. Building connections: A collaborative agri-food cluster is a leading characteristic of the alternative proteins sector in the Netherlands. This well-established ecosystem is built from entrepreneurship and experience, world-class universities in agri-food, excellent connectivity, and logistics, as well as an approachable and supportive government. As a gateway to Europe, the Netherlands is often selected by foreign companies as the location for head offices, manufacturing or research facilities. It is shown that 90% of Dutch people speak English, which fosters a growth environment for international companies.
2. Building innovations: The Netherlands ranks the sixth most innovative country in the world (Global Innovation Index 2021). It is also the birthplace of several successful and innovative companies and products, including cultured meat and fermentation technologies.
3. Building companies: The Netherlands has an excellent climate for accelerating innovations to start-ups, and ultimately start-ups to large-scale impactful companies. The Dutch alternative protein landscape is a combination of and collaboration between start-ups, scale-ups and large-scale industries.
4. Building brands: Several world-leading brands and creative concepts have originated in the Netherlands, including Mosa Meat, Protix, Schouten, The Vegetarian Butcher / Unilever, Vivera, and many more. Furthermore, Dutch consumers are amongst the global frontrunners in the protein shift: per capita consumption of meat analogues is the highest in Europe (ProVeg, 2021).
5. Building transitions: The Netherlands has over a century of experience in the protein industry. The existing infrastructure, knowledge and experience have been essential in leading the transition from animal-based to non-animal-based proteins.

The Netherlands is focused on solving global challenges together through collaboration beyond borders. An open, inventive, and inclusive culture makes the Netherlands an ideal partner for other countries to work with on the Global Goals (Sustainable Development Goals).

0. Building on research and education

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A strong foundation of research centres and universities

The Netherlands is an international figurehead in agri-food related knowledge. This ensures a highly skilled workforce with excellent command of the English language. Furthermore, there are many research facilities available for companies looking to test, trial, and upscale the production of their innovations.

Research centers & institutes

- Bioprocess Pilot Facility
- Food Application Centre for Technology
- Food Tech Brainport
- Green Protein Excellence Center
- INNOLAB
- Louis Bolk Institute
- NIZO
- Planet B.io
- Susinchain
- The Protein Competence Centre

World-class universities in agrifood

Amongst the leading universities are:

- Aeres University of Applied Sciences (Almere)
- Delft University of Technology
- Eindhoven University of Technology
- HAS University of Applied Sciences (Den Bosch)
- Leiden University
- Maastricht University
- University of Groningen
- Utrecht University
- Wageningen University and Research (WUR)

World-class knowledge & development

NIZO and Wageningen University & Research (WUR)

NIZO is a private R&D centre focused on the development and application of innovations for the global food industry. We talked with Fred van de Velde, the Expertise Group Leader of Protein Functionality.

What characterises the alternative protein ecosystem in the Netherlands?

- "The Netherlands is a protein country. We build on our experience in the meat and dairy industry to find practical solutions for alternative proteins. Our ecosystem is characterized by its comprehensiveness: we are experts in all parts of the supply chain and many different protein sources. We are frontrunners in scientific knowledge, the transition from ideas into practice, the production of crops, and the valorisation of residual flows."

What makes NIZO unique?

- "We are an independent and private organisation offering essential knowledge and facilities to companies looking to develop their product. Unlike in a public institution, clients at NIZO always retain ownership of their products and the results of studies do not have to be made publicly available. This makes NIZO the most suitable partner for clients looking to trial products without the risk of exposing sensitive information to other competitors. For the more fundamental science-based problems, we usually refer clients to universities".

What developments do you observe?

- "My focus is on solving the two major issues in alternative protein products: low solubility and off-flavour and taste. At NIZO, we use extraction and processing to obtain high-quality protein ingredients, whilst monitoring the properties and perception (texture and flavour) of the final product.
- In general, I see a trend of consumers increasingly demanding healthy and sustainable non-animal-based products, with a nutritional profile that matches the animal-based alternative. In this industry, fermentation and the Faba bean especially are receiving a lot of attention."

Wageningen University and Research (WUR) is the beating heart of education, research, and development of alternative proteins. Founded in 1918, the WUR is on a mission to 'explore the potential of nature to improve the quality of life'. The WUR is a collaboration between the University and the nine Research Institutes which independently carry out application-oriented and field-based research. We met with Ariette Matser, expertise leader in Food Processing Technology at Wageningen Food & Biobased Research.

- "The Netherlands is a global leader in knowledge of proteins. For the past 100 years, we have focused on animal-based proteins, but in the last 15 years, we have made incredible progress in the field of alternative proteins. To make the protein shift happen, we have to focus on ingredients that are scalable and locally available. We need to continuously innovate in processing technologies to allow for milder processing, whilst creating tasteful and succulent products.
- WUR is part of a larger system, and we truly believe in finding holistic solutions together. We collaborate with other knowledge institutes and the private sector. To join scientists together to exchange knowledge, we have organised two scientific conferences about alternative proteins, and we have published an elaborate review on the latest status of meat analogues and alternative ingredients. We are increasingly focusing on multidisciplinary collaboration between knowledge domains. Connecting different research fields, such as technological innovations and consumer behaviour can create a substantial impact."

WUR is active in various domains of the protein shift. This includes research and development into plant breeding, food processing, policy, and consumer behaviour.

1. Building connections

1. Building connections

A supportive ecosystem

The Netherlands is widely known as a small country in size (237 times smaller than the United States) and is located strategically in Europe. Combined with world-class infrastructure, four seaports, and an international perspective, collaboration is in Dutch nature.

The Dutch approach is known as the Triple Helix, whereby entrepreneurs, research institutes, governments, and societal organisations work together with a common interest to further advance the market and meet global societal challenges. There are over 500 examples of public-private partnerships which offer opportunities for networking, knowledge-sharing and business ventures.

The Dutch are known for open innovation, exchanging knowledge, and thinking out-of-the-box. The Dutch highly value collaboration, direct communication, and a good mix of 'gezelligheid' (sociability) in business. From small-scale to multinational companies, from upcoming parties to proven concepts, the Dutch are well-connected and can easily access other organisations.

Several network organisations have contributed to establishing connections and providing platforms for people to meet.

Global Dutch

As a world leader in agri-food innovation, the Netherlands is known as the gateway to Europe. Fifteen of the top twenty biggest agri-food companies have major production or R&D sites in the Netherlands. The list includes Nestlé, AB InBev, Coca-Cola, Unilever, Heineken, Cargill, and Kraft Heinz, but also fast-growing innovators like Innocent Drinks and Lamb Weston. There are several Expat Centres in the Netherlands, helping international companies with work and residence permits, housing, schooling, healthcare, personal needs and a streamlined admission procedure.

In the alternative protein category, several big names have collaborated with Dutch stakeholders or have settled in the Netherlands with production facilities or offices:

- Beyond Meat (USA) selected the Netherlands in 2020 to open its first co-manufacturing facility in Enschede.
- ENOUGH (a subsidiary of the Scottish 3FBIO) invested 42 million euros in a factory in Zeeland.
- Meatless Farm (UK) collaborated with Van Loon Group to set up their factory in Almere.
- Oatly (Sweden) selected the Netherlands as their first location outside of Sweden for a production facility in Vlissingen.
- Proeon (India) chose the Netherlands as the location for their new research lab in Delft.
- Redefine Meat (Israel) opened its factory in the Netherlands to print 3D plant-based meat for EMEA in Best.
- Sophie's BioNutrients (Singapore) expanded to the Netherlands (Amsterdam). The company produces a pure protein flour from microalgae (fed off of food waste), used for any food application.

Due to its location and connectivity to Europe, the Netherlands provides access to over 244 million consumers within 1,000 kilometres, having 95% of Europe's most lucrative consumer markets just around the corner. The Netherlands is a frontrunner in strong infrastructure, logistics and distribution. Dutch companies and research institutes are at the frontier of AgTech innovation and R&D.

The Dutch government assists businesses in the Netherlands and abroad by providing information and making connections through its network of Innovation, Agricultural Attaches and NFIA offices. For businesses that consider expanding into Europe, the NFIA helps and advises foreign businesses in the various stages of establishing, rolling out and expanding their international activities in the Netherlands. For more information, visit www.investinholland.com.

Mission-aligned partners

LIVEKINDLY Collective

LIVEKINDLY Collective is a worldwide collective of founders, entrepreneurs, and business leaders with a mission to make plant-based living the new norm. Their goal is to connect people and brands, helping them to scale (internationally). Their portfolio consists of seven brands (including The Dutch Weed Burger). In the first fifteen months, LIVEKINDLY Collective raised 538 million US dollars, of which more than 100 million US dollars was invested by the Netherlands. We spoke with Tal Nadari, Regional Director of Europe, UK, Australia, and New Zealand.

Why was LIVEKINDLY Collective founded and where are you based?

- "We want to fix the broken food system by encouraging producers, consumers and governments alike to live kindly. We cannot feed ten billion people with the way we produce and consume food today. We cannot ignore the climate, the Earth, and our surroundings. There is no multinational player solely focused on alternative products. That is why LIVEKINDLY Collective is the unique Global Pure Player in this field. Founders Kees Kruythoff and Roger Lienhard got together in March 2020."

LIVEKINDLY Collective builds a portfolio of front-running brands. Why do you believe in brands?

- "We focus on brands because brands offer us a way to speak to consumers. Some brands tailor to vegans, others speak to meat lovers. Our products need no compromise – the taste can satisfy any craving on any eating occasion."

Which consumers are you targeting?

- "Meat analogues can be expensive; we want products that are accessible and available to all consumers. We are investing in increasing capacity and to improve local sourcing to meet the growing demand of our products. We are fixing food chains by connecting farmers to consumers while reducing carbon emissions throughout.
- Research has shown that 75% of Dutch consumers want to eat less meat. The consumer journey from carnivore to flexitarian or vegetarian is a diverse route. People need trigger points to 'wake up'. This can be watching a documentary (Gamechangers, Cowspiracy), meeting new people, or becoming a parent.
- Minds change first, behaviours follow. On average, people cook twelve to fifteen different dishes in their lifetime. The transition from meat to alternative products is the easiest when products are familiar to people. They like their favourite dishes, and they want to have products with the same functionality and taste as what they know. Experienced consumers start to experiment, trying out new protein sources (such as seaweed) and finding new applications for products."

Can animal-based meat companies contribute to the protein shift?

- "They have to. In South Africa, we have partnered with RCL Foods, the biggest meat producer in the area. Meat producers have the logistics and knowledge of how to deliver trucks full of produce to retailers, on time, every day. Therefore, traditional animal-based companies are necessary to add scale and speed to the protein shift.

What can governments do to support the ecosystem?

- "The Dutch government has increasingly been joining the discussions and becoming more aware of their role in the protein transition. Firstly, governments must create a supportive environment with substantial funds to stimulate innovation and development. Secondly, the government is in the perfect position to bring stakeholders together and to start the conversation. Finally, consumers must be educated. Through storytelling, documentaries and relatable role models, consumers can be made conscious of the relevance of the protein transition and the effects on their health."

Do you foresee a fully alternative protein future?

- "Personally, I hope so. Technology is crucial in creating tasty products. At this point, meat analogues still need to resemble animal-based meat to accommodate the habits of the consumer. We are seeing the rise of locally available proteins, such as yellow peas and Faba beans in Western Europe now. We foresee a future of a variety of products, leaving room for different crops, seaweed, cultured meat and insects."

The green gold

The Dutch Weed Burger

The Dutch Weed Burger, founded in 2012, supplies products enriched with Dutch-grown seaweed. In 2021, the company announced it was joining LIVEKINDLY Collective. We met with Co-Founder Mark Kulsdom.

What makes the Netherlands an alternative protein powerhouse?

- "The Netherlands has the highest consumption of meat analogues in Europe. Together with its central location, excellent infrastructure and seaports, the country is an ideal distribution hub for the European continent. I would say the Netherlands has been a leader in alternative proteins for the past ten years, in part due to the advanced research and innovation at Wageningen University & Research."

You were one of the first companies to center your business around seaweed. What motivated that choice?

- "In 2012, scientists first labelled seaweed as 'the protein of the future.' We felt that seaweed and microalgae were the missing links that would allow us to change our diets to be fully plant-based without missing any nutrients. For many people, seaweed was a very exotic and novel product. In 2017, the market for alternative products blew up. While we were one of the only two vegan caterers in 2012, we now see new products, brands and companies launching every day. It's getting crowded, but it's good as well. It raises the bar of quality constantly!"

Did you get a lot of support as a starting company? And how has the transition into LIVEKINDLY Collective been for you?

- "The Netherlands has a good climate for entrepreneurs, especially those that focus on purpose and social value. We have received a lot of support from the Impact Hub and Social Enterprise Nederland. We have quite a track record already in the market, However, it remains difficult to become a truly established company in the food industry. We sought collaboration with LIVEKINDLY Collective because they respect the uniqueness and authenticity of each individual brand, and they empower us to grow and become an international brand while keeping our own identity."

How do you foresee the future of proteins?

- "We are not looking to make meat-like products. We want to celebrate the power of plants by making unique products, with the best resources the plant-based kingdom has to offer. With the existing prejudice of plant-based diets being dull, we are starting to change that mindset through our own approach, based on respect for animals and the planet, mixed with radically delicious food! Thus, it's a win for all."

Making more with less

ENOUGH

ENOUGH BV is a food tech company with a purpose “to make protein sustainable” by growing mycoprotein, an existing ingredient with an established market role, more sustainably and at lower cost than all other protein options. With support from investors and the EU’s Bio Based Industries Joint Undertaking, ENOUGH is co-locating next to Cargill and building its first large-scale facility in Zeeland. It is expected to be completed by September 2022. Operations Director Rob Cogghe, told us all about the factory.

Why do we have ENOUGH?

- “We have had enough cows, enough chickens, we have been fishing enough. Our product, ABUNDA, is a ‘wet protein’ with the consistency of minced or pulled chicken. Every kilogram of ABUNDA uses 93% less water and 92% less CO2 emissions than beef (64% and 66% for chicken, respectively). This means that every hour we produce ABUNDA (1.6 MT), the equivalent of 7 cows or 133 chickens are saved from being slaughtered. ABUNDA is a unique product: colourless and odourless so applicable in any product without an aftertaste.”

Why did you select the Netherlands as the location for your new production facility?

- “We were looking for a location where we could find fermentable glucose (sugar from wheat), which is our key ingredient for producing ABUNDA, and a place to dispose of our waste streams. We considered many locations in Europe, but eventually, we chose Cargill in the Netherlands. We view the Netherlands as an extremely positive environment for entrepreneurs. The national and regional governments are both very vocal about their strategic focus on the protein shift and sustainability in general. The Netherlands is attracting more and more companies, including Meatless Farm, Oatly, and ourselves. People are curious, positive and eager to help.”

How is mycoprotein made?

- “Cargill provides us with sugars, which we ferment into the mycoprotein we deliver to our clients, the producers of meat analogues. The biggest advantages of the ENOUGH process are: energy efficiency, zero waste, and no noise or odour are released during the production process.”

What are your future plans?

- “We need to constantly innovate. We are eager to attract young talent; to give them the opportunity to work in this exciting field and for us to share our experiences with them. Through our partnership with Cargill, our international ambitions will likely include a move to the US, as well as to Asia and South America.”

Strong partnerships and a gateway to Europe

Beyond Meat

Beyond Meat, founded in 2009 in the US, is a leader in plant-based meats. Beyond Meat products are designed to have the same taste and texture as animal-based meat while offering certain environmental benefits. As of June 2021, Beyond Meat has products available at approximately 119,000 retail and foodservice outlets in over 80 countries worldwide.

Beyond Meat has selected the Netherlands to expand local production capacities in Europe. The Netherlands is the only location in Europe where Beyond Meat has opened a manufacturing facility. We met with a representative from Beyond Meat.

Why is the Netherlands the place to be for plant-based meat producers?

- "At Beyond Meat, we have strong ambitions to make delicious plant-based meat more accessible to all. That's why in June 2020, Beyond Meat announced the opening of its first co-manufacturing facility in Europe in partnership with Zandbergen World's Finest Meat as well as the acquisition of the company's first manufacturing facility in Enschede, both of which are located in The Netherlands.
- The decision to open a co-manufacturing facility in the Netherlands was made, in part, due to the strong partnership we have built over the past years with our partner, Zandbergen World's Finest Meat. Zandbergen was an early importer of Beyond Meat products and helped us further expand the brand across the EMEA region.
- Following the opening of this first co-manufacturing facility, we wanted our fully owned second facility to be located nearby for ease in production. The manufacturing facility in Enschede works in tandem with the Zandbergen co-manufacturing facility, allowing for end-to-end production in Europe. Together, these facilities have allowed us to roll out our innovations at the pace and scale needed to remain highly competitive in the region, as we work to bring the nutritional and environmental benefits of plant-based meat to consumers across EMEA.
- Having a manufacturing presence in Europe not only brings production closer to the consumer, but also allows us to leverage local supply chains that will ultimately improve our cost structure and sustainability of operations. A local manufacturing presence further allows us to get one step closer to achieving price parity with animal-based meat.
- With the opening of our manufacturing facilities in the Netherlands, we expect to increase the speed, scale and efficiency with which we can serve the growing demand for Beyond Meat products and reach our retail and foodservice customers across Europe.
- Beyond Meat's brand commitment, Eat What You Love™, represents a strong belief that there is a better way to feed our future and that the positive choices we all make, no matter how small, can help us move towards the kind of future we want. By shifting from animal to plant-based meat, we can help address concerns related to resource conservation and animal welfare."

2. Building innovations

2. Building innovations

Novel technologies, ingredients and concepts

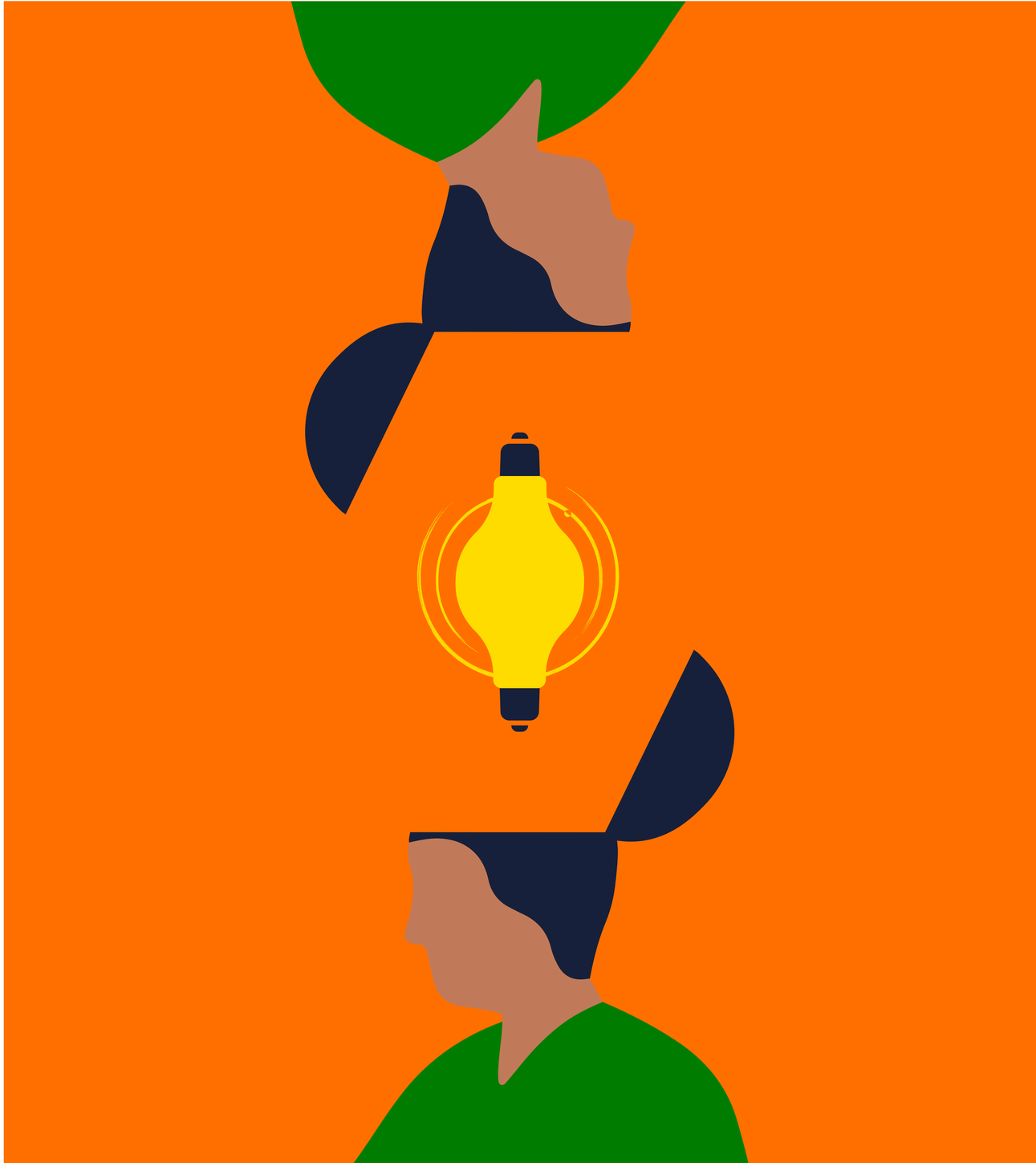
The Netherlands is an innovative country. The Netherlands is very strong at translating research and development (R&D) into well-functioning products and even industries.

Too often, valuable interventions never make it to the market. To successfully launch an idea or innovation to the market, several factors are of importance, those of which the Netherlands is successful in achieving. They include:

- High-quality fundamental research is vital, especially in the fields of food safety and product development, as well as practical issues such as shelf life and packaging.
- The strong connections between actors (including researchers and entrepreneurs) in this Topsector allow for close collaboration. Private sector players, public stakeholders, and research institutes cooperate towards a common goal.
- Companies in the Netherlands have strong business acumen. The excellent business climate allows businesses to thrive and allows start-ups to expand into scaleups and established corporates. It allows for the successful launching of new ideas to the market.
- Excellent infrastructure of logistics and a strategic location in Europe allow businesses to effectively produce raw materials and efficiently reach consumers throughout Europe and beyond.

This chapter underlines several examples of pioneering technologies, ingredients and concepts which have successfully been launched into the market. These examples include, but are not limited to, the following:

1. Proteins produced on land and in the sea: De Nieuwe Melkboer, The Dutch Weed Burger, Seamore, and Zeewaar.
2. Proteins produced with mycoprotein (fungi), algae, and/or cellular agriculture: Avebe, Duplaco, ENOUGH, Fumi Ingredients, Lgem, Meatable, Monkeys by the Sea, Phycom, Mosa Meat, The Protein Brewery, and Those Vegan Cowboys.
3. Insect-based proteins: InsectoCycle, Ÿnsect (formerly known as Protifarm), and Protix.



Student to startup

FUMI Ingredients and Rival Foods

FUMI Ingredients creates egg ingredients without the chicken. Their egg-replacers are based on natural micro-organisms. Founded in 2015, the company is now collaborating with ABInbev to scale up production to several kilograms a day. We talked with Founder Corjan van den Berg.

- “Our technology allows us to valorise residual flows. We are collaborating with ABInbev to turn their residual brewery yeast into an egg alternative. The product works as a binding agent with a high protein content really well. We also foresee a future for plant-based cheese.
- The market demand for this product is significantly larger than what we can supply currently, as it is a valuable ingredient in meat analogues or bakery products. Our yeast protein is a great addition to functional protein extracted from sugar beet leaves or potatoes. We are looking to scale up our production to meet the growing demand of several meat analogue producers.”

Rival Foods is a Wageningen University spin-off offering food companies a unique technology that creates plant-based alternatives of high-quality meat, fish, and poultry whole-muscle products. We met Co-Founder Birgit Dekkers.

What important trends do you observe in the alternative protein sector?

- “Frontrunners such as the Vegetarian Butcher first attracted attention for the category of alternative proteins, with corporates such as Unilever and Nestle now joining the scene. Consumers are increasingly demanding ‘clean label’ and healthy products, which is why acceptance amongst consumers is essential to further advance the sector.”

How would you describe the climate for start-ups and entrepreneurs in the Netherlands?

- “The Netherlands has an excellent business climate with different accelerator programmes for starting companies. Programmes are offered by the EU, Wageningen University & Research, Foodvalley NL, and regional and national government bodies. Subsidies are readily available in the initial stages of starting up. This does, however, become more difficult with EU subsidies for the scale-up phase, as registration is time-consuming. There is also an informal network of experienced entrepreneurs sharing their know-how.”

Novel solutions from established companies

Avebe and Ruitenberg Ingredients

Royal Avebe is an ingredient supplier producing potato starch and potato protein since 1919. Avebe has developed a technology to extract proteins from potatoes whilst maintaining their nutritional value ('Solanic'). We discussed this with Gerard ten Bolscher, Managing Director Innovation & R&D, and Marc Laus, Technology Officer Product & Application.

What characterizes the Netherlands for you?

- Marc: "The Netherlands is the hotspot for companies inventing new products and applications. We have a long and rich history in protein production."

Why potato proteins?

- Marc: "Avebe has always been a plant-based company. Potatoes are never perceived as protein-rich products, but the protein yield per hectare is much higher than soybeans and comparable to Faba beans. Many of the products in supermarkets contain potato-based ingredients. Potatoes are locally grown products offering incredible potential for the protein transition."
- Gerard: "Our product is fully plant-based and without any artificial food additives. We are valorizing potato protein through improved technology to create a functional protein used in plant-based meat, milk, and cheese, but also confectionery products (gelatin-replacement). Potato proteins are excellent replacements of eggs, as only small quantities are required to match the functionality of eggs (binding agent, foaming, emulsifying)."

What market developments do you observe?

- Gerard: "The consumer is increasingly demanding healthy and 'clean-label' products. Compared to beans, potato proteins deliver a much better texture, creating a larger similarity to dairy proteins or egg white. The nutritional profile of our potato proteins is largely on par with cowmilk, meaning that it is an excellent replacement of dairy proteins in a diverse range of products." Marc concludes: "Besides that, our Solanic potato proteins are 'clean label': they do not require allergen labelling and can simply be labelled as potato protein. This makes them suitable for numerous consumers."

Ruitenberg Ingredients is a Dutch family-owned business in the food industry. The company designs creative and innovative solutions, including plant-based textures and edible sausage casings. We met with the R&D Manager, Marian Verbruggen.

Can you tell us more about your plant-based sausage casings and meat analogues?

- "Our casings are based on seaweed extract and are the only alternative to common (artificial and animal-based) casings suitable for all sausages, including plant-based. The product was developed in response to the BSE crisis (mad cow disease) as a safe alternative for animal-based products. Rudin®ProVega is a unique protein structure with texture, bite, and juiciness comparable to meat. Our innovative technology allows us to switch between protein sources. We can make products from animal-based proteins (milk or egg) or proteins that are plant-based (Faba bean, pea, etc.). Unlike other meat analogues, we do not use extrusion to obtain our structures. Other product lines, such as our filling systems and smoke flavourings, contribute to the development of attractive concepts with our customers which are then introduced into the consumer market."

Which trends do you foresee for the protein shift?

- "In addition to meat analogues, we are developing plant-based alternatives in the convenience and confectionery segments. Gelatine, as well as egg proteins, need plant-based alternatives with similar functionality, no off-flavour and to still be affordable for the consumer."

What makes the Netherlands a leader in the protein shift?

- "The entire supply chain is represented in the Netherlands. We have seed breeders, ingredient producers, pioneers in biorefinery, processors, and we are a global frontrunner in terms of knowledge and openness to collaboration. Furthermore, we are not afraid to experiment with new protein sources, such as algae, seaweed, and insects. We have a good support system and can easily reach out to one another."

The potential of speed breeding for proteins

KeyGene

KeyGene is an ag-biotech company specialising in innovative plant molecular genetics research and crop development for higher crop yield and quality. KeyGene exists for over 30 years, employs over 160 professionals and has a turnover of 23 million euros. KeyGene is based in the Netherlands (HQ), US and India and serves from there many companies all over the world.

KeyGene is actively promoting speed breeding to accelerate the protein transition. KeyGene is open to collaborating with partners along the value chain to accelerate the improvements of crops for human consumption. We met with Herco van Liere, VP of Business Development, to discuss the potential of plant breeding for the protein shift.

- “Companies are only just starting to realise the potential of speed breeding for protein crops, legumes like Faba beans, peas, lupines and soybeans, for the use of human consumption. KeyGene applies molecular breeding techniques to create various novel plant varieties that meet the requirements of farmers, breeders and the food processing industry. These new varieties for example are developed to require milder processing, which means the qualities of the plant and proteins remain better intact. This leads to improved meat analogues with better taste, texture, and a healthier nutritional profile.
- We are increasingly looking for alternatives to imported soybeans, protein crops that are more sustainably grown in Europe. One example is the Faba bean that grows well in the North-Western European climate. Of all legume crops, Faba beans have the highest protein yield per hectare and the highest positive impact on soil fertility (N-fixing capacity).
- No other company has dedicated as much effort and energy into speed breeding technologies and the know-how of food grade legumes like Faba beans, as we have. To be successful in the protein shift, companies along the value chain have to cooperate to invest jointly. We invite companies to partner.We offer access to our extended network and provide insights and access to our varieties-under-development.”

Providing efficient proteins to the world

Ÿnsect

Ÿnsect (formerly known as Protifarm), was founded in 2015. Ÿnsect is a global leader in insect ingredients and produces ingredients for meat alternatives, but also bakery, sports nutrition, pasta, and more. Ÿnsect employs over 200 international employees in France, the Netherlands and the USA. We met with Tom Mohrmann, CEO at Ÿnsect the Netherlands.

How can the Netherlands work towards a restored balance of animal-based and non-animal-based proteins?

- "To feed the growing population with sufficient proteins, we have to find alternative and novel protein sources to complement the proteins we know now. Across the world, we see an increasing consumption rate of animal-based proteins such as meat, fish, egg, milk and cheese. However, to ensure satisfactory diets for generations to come, we have to diversify the sources of our proteins.
- Multiple initiatives are contributing to that protein shift: our insect protein is one such example. If we were to set up our farm on a mere 260 square meters (the size of three Wadden Islands in the Netherlands), we could provide everyone on the planet with about 40 grams of protein per person per day. It is really extremely efficient."

How can and will insect-based products contribute to the protein shift?

- "Efficient and sustainable solutions will help us achieve a healthy lifestyle as well as a healthy planet. To contribute to the protein shift, we developed AdalbaPro, the world's first range of insect ingredients for the food and beverage industry. AdalbaPro is made of Alphitobius diaperinus (buffalo mealworm), a hardy insect with exceptional nutritional values. Insects are highly nutritious and much more sustainable than other protein sources. Compared to alternatives, insect production requires much less land, water and feed."

How have you experienced the transition from Protifarm to an Ÿnsect company?

- "Very well. We learn a lot from one another and we complement and strengthen each other in various areas."

Can you tell us about Ÿnsect's international ambitions?

- "Our production and processing systems are highly scalable and can be set up anywhere in the world. We have the ambition to cultivate and process insects in multiple locations while keeping our food miles as low as possible. We envision a licensing model whereby we enable other companies to set up their own cultivation and processing facilities with our technological knowledge."

Microalgae as high-quality and scalable future protein

Phycom and Lgem

Phycom is one of Europe's largest producers of high-quality microalgae with functional and nutritional properties. We spoke with Christiaan Stumphius, CCO at Phycom, at the Food Forum in Almere.

How are algae grown?

- "At Phycom, we produce algae in fully closed systems. This greatly contributes to constant quality but also prevents any contamination from other substances. Products grown in open water bodies have the risk of absorbing contaminants and debris, which our system prevents. We deliver algae to our consumers in the form of paste, pellets, flakes, or powder."

Are Phycom's microalgae used for meat analogues?

- "Yes, microalgae greatly contribute to the taste, functionality, and nutritional value of meat analogues. Algae are an incredibly efficient source of protein and amino acids. They also function as a binding agent, improving the texture of products."

Do you foresee a substantial role for microalgae in the protein shift?

- "Microalgae are one of the most scalable and high-potential protein sources of the future. We are continuously researching and developing microalgae to play a more prominent role in the protein shift. For instance, we are currently researching how to increase the quantity of microalgae used in meat analogues. There is great potential for microalgae as a functional ingredient in meat analogues as they possess suitable binding properties."

Lgem designs and manufactures reliable and innovative systems to grow algae. Lgem produces efficient (low-labour, low-energy) and scalable systems available globally. Lgem is supplying a large-scale alternative meat producer with algae to improve taste, texture, and nutrition. Lgem's algae photobioreactor systems can produce any species, especially fragile species of algae, ranging in the application, from feed and food to cosmetics and pharma. We visited Lgem's facilities to meet with Chief of Operations Sander Hazewinkel.

- "Algae have protein levels similar to meat and fatty acid profiles such as fresh fish. Nannochloropsis oculata for instance closely resembles the nutritional profile of herring; high in Omega-3 fats and with 70% proteins, algae are alike herring but without the fish. Algae improve the taste, texture, colour and nutritional profile of non-meat and non-fish products.
- Compared to soy, which harvests ~400 kg protein per ha, algae yield 15 to 30,000 kg of protein per ha. Algae are precious, yet affordable non-GMO components of food chains.
- Algae are a sustainable and healthy alternative in strengthening the food system. The potential of algae is enormous, and we are aiming far beyond the European market."

Fermenting future foods

The Protein Brewery

The Protein Brewery, founded in 2020, developed a unique protein-rich ingredient: ‘Fermotein’. In their first year, this fast-growing company attracted 22 million euros to construct a demonstration factory. We met with Founder Wim de Laat.

What is Fermotein?

- “Fermotein is a fermented protein which replaces animal-based products in meat- and dairy analogues, pasta and chocolate. The skins of sugar beets, potatoes, cassava, or maize are removed and the rest is put in a fermenter. Through a natural process, the fungus transforms the carbohydrates in the crops into proteins. The protein doubles in quantity every two hours, which is undoubtedly much faster than an animal can grow.
- The unique microorganism is cheaper than comparable alternatives because it is a simpler and cheaper process and no nutrients are lost in the process of fermentation, Fermotein also contains many dietary fibre, essential fatty acids, minerals and vitamins.”

How is innovation best encouraged?

- “Continuous innovation is essential. Standing still and missing opportunities is a bigger risk than making a move. The investment we received from Novo Holdings, Roquette Ventures and Unovis Asset Management, shows trust in our original product. Large corporates can also make a great impact through strategic partnerships and investing in innovative start-ups.
- Furthermore, innovations are achieved by teams. The importance of a strong team and entrepreneurs cannot be underestimated. My slogan is: Grow crops without chemicals, produce proteins without animals.’”

“The importance of a strong team and entrepreneurs cannot be underestimated. My slogan is: Grow crops without chemicals, produce proteins without animals.’”

The missing link in a circular future

Protix

Protix is the market leader in insect breeding for food and feed. Protix is the world's largest producer of insects for animal feed (fish, cattle, pet food), as well as for human consumption. We meet CEO and co-founder Kees Aarts.

Why insects?

- "Especially in these times, it has become very clear that we need our current food system to change and bring it back in balance with nature. The FAO has identified insects as a highly nutritious and healthy food source with high fat, protein, vitamin, fibre, ad mineral content. Insects are the missing link in a circular future and Protix invests heavily in science, technology and the development of new ingredients to serve customers in all segments of the food system. "

How can and will insect-based products contribute to the protein shift in the coming ten years?

- "Insects will contribute both directly (meat analogues) and indirectly (resources for animal feed). Chickens, pigs, fish and shrimp are currently fed soy or fishmeal, which is causing deforestation and overfishing. Protix proteins have a very low footprint and a high nutritional value. Insects can act as an accelerator in the transition towards sustainable meat and will increasingly become available also as food."

How do you envision the development of new meat?

- "At present, plant-based and cultured meat products require many complex additives to create tasty products, increasing the footprint. At Protix, we believe in a multi-species approach, whereby we look at the food system as a whole. We provide animal feed, but also ready-made consumer products including snacks and cooking products, available under the Enough brand."

Can you tell us more about the rules and regulations of insects as food?

- "We are the first insect producer with EU approvals on two applications. The approved novel food application allows us to commercialize insects in Europe and to develop low footprint foods for the conscious consumer. Protix also submits novel food dossiers for the black soldier fly and other species.
- The European Commission authorized the migratory locusts (grasshopper) as human food as part of the push towards more sustainable farming and diets. The approval is great news and an important milestone towards wider commercialization of insects as food."

What are your ambitions for internationalization?

- "Protix products are sold in over twenty countries. We are in the process of expanding our reach by constructing Protix factories in Canada, Korea, the US, and Western Europe. Insects as a circular, natural and nutritious resource offer great potential. We want to move insects as food from 'niche to normal'."

Meat lovers on a mission

Meatable

The cultured meat sector is buzzing. A mere three years after its founding, **Meatable** has attracted over 40 million euros to advance their production of meat. We met with CEO and Co-Founder Krijn de Nood.

- “At Meatable, we love meat. It’s delicious, packed with protein, and brings people together in shared experiences. What we don't love is industrial farming, as producing so much meat for so many people around the world has drastic consequences. Whether it’s animal welfare, the climate emergency, or the health implications associated with industrial farming, more and more people are seeing the downsides and are hungry for a better solution. So are we.
- But despite all this, meat consumption still continues to rise, especially in developing countries. In a world of over 7 billion people, only 8% of people are vegetarian. The market is loud and clear — for the vast majority of humans on earth, meat is still the preferred food choice. So, how do we build on the momentum of meat alternatives when the numbers suggest we need to convince over 80% of the world’s population that choosing something else really is better?

- We don’t do it by taking meat away from people. We do it by finding a more efficient production method for it. Meat, to put it simply, is nothing more than protein and fat cells. Biology has been making protein and fat cells since the beginning of time. Nevertheless, with modern technology and a deeper understanding of biology, we not only know how protein and fat cells grow inside an animal, but we can also replicate that process in factories without the animal.
- Meatable is pioneering a way to make real meat without the need to harm animals, people or the planet. With our product, you can enjoy real meat, without any of the drawbacks. No animals are killed, fewer emissions are released, and significantly less land and water are required. And, unlike plant-based alternatives, our product is literally meat. It has the same taste, texture and nutritional benefits — it’s exactly the same thing.”

Krijn also tells us about his own experience and motivation:

- “During an Erasmus philosophy course in Barcelona, I came across the philosophy of animal rights activist Peter Singer and realised that there was a huge ethical problem - around slaughtering animals for foo d- about which little was being done. This insight stayed with me for years. Then I met Daan Luining and Mark Kotter. Daan had a great idea, Mark had a distinctive technology and I had the commercial insight to do something with this ethical problem. Together we founded Meatable.
- It’s our mission to become the global leader in sustainable and efficiently produced meat. We don’t take that commitment lightly. This does mean that we want and need to have products available in stores at a given point in time and we are aiming to have ours in stores by 2025. It’s our goal to do this as sustainably and effectively as possible.
- The Netherlands offers Meatable a favourable business climate, a partnership with Dutch multinational Royal DSM, access to top biotech universities, and is interesting for talent coming from around the globe. All factors which we can turn to our advantage.”

3. Building companies

3. Building companies

A strong entrepreneurial drive

The Netherlands has an excellent business climate allowing established businesses to innovate and thrive and allowing start-ups to scale and develop into large-scale and impactful companies.

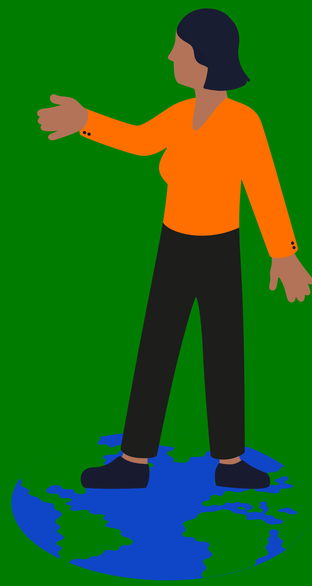
- IMD World Competitiveness Ranking (2021) #4
- Global Innovation Index (2021): #6
- Education First English Proficiency Index (2021): #1
- Digital Economy and Society Index (2021): #4
- World Happiness Report (2021): #5

In total, the Netherlands is home to over 4 million companies (to an adult population of ~14 million people). This is a healthy mix of start-ups, scaleups, and established companies. Many Dutch companies have existed for over 50 or even 100 years. There are over 250 companies active in the protein shift. The Dutch landscape is an effective collaboration between start-ups and large-scale industries, as well as novel foods and more traditional foods. Our talented workforce is educated in the skills of entrepreneurship: there are more than 250 economics, commerce, and management programmes provided by the universities in the Netherlands.

For more than 40 years, the Netherlands Foreign Investment Agency (NFIA) has served as a one-stop-shop for successful European expansion. It has been supporting nearly 5,000 companies from some 50 countries, to establish or expand their business in the Netherlands. As an operational unit of the Dutch Ministry of Economic Affairs and Climate Policy and with 28 offices based at Dutch Embassies and Consulates, the NFIA is the first port of call for foreign businesses looking at opportunities in the Netherlands.

Landing programs and accelerators

- BOX (Blue Ocean XLerator)
- Brave New Food
- Incubase
- Invest-NL
- Protein Fastlane
- ScaleUpFood
- Shared Facility Finder, an initiative of Foodvalley NL and WUR
- StartLife
- The Green Protein Accelerator, hosted by Bobeldijk Food Group



Stimulating practical food innovation

TOP and Ojah

TOP (part of BOX Holding) is a private plant-based research and development centre. Globally, TOP has launched over forty companies, including Ojah and Beeflike (JV with Cargill). **Ojah** provides poultry-like products based on soy, water and seasoning ('Plenti.eu'). Many consumers will be unknowingly familiar with Ojah's products, as they are sold via their customers under new and existing brand names across Europe and the rest of the world already. We spoke with Wouter de Heij, CEO at TOP, and Frank Giezen, CEO and Founder of Ojah.

Can you tell us more about TOP and Ojah?

- Wouter: "We believe in new meats, dairy, eggs, and fish, based on plants, algae, and seaweed. We have a global focus – we need to think big. TOP selects five to ten companies each year to help them grow. For example, we have helped Ojah grow into the global leader in poultry-like products."
- Frank: "Ojah is the producer behind many of today's meat analogues. When we founded Ojah in 2009, nobody believed poultry-like products could exist. Ojah developed the best-in-class High Moisture Extrusion (HME) technology which was monumentally different from the dry products that were in supermarkets up until that point. Investors had to personally taste our products before they believed what we had been saying all along: we do not need to compromise on taste when developing plant-based products."

How can you predict the success of a company?

- Wouter: "We have a proven track record for thinking at least five to ten years ahead. We need to predict developments in the market and in technological advancements. People are the most important factor in making a company succeed. Their projects and business case are the second and third criteria we look at before deciding to work with a new enterprise."

Is the Netherlands the right place to start a company?

- Frank: "Expanding a company is extremely difficult, but the Netherlands is the best place to do it. Funding is widely available, both in the early stages through subsidies and in the later stages through capital and loans. Dutch people are ambitious and proficient in the English language."

What characterises the alternative protein ecosystem in the Netherlands?

- Frank: "A unique feature of the Netherlands is that both companies and scientists truly collaborate. We have a joint interest: developing the market for alternative proteins. We build on our joint experience. If a client approaches us and we cannot provide them with that specific product at that time, we are not afraid to recommend one of our competitors. We also appreciate the skills of our fellow companies like the Vegetarian Butcher that build brands, whereas we build technologies. I believe SMEs have the biggest potential to conceptualise and execute ground-breaking ideas."

"Growing a company is extremely difficult, but the Netherlands is the best place to do it."

Investing in plants

New Dawn Capital and Plantbase.vc

> "Our start-ups have global success, our major food producers invest in R&D, and foreign producers settle here."

Together with her brother, Silla Scheepens founded alternative protein fund **New Dawn Capital**. They have invested in, amongst others, LIVEKINDLY Co (NL), AllPlants (UK), No Evil Foods (US), and Bumi Mindful Foods (NL). Willem Blom founded **Plantbase**, an impact investment fund with a portfolio including Heura (Spain), Eat Just (US), Mycorena (Sweden), Meatable (NL), LIVEKINDLY Co (NL), Veganz (Germany), Avant Meats (Hong Kong), Monkeys by the Sea (NL) and Change Foods (US) along with others.

How would you characterize the Dutch business environment?

- Silla: "The Netherlands truly activates entrepreneurs. The Netherlands is a frontrunner with many stakeholders active in the protein shift. We have world-class knowledge, well-functioning banks, support from the government, and highly skilled people."
- Willem: "The Netherlands is the birthplace of the protein transition. Our start-ups have had global success (Ojah, Vegetarian Butcher), our major food producers invest in R&D (Unilever, Upfield), and foreign producers settle here (Beyond Meat, Like Meat). Companies can easily raise large funds, with a lot of willingness and capital available amongst investors."

What do you perceive as the most innovative product categories in the next five to ten years?

- Silla: "True innovation is seen in precision fermentation and cell-based products. The alternative meat and milk industry is rather saturated and dominated by large corporates and well-funded scale-ups. However, the underrepresented categories of non-animal-based fish, cheese, and eggs, which are more difficult to produce, offer great potential. The next ten years will be pivotal in the protein shift."
- Willem: "Taste-wise, alternative meat and dairy are getting closer to animal-based meat. However, price-wise, there is still a gap, hampering wider adoption. Fermentation is a promising category, as is cell-based fish. In the end, we need a combination of all categories."

What makes a company promising to you?

- Both: "Team!"
- Willem: "I invest in diverse teams with intrinsic motivation, a strong vision, and solid collaboration. The product must be tasty and convenient for consumers and strive for price parity. The company's financial requirements must match my own. I also look at their marketing strategy and their ability to assess their addressable market and competitive landscape."

- Silla: "Team is my first criterium. Furthermore, the product or service must stem from and show strategic insight, and the market potential must be large enough."

Would you have any recommendations for future stakeholder collaboration?

- Silla: "The larger corporates have knowledge and data about product development and consumer behaviour, as well as access to retailers. Allowing start-ups to have greater access to data, knowledge, and retailers would create a level playing field."
- Willem: "Alternative proteins are the driving force for jobs. We must all continue to embrace the protein shift and support alternative proteins any way we can. Hocus Pocus, keep the focus."

4. Building brands

4. Building brands

Guiding consumers towards a more balanced diet

Brands are essential in building relationships with the public and creating loyal customers. Brands have not only given a visual identity to alternative proteins; they have also completely shifted the mindset of many consumers.

Before the early 2000s, alternative proteins (new meat, dairy, fish, and egg products) were consumed mostly by vegetarians and vegans. The introduction of brands advertising their products as ‘tasty’ has introduced many meat-eaters and flexitarians to the concept of alternative proteins. Brands have greatly attributed to changing the consumer perception of alternative proteins from ‘disgusting’ to ‘cool’.

The Netherlands is the homeland of several internationally successful brands and the origin of creative concepts.

It is also home to some of the most accepting and early-adaptor consumers of alternative proteins. Per capita consumption of meat analogues is the highest in Europe (ProVeg, 2021).

Several successful (global) consumer brands include:

- BOON offers burgers, nuggets, meat balls and sausages based on beans.
- The Dutch Weed Burger is a Dutch phenomenon. The assortment includes burgers and sausages made of Dutch seaweed.
- The Vegetarian Butcher’s meat successors are made from soy, lupine, and various vegetables. The vegetarian and vegan assortment includes bacon, meat balls, ground meat, patties, poultry products and sausages.
- Schouten Europe, a famous name in the Dutch industry since the 1990s, produces plant-based meat analogues.
- Several retailers have launched their own brands, including Albert Heijn, Jumbo (Veggie Chef), and Lidl.
- SoFine Foods has been making plant-based products since 1963. SoFine Foods was acquired by Alpro in 2006.
- Upfield: the portfolio includes some legendary brands, including Violife, Flora, Rama, Blue Band, Proactiv, Becel, and Country Crock.
- Vivera launched the world’s first vegan steak in 2018.
- Willicroft (Plant-Based Cheese) is an Amsterdam-based start-up creating plant-based cheese for dairy cheese lovers.

Cutting out the middle cow

Those Vegan Cowboys and WildWestland

‘Know-how’ since 1936, ‘no cow’ since 2020. **Those Vegan Cowboys** is an alternative dairy laboratory founded by Vegetarian Butcher founders Jaap Korteweg and Niko Koffeman. Together with Dutch cheese producer Westland Kaas (Old Amsterdam, Maaslander), the brand **WildWestLand** was created. We met Hille van der Kaa, the Chief Operational Cowboy.

How will the cheese of Those Vegan Cowboys be different from other alternative cheeses?

- “We aim to produce animal-friendly cheese by developing a cow-replacing fungus, mimicking the stomach of a cow. We ‘feed’ grass to a stainless-steel cow and produce a fully plant-based cheese for cheese lovers.
- Most producers currently work with products grown outside of the Netherlands, such as coconut or cashew. We expect a development towards local sourcing and products based on Dutch ingredients. With an increased focus on the health-aspect of products, we can also improve the nutritional profile of cheese with less saturated fats and better proteins compared to animal-based cheese.”

Can you tell us more about the collaboration with Westland Kaas?

- “It will be a few more years before Those Vegan Cowboys has fully developed our stainless-steel cow. Until our cow-replacing fungus is fully developed, we are partnering with Westland Kaas to establish ourselves as cheese experts while making use of their sales and distribution channels. WildWestLand products are fully plant-based and made from coconut.”

How would you describe the WildWestLand brand?

- “We’re a cheeky brand. We are storytellers, always looking to push boundaries. Anyone still denying the protein shift is fooling themselves. Our brand has been launched at most of the major supermarkets in the Netherlands. To reach as many people as we can, we are looking to expand even further.”

What will be the role of dairy farmers in a future without cows?

- “We are replacing their cows with a stainless-steel cow, which can work 24/7 without ever suffering. However, we still need grass to produce cheese, meaning farmers are still very much a part of the supply chain. The Dutch cheese tradition has entered the 21st century. And it's made of plants.”

"Dutch cheese tradition has entered the 21st century. And it's made of plants."

Pioneer in plant-based products

Schouten Europe

Schouten Europe, a company founded in 1893, was originally a bakery and cattle feed company. Grandson Henk Schouten took over the business in 1990 and figured it is much more efficient and sustainable if you convert vegetable material directly into food for people, instead of feed for animals. Schouten is now a globally active business offering a wide range of plant-based products. We met with Commercial Manager Mark van Noorloos.

What characterises the alternative protein ecosystem in the Netherlands for you?

- "The Netherlands is characterised by its entrepreneurial mindset, excellent infrastructure, high-quality knowledge institutes, engaged retail environment and strong support from network organisations. Our agricultural background and expertise in raw materials contributed greatly."

How do you envision alternative proteins in the next ten years?

- "We expect meat analogues to further develop into products which are valued for their product qualities and not necessarily for their similarity to animal-based meat (for example falafel and tempeh). When this complete transition will happen depends on the attitude of consumers. New products are being launched every day – we believe the focus should be on creating better products, not more."

How has the market demand developed?

- "The pandemic has impacted consumer behaviour. The uncertainty scares people, making them less inclined to change their habits and try new products. The exponential growth of the meat analogue market we have seen in the past 15 years (20-30% per year) is now slightly stabilising to about 7% per year. However, the market now is much larger than it was 15 years ago, as many more meat-eaters are also consuming meat analogues."

Which international markets are of interest to you?

- "We look up to the UK and the Nordic countries for their assortment of meat analogues from a diverse range of ingredients (such as oats), as well as their communication about the sustainability of these products.
- Western Europe and the US are our priority markets. However, Henk Schouten is a true entrepreneur with a strong focus on having a positive impact on people. Therefore, he invented and launched Tempeh Today in India. Small Fermentation Units allow people in India to turn pulses into tempeh, increasing the local availability of proteins through highly-nutritious products at an affordable price."

Plant-based spreads going global

Upfield

Upfield is the number one producer of plant-based foods globally. Their portfolio includes brands like Violife, Flora, Rama, Blue Band, Proactiv, Becel, and Country Crock. Upfield was founded in 2018 when the standalone company was created after the separation from Unilever. The spreads business originated in 1871 and was part of the foundation of Unilever. We talked with Sonja Kalkhoven, the R&D Director of Global Product Development.

Can you tell us more about Upfield?

- "Our goal is to facilitate the plant-based movement and protein shift by offering great tasting products on-par with their animal-based alternatives. Taste and functionality are key to removing the threshold consumers might experience when choosing plant-based products. While at present, 99% of our products are plant-based, we aim for a fully plant-based assortment by 2025."

How are you supported by the alternative protein ecosystem in the Netherlands?

- "Currently, Upfield R&D is headquartered in Rotterdam, but we are relocating to Wageningen. We have performed an international search for the best location, and Wageningen offers the best environment for companies and universities to come together. Collaboration is the key to success, to inspiring each other and finding technical solutions together."

Are consumers willing to buy plant-based products?

- "It is important to realise that using the term 'plant-based' is not the reason for consumers to believe in a product. Products must have a taste and functionality similar to animal-based products, but with the added value of sustainability and health benefits.
- We see the market changing, especially with European consumers becoming more aware of the benefits of plant-based products. It is important to study the signature dishes of each country to ensure the plant-based products match the local application and taste."

How can various actors in the ecosystem contribute to the protein shift?

- "The solution is not in one company or one place. We need to establish common goals and the Netherlands must look beyond country borders. We have to work together universally, to find smart solutions.
- The industry must continue developing high-quality products, whereby SMEs can contribute through creative solutions and greater companies can stimulate large-scale impact. Governments must encourage consumer behaviour and facilitate the transition from animal-based to plant-based products. Knowledge institutes are essential for fundamental knowledge and linking the various parts of the value chain."

"Products must have a taste and functionality similar to animal-based products, but with the added value of sustainability and health benefits."

The important role of retailers

Albert Heijn

Albert Heijn is the largest supermarket chain in the Netherlands, with a market share of 35% in 2020. Albert Heijn was founded in 1887 and presently employs around 100,000 employees in 895 branches in the Netherlands. The supermarket chain is part of Ahold-Delhaize. Anita Scholte op Reimer, VP Quality and Sustainability:

“As Albert Heijn, we acknowledge the important role we play in contributing to the diets of Dutch consumers. From our data, we observe the consumers in the Netherlands are become increasingly motivated to reduce the environmental impact of their diets by consuming fewer animal-based proteins. We support this movement by offering the largest assortment of vegetarian and vegan products and ready-made meals of all Dutch supermarkets. In 2021, we allocated more shelf space to plant-based products, and we aimed to double the sales of plant-based alternatives for meat, fish, and dairy. In 2022, we are adding even more plant-based products to our range. We are a partner of the National Week without Meat and we are the retail member of the ‘Vegetarian Favourites’ campaign of the National Lottery. Together, we can reach our common goal: by 2025, on average, the Dutch consumer has a diet of 50% animal-based proteins and 50% plant-based proteins.”

“We observe the consumers in the Netherlands are become increasingly motivated to reduce the environmental impact of their diets by consuming fewer animal-based proteins. We support this movement by offering the largest assortment of vegetarian and vegan products and ready-made meals of all Dutch supermarkets.”

Organic and local products to restore balance

Ekoplaza

Udea is a Dutch wholesaler, brand house, importer and exporter of organic foodstuffs. Furthermore, Udea is the owner and franchisor of organic supermarkets **Ekoplaza** and Marqt. Ekoplaza has approximately 85 branches in the Netherlands and is expanding to Belgium. We spoke with Steven IJzerman, Quality Manager at Udea.

Can you tell us more about the ambitions of Ekoplaza regarding the protein shift?

- "At Ekoplaza, we offer products that have a positive impact on the environment and animal welfare. We support a fair collaboration between growers, suppliers, and our supermarkets. We supply a very wide range of plant-based products. Besides, we stimulate the use of locally sourced ingredients, through which our growers are encouraged to produce lupine or other legumes."

How can you encourage the consumer to buy more alternative protein products?

- "Our consumers generally have a high awareness of the impact of meat on the environment. To further encourage our consumers towards a more sustainable choice, we allocate two-thirds of our shelves (fresh produce) to plant-based products and only one-third to meat and fish. Our brochure, promotions and recipes often feature plant-based products. We also support the National Week Without Meat and Dairy."

You emphasised the importance of the connection between producers and consumers. How can you strengthen this link?

- "We strive to close the gap between growers and consumers by introducing growers' personal stories on a sign next to their products in supermarkets. Growers would largely benefit from growing legumes and pulses because it improves the quality of their soil. We stimulate the sales of plant-based products made from novel and local ingredients for the consumers to be able to understand the connection between products."

How do you envision the responsibility of retail in general to accelerate the protein shift?

- "Most supermarkets offer food at very low prices, which does not represent its true value. Introducing novel and small-scale brands is risky because unknown often means unloved. However, Ekoplaza shows it can be done. We are increasing the accessibility of our shops by increasing our scale, to ensure the shops are in proximity for people and the prices can be reduced due to the economy of scale. At Ekoplaza, we truly believe that plant-based is the way forward."

Plant-based diets made affordable and accessible

Lidl

Lidl is one of the largest European supermarket chains, with over 11,000 stores in 30 countries (of which ~440 stores in the Netherlands). The retailer stands for the highest quality at the lowest price. We met with Rebekah Simmons, who works at the Corporate Social Responsibility department of Lidl the Netherlands.

Can you tell us more about Lidl's ambitions regarding the protein shift?

- "At Lidl, our goal is to make a plant-based lifestyle affordable and accessible for everyone. We believe that sustainable and good food does not need to be expensive, which is why we continuously expand our range of vegetarian and vegan products. In 2020, we tripled our range of meat alternatives and doubled our range of plant-based dairy."

At Lidl, how do you perceive the responsibility of retailers in inspiring consumers to adopt a more balanced diet?

- "As the third-largest retailer in the Netherlands, we welcome approximately four million customers every week. We can encourage all these people to eat more plant-based foods. Therefore, we constantly find ways to further expand our vegetarian and vegan assortment, while also prominently placing meat analogues on our shelves. We publish a meat-free brochure twice a year, we are a partner of the National Week Without Meat and Dairy, and you can find many vegetarian and vegan recipes in our brochure and on our website."

Why is affordability so vital in achieving a more balanced protein consumption in the Netherlands?

- "We need every person in the Netherlands to work together if we want to stand a chance at achieving the objectives in the National Climate Agreement. Incorporating more plant-based products into your diet is an effective way to contribute. We believe price should never be an obstacle. Our products are accessible: with almost 440 stores in the Netherlands, Lidl is always nearby. By keeping our prices low, our products are also affordable, allowing our plant-based assortment to reach a growing number of consumers every day."

Where does Lidl think the major innovations originate?

- "As a future-proof organisation with sustainability in our DNA, Lidl is continuously looking for ways to make our assortment more sustainable. Start-ups and their revolutionary ideas are key innovators, which is why we are organising our third yearly 'Future Goods Week' in 2022. As a multinational company, we offer small-sized companies a chance to present themselves. By collaborating with pioneers who create new, healthy, or sustainable products, we are in turn making a sustainable and healthy lifestyle affordable and accessible to everyone."

5. Building transitions

5. Building transitions

Animal protein industry repurposing

Combining valuable experiences and innovation expertise allows the Netherlands to move towards a restored balance of animal-based and non-animal-based consumption.

With an innovative mindset and a focus on collaborations, many meat, dairy, fish and egg companies are embracing the transition to include non-animal-based products in their product range. Dutch meat and dairy giants are using their expertise in taste, quality, and innovation to offer the consumers vegetarian or vegan alternatives to meat, dairy, fish, and eggs. A transition occurs once a company with expertise in the animal-based product sector embraces the arrival of alternative proteins. The transition can be built in various ways; some companies change from within: converting production capacity from animal-based to alternative protein production. Alternatively, companies can use their expertise, infrastructure, or financial support to accelerate start-ups or scale-ups in the alternative protein industry.

With meat consumption declining, meat giants often envision future growth not through the growth of their meat production, but by keeping their production capacity for meat stable and simultaneously growing in the alternative protein branch.

Success examples include:

- **FrieslandCampina** launched **Valess** in 2005 to introduce dairy-based alternatives to meat.
- Brazilian meat processor **JBS** branched into the alternative protein sector by purchasing Dutch meat analogue producer **Vivera** in 2021.
- Dutch animal nutrition producer **Nutreco** launched its investment fund NuFrontiers to ‘develop tomorrow’s new feed and food businesses’, including Mosa Meat.
- **Kennemervis Groep** purchased **Bobeldijk** Food Group in 2020. Bobeldijk, originally a meat processor, launched meat and fish analogues under its Vegafit brand.
- A meat processor founded in 1858, **Stegeman** expanded their assortment to include meat analogues.
- **Van Loon Group** has freed production capacity in their Almere factory for the British meat analogue producer **Meatless Farm**.
- **Vion** reduced their meat production capacity to launch their meat analogue brand **ME-AT the alternative**.

The ‘unusual suspects’ are essential players in shaping the landscape of alternative proteins.

From meat to ME-AT the alternative

Vion and ME-AT the alternative

In 2019, **Vion** made headlines: the meat giant was converting one of their beef slaughterhouses into a plant-based meat production facility. Two years later, products of **ME-AT** (pronounced 'meat') have been successfully launched in retail and Out of Home in thirteen European countries. We connected with Willem Cranenbroek, the General Manager of ME-AT the alternative.

Why would Vion, a successful, global, top-100 food company, introduce alternatives to their own products?

- "At Vion, we feed over 100 million consumers every day. With this comes the responsibility to take care of our planet and the health of our consumers. We see an ideal balance of 30% animal-based protein consumption and 70% plant-based. People are looking for alternatives to meat – we expect meat consumption to decline by 20% in the coming 10 to 20 years. However, many consumers are unsure how to introduce more plant-based products into their diets.
- With ME-AT the alternative, Vion is substituting a portion of their total beef capacity to produce plant-based alternatives. We know meat. We know mass production and distribution. We're used to supplying consumers with fresh products every day. This makes us the perfect expert to create meat-like products based on plants. Many people don't realise that the machines producing burgers from meat are the about the same as those producing burgers from plants."

Is the Dutch consumer very different from Danish or German consumers?

- "Of all Europeans, the Dutch spend the highest amount per person per year on meat analogues. However, there are extreme regional differences, mostly between urban and non-urban areas.
- There are differences in each culture for the acceptance of meat analogues in general. We specifically observe a difference in preference for fresh or frozen products. Frozen products are the preferred choice for Danish consumers, which is great for reducing food waste. However, the Dutch observe deep-frozen products as lower quality."

Why is there such a big price difference between meat and meat analogues?

- "Meat is much too cheap in European retail. Meat is seen as a commodity, with hardly any distinction amongst producers or country of origin. Europe has an excess supply of meat. The production has increased over the last few years all over Europe. Next to that, China is producing more of their own meat. The industry has to change to find a new balance with added value for farmers and consumers.
- Plant-based products are high-tech products. Continued research and development require large investments. Meanwhile, the production scale is much smaller than that of meat which drives prices up. Many supermarkets experience higher food waste for meat analogues compared to that of meat, meaning they increase their margin.
- The irony is: the market for plant-based meat must grow to allow for products to drop in price, but for the market to grow, prices need to drop."

How do you envision the future of proteins?

- "People are looking for healthy, sustainable, and animal-friendly products. We strongly believe in building shorter food chains with local products. In the Netherlands, we are experimenting with Faba beans. Vion and ME-AT the alternative are greatly investing to produce healthy and high-quality plant-based meat analogues with a Nutri-Score of A or B, thereby taking our responsibility in working towards a more balanced consumption pattern. Additionally, we are also heavily investing in Building Balanced Chains (BBC) with these local proteins. In this way, we can give our farmers a future and our consumers a difference."

Building new global value chains

Nutreco

Nutreco is a global leader in animal nutrition, with over 100 years of experience. Its NuFrontiers team works to identify, develop, and invest in next-generation breakthrough innovations within the value chain. Its investments and partnerships include Mosa Meat, BlueNalu, and ENOUGH. We talked with Joost Matthijssen, the Director of Venturing & Business Development.

How do you foresee the future balance of animal- and alternative proteins?

- "To feed a growing population, we will need all the protein sources we can leverage, so it's not 'either/or' – it's 'and/and'. Animal proteins will continue to play a significant role in our food supply. However, demands are changing, so innovation is required to improve performance on sustainability, animal welfare and efficiency. Despite all the attention it receives, the alternative protein sector is currently relatively small in volume terms, but it is growing rapidly. Much of the innovation in this area will be about scaling up emerging technologies."

What category of alternative proteins do you believe in?

- "Plant-based proteins are currently the largest and the most influential category, but there are inherent limits to their ability to truly mimic animal proteins. Nevertheless, cultured meat and fermented products, although currently smaller categories, have the potential to develop into products with taste, texture, and nutritional properties comparable to animal proteins."

How can animal-based companies like Nutreco contribute to the protein shift?

- "There are synergies between animal and alternative protein producers because of the overlap in capabilities required to produce and distribute sustainable proteins at scale. Animal-based producers can use their expertise to resolve challenges in the alternative protein value chain, including input sourcing and scale-up. We are firm believers in partnership - if you can solve these puzzles cooperatively, you are stronger together."

- Nutreco can greatly contribute to cultured meat and fermentation through innovation, expertise, infrastructure, and connecting relevant stakeholders in the value chain. For example, like animals, cultured protein requires amino acids, minerals, and vitamins. We are experts in ingredient sourcing and in building a global supply chain and now we are using that experience to support our partners in the alternative protein supply chain."

"Animal-based producers can use their expertise to resolve challenges in the alternative protein value chain, including input sourcing and scale-up."

Time to redefine

Redefine Meat

Israeli start-up **Redefine Meat** combines technology, culinary arts, and science to create 3D-printed plant-based meat. The company has selected the Netherlands as the location of their EMEA headquarters and factory to serve the European, Middle Eastern, and African (EMEA) markets. We met with Edwin Bark, Senior Vice President.

Why is Redefine Meat a company like no other?

- “We have spent an endless amount of time studying meat. Along with scientists, chefs, and technologists, we have come to understand meat at its very core. By understanding every fibre of meat, we can now create whole cuts through 3D printing voxel by voxel (3D pixels). Because we are the only company in the world with scalable technology to create whole cuts*, which delivers the meat experience and versatility Michelin-chefs are looking for, they have now integrated our products into their menus, which is a first.”

As an Israeli company, why have you selected the Netherlands?

- “The Netherlands is simply a hotspot for plant-based food. The Netherlands offers an exceptionally high level of knowledge, education, and skilled people. The Wageningen (WUR) campus and the Foodvalley region attract some of the biggest companies in the world to advance their R&D. The Netherlands has a favourable business climate and offers lots of support in finding locations and connecting with the invest in Holland network.”

How have you experienced the country so far?

- “We have been welcomed with open arms. The municipality, the governmental institutes, and the banks are extremely supportive in allowing us to settle.”

What are your ambitions?

- “We want to become the global leader in new meat. We are motivated to collaborate with stakeholders from the Foodvalley ecosystem. For now, Europe is the biggest market in meat analogues, but China is catching up quickly. We can greatly impact the food system and we will not settle for anything other than a global presence.”

*Whole cuts or primal cuts include products such as steaks and chops.

Milk from cows... and soy

De Nieuwe Melkboer (The New Milkman)

For generations, the family of Bart and Tom Grobben have been producing milk. To continue the work for the generations to come, Tom and Bart made a drastic change: milk produced from soy instead of cows, at their company **De Nieuwe Melkboer**. We met with Co-Founder Bart.

What spurred the change in you?

- "Both my brother Tom and I left our family farm to study in the city. We were both inspired by the focus on plant-based diets as a more sustainable solution. We wanted to be a part of that solution, helping to meet consumer demand while being a future-proof and inspirational company. All large-scale plant-based dairy producers source their products from different countries. We were looking for a truly Dutch solution."

From cows to soybeans. Have you had any challenges along the way?

- "We started by producing soy milk, as soy was the only available source when we started out. We are now looking into expanding into different ingredients, such as oats, Faba beans or potentially flax seed and quinoa. Soy is a rather difficult product to grow in the Netherlands, as the wet climate increases the risk for fungi. We have learned a lot through trial and error, and we are currently on our sixth harvest."

Do other dairy farmers share your views?

- "At present, we still have a part of our land which is dedicated to dairy cows. We are working towards producing more plant-based than animal-based milk within the next year. Our peers were very sceptical when we first started out, unsure whether we would build a solid business case. Now that we are successful, their curiosity has increased, and they are more open to the possibility of diversifying their dairy farms into dairy-soy farms."

What are your future ambitions?

- "We are looking to further advance the plant-based food chain in the Netherlands. We are a food-loving country! At present, our infrastructure, experience and legislation are tailored to animal-based products, but it offers the opportunity to facilitate plant-based food chains on a very large scale."

Soy is from Brazil, right? Wrong!

DutchSoy, GreenFood50 Quinoa, Lekker Lupine

Jan Groen founded Green Organics in 2000 and ventured into **DutchSoy** in 2018. Marieke Laméris co-founded **Lekker Lupine**, a platform stimulating the production and consumption of organic Dutch lupine. Marc Arts founded **GreenFood50** in 2014, offering a wide variety of Dutch quinoa ingredients.

- Jan: “When consumers think of soy, they think of soy from Brazil which is causing deforestation. However, we grow organic Dutch soy. We must all take responsibility to consume more plant-based products, including soy, quinoa, lupine, and Faba beans.”

- Marieke: “We need to stimulate the demand for lupine, which is a largely unknown product amongst Dutch consumers. Lupine grows well in the Dutch climate and the cultivation enhance soil fertility and biodiversity. Lupin beans are a very diverse product: cooked, they can be used in salads and spreads. In other forms, it can also be used in snacks, cookies, plant-based cheese, and tempeh (through fermentation). Lupine has all nine essential amino acids and, second to soy, the highest protein content of all pulses – this makes it interesting for sports and health.”

- Marc: “Same goes for quinoa. Quinoa has a very complete nutritional profile of amino acids, unsaturated fatty acids, and is a rich source of fiber, vitamins and minerals. It requires mild processing, which means all the nutrients are preserved. It is locally grown, non-GMO, and gluten-free.”
- Jan: “In the protein shift, the farmer and the retailer are essential players. Farmers overcome incredible challenges to deliver us high-quality products. Retailers are the gate to the consumer and play a vital role in advancing the protein shift.”
- Marc: “We need to connect growers and other actors in the value chain to jointly accelerate the protein shift. Plant-based products must be affordable to ensure a wide reach amongst consumers.”

IV. Building on experience

Meet the pioneers

The Netherlands is the origin of some of the greatest and most innovative minds in the alternative protein sector. Several influential people, brands, and companies have already been featured in this magazine. As early as the 1990s, various people were actively promoting the switch to a more sustainable diet.

- In 1990, Henk Schouten, founder of Schouten Europe, launched the Netherlands' first plant-based meat analogues.
- From 1999 to 2005, Prof. Dr. Harry Aiking actively promoted sustainable diets through leading the Protein Foods, Environment, Technology, And Society (PROFETAS) programme.
- In 2000, Willem van Eelen received funds from the Dutch government and Stegeman to advance his research on cultured meat.
- In 2005, Friesland Campina launched Valess, a brand of meat analogues based on dairy and algae.
- In 2009, Kees Aerts and Tarique Arsiwalla founded Protix insect technology and are product leader in insect-based protein and nutrition.
- In 2010, The Vegetarian Butcher was formally launched on World Animal Day by Jaap Korteweg and Niko Koffeman.
- In 2013, Dutch cardiologist Mark Post (Mosa Meat) famously launched the first cultured meat hamburger. Peter Verstrate was the food technician behind this first type of burger, which was based on the initial ideas of Willem van Eelen. Maarten Bosch and Tim van de Rijdt are also key figures in the Mosa Meat success story.
- In 2018, Krijn de Nood and Daan Luining founded Meatable, a cultured meat company hoping to sell cultured meat to consumers at a reasonable price by 2025. The company entered a Joint Venture agreement with DSM in 2021.
- In 2018, Vivera launched the world's first plant-based steak.
- In 2021, Redefine Meat, an Israeli company producing 3D-printed plant-based steaks, decided to establish a production facility in the Netherlands.

The Netherlands is the cradle of several global phenomena, including great advancements in artificial intelligence (AI), precision and vertical farming, and fundamental research in the healthcare sector. By combining the experience of different sectors through interdisciplinary collaboration, the Netherlands ensures maximum efficiency and progress.






A cowboy shooting for the stars

Jaap Korteweg

"By 2045, we will consume 80% new meat and dairy and only 20% animal-based products."

Jaap Korteweg, founder of the Vegetarian Butcher (2007), has not been idle since selling the company to Unilever in 2018. In 2020, Jaap and his business partner, Niko Koffeman launched Those Vegan Cowboys, a company aiming to produce cheese from a stainless-steel cow (no animals needed). The company has partnered with Westland (Maaslander, Old Amsterdam) to sell plant-based cheese under the label WildWestLand.

Can you identify a trigger point in your life that led you into the alternative protein ecosystem?

- "Together with my family, we decided to buy two pigs which we would slaughter. Obviously, that did not work. How can you possibly enjoy a meal made from the pig you have been living with for two years? For me, this was the reason to completely eliminate meat from my diet.
- We are creating an artificial distance between the animals and the food we eat. This is an unnatural thing that we must stop. I believe using animals for our own good needs to end. Animals are autonomous creatures and I have no idea why they would deserve any less than we do."

How do you think meat and dairy analogues will develop in the next ten years?

- "When we started the Vegetarian Butcher, we thought we would have a 10% chance of success. Investors believed my prediction at the time and based on that; they chose not to invest. Now, I would say we have a 5% chance of succeeding in making cheese with stainless-steel cows. With this lower chance of success, investors are lining up. The market has completely changed. Investors are seeing great potential in new meat and dairy, which increases the chances of those products succeeding.
- With new meats, we are currently at a 5% market share, though I believe we can increase that to 20% in the next ten years. The relative share of new cheese is much lower. After ten years, we will have reached a tipping point where new meat and dairy will be at the same price point as the old meat and dairy, which will tip the scales in our favour. By 2045, we will consume 80% of the new meat and dairy and only 20% of animal-based products."

What are, and have been, major obstacles in marketing new meats and dairy?

- "Consumer acceptance is based on experience. Any new product is risky for consumers: can we trust this, but more importantly, will it taste good? This has been an obstacle in the past, and it is (to a lesser extent) still an obstacle today. More and more consumers are becoming familiar with new meats and dairy which increases their approval."

Why is the Netherlands the go-to hub for new meats and dairy?

- "Globally, the Netherlands is perceived as a trailblazer, with the US and Israel also considered as major innovators. A major contributor to our leading position is the flexibility of the major old meat and dairy companies, which have embraced the arrival of new meats and dairy. The Netherlands has a favourable consumer market with many early adopters.
- The Netherlands is a food country, but to remain so, we must seize the opportunities we have. I am calling on companies, the government, and farmer cooperatives to take action and invest in new meat and dairy. Without investing in innovations and products, we will lose our pioneering position. Stop spending money on old fossils, quite literally, and start investing in the future."

What inspires you?

- "Did you know that Donald Duck's Gyro Gearloose (Willie Wortel) had already invented the stainless-steel cow in 1958, just like we are doing now with Those Vegan Cowboys?
- Dreamers have the power to imagine without limitations. For me, inspiration comes from the idea of a better world, where people are spectators creating more space for wild animal life. I hope that we will succeed in living comfortably without using animals, but rather with respect for them and their environment."

The daughter of the founding father of cultured meat

Ira van Eelen

Founder of **KindEart.Tech**, advisory commissioner to **Just** (one of the fastest-growing US food start-ups), Ira van Eelen is a force to be reckoned with. As the daughter of Willem van Eelen, founding father of cultured meat, Ira has been an advocate for cultured meat for many years.

What makes the Netherlands a strong protein country?

- “We are a business-oriented country, and we are rightfully proud of Dutch innovations. There is a strong collaboration between governments, universities, and the industry. The Netherlands is open to trade, eager to invest, and the birthplace of several global phenomena.”

Will we only eat cultured meat in the future?

- “Of course not. It would be ignorant to think of cultured meat as the only silver bullet. Meat in the current system is not a viable model. Instead, I see a future in a combination of cultured meat, plant-based products, and hybrid products.”
- Many consumers believe meat comes from animals. How can you update this mindset to include cultured meat?
- “The media often portrays cultured meat as a scary, lab-grown product in a petri dish. This is damaging to its image, as cultured meat is just like meat: meatballs, foie gras, gourmet, a nice pasta sauce; you can do anything with it. Organising tasting sessions for consumers to become familiar with the product would be a great way to introduce new meat to a wide group of people.”

How can cultured meat become a scalable product?

- “You only need a handful of animals (different species) to maintain stable production. I believe in achieving large-scale through many small-scale production systems. I think large scale factories are not the only way forward.
- I believe in diversity, locality, and transparency. Cultured meat can be produced in small-scale bioreactors, which are easily replicated and can be placed on farms or in butcher shops. Decentralised production reduces food miles and allows us to reach many people through localised solutions. Production of meat, cheese, egg, dairy, and non-animal-based products is necessary to work towards a more balanced future.”

“We are a business-oriented country, and we are rightfully proud of Dutch innovations. There is a strong collaboration between governments, universities, and the industry. The Netherlands is open to trade, eager to invest, and the birthplace of several global phenomena.”

Building new experience

Meet the future pioneers

The prominent voices of the alternative protein sector are not limited to the people of this magazine. There are many more ambassadors for the protein transition.

One of these ambassadors is **Floor Schreuders**, who started her research career at the WUR with a bachelor and master degree in Food Technology with a specialization in sustainable food process engineering. To pursue her research ambitions, she worked as a PhD candidate at the Laboratory of the Food Process Engineer Group of the WUR. In 2021, she successfully finalized her PhD: 'Structuring pea towards meat analogues'.

- "Consumers indicate the resemblance of meat analogues to their meat-version counterparts (texture, elasticity etc.) as an important factor to transition towards less animal-based proteins and more plant-based products. The challenge of meat-resemblance for meat analogues motivated me to do a PhD. Pea protein is considered as a promising alternative to soy and wheat gluten as it has lower allergenic potential, good functionality, and lower environmental impact than soy."
- One of her key propositions derived from her thesis is: "Thorough insight in meat analogues requires even more thorough insight of meat as a reference. We need to start at the basis and fully understand the properties, structure and behaviour (e.g., when heated) of meat, as this will positively enhance the development of meat analogues."
- In her thesis, she concluded that: "Benchmarking plant-based materials (including pea) against real meat indicated that plant-based materials have similar textural properties as chicken, but that their elasticity is not yet the same. Therefore, elasticity is an important topic for future research."
- The secret to achieving productivity in the Dutch meat analogue industry according to Floor? "'Gezelligheid' (sociability) in the work field."

Now that she received her doctor title, Floor is even more motivated to positively contribute to easing the switch of consumers towards meat analogues. She continues her research career as Assistant Manager Plant Meat Structuring at Unilever.

Mike Maduro – Founder of Freggies

Mike Maduro, former American Football player, founded Freggies in 2017. Mike combined his background in sports, engineering and his Caribbean roots to create Freggies: tasty and sensational plant-based vegetable snacks. Freggies produces burgers, sates, stews, juices, and ready-made meals. Mike explained how he feels the younger generation contributes to the protein shift:

- "As the son of a butcher, I only stopped eating meat when I rediscovered the power of vegetables. Veggies should be the centrepiece in our meals! We can positively impact our health and the health of the planet by changing the way we eat.
- The world is transitioning: the energy sources we use, the proteins we consume, they are all changing. The Netherlands is one of the global frontrunners in technological innovations, food production and food safety. To restore the balance in our protein consumption, people need to be inspired to change their mindset and consume more vegetables. Automatically, this will lead to a reduction of meat consumption. With Freggies, I am making a more plant-based lifestyle easy and tasty."

International ambitions

Success factors

Many Dutch organisations have successfully launched their products or production facilities abroad. Other private sector players are either aiming for a global presence or have not yet fulfilled their international ambitions. Below the different types of internationalisation, and a selection of the success factors and opportunities abroad are highlighted.

Type of internationalization*

- Trade: exporting products or services to foreign companies can be the first step towards internationalisation.
- Innovate: exporting knowledge and innovative technologies abroad and/or co-create new knowledge and innovations via International R&D Cooperation.
- Collaboration with a local partner or distributor.
- Invest: companies can choose to invest in a local production facility to serve the regional market. This leads to a reduction in transport costs and emissions. Furthermore, it allows companies to distribute perishable or fresh products and to tailor the product to fit the taste preference of local consumers.

*The types of internationalization are not in chronological order.

Success factors

To successfully enter a new market, it is important to thoroughly research and prepare. To increase the chance of success, the following factors should be considered:

- Knowledge of the local market and culture, including market sizing, local sourcing, and researching the local infrastructure and energy sources.
- Access to local network or local representation. exploring new markets is time-intensive. Companies often lack in-house capacity for the planning and execution of market entry.
- Collaboration with one or more reliable partner(s)
- Feasibility and risk assessments
- Market entry strategy and legal option assessment. It is important to consider the costs of import tax and the admin that comes with exporting or localising in a foreign country. The regulatory framework (including food standards) often differs per country.
- Exploring the opportunities for grants, export & development financing. expanding to other countries can be expensive and risky, which is why it can be sensible for entrepreneurs to cover that risk through grants (e.g., for feasibility studies), loans or guarantees.

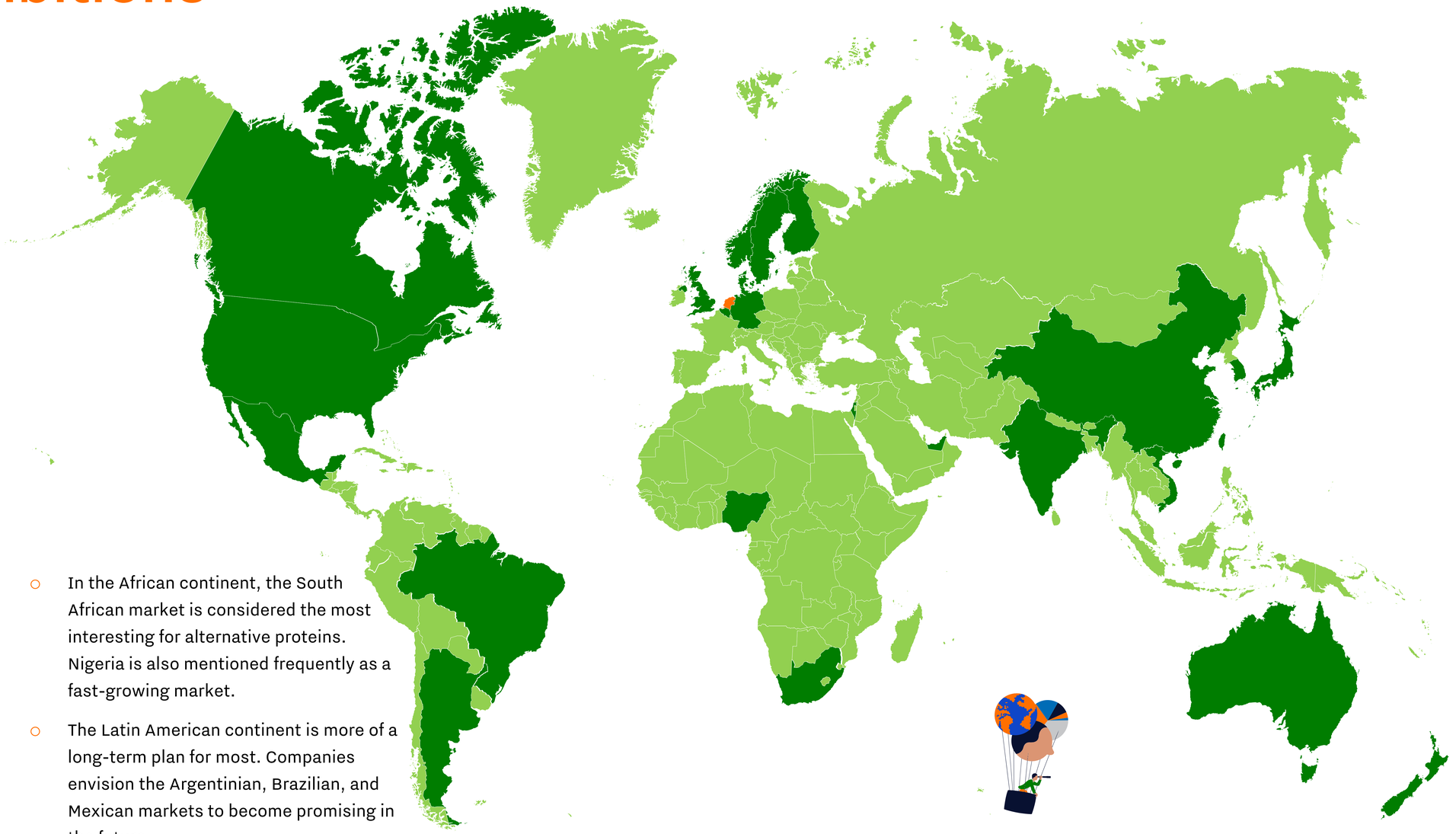
International ambitions

Opportunities abroad

Opportunities abroad

Based on the interviews with private sector companies, we have highlighted a selection of countries in which they show interest.

- The European market is considered the most interesting for most Dutch companies. Not only is it an advanced and large market, but it is also geographically and culturally viable as the Netherlands is in Europe. The countries which are considered the most promising for Dutch companies include Belgium, Germany, the Nordic countries and the UK.
- •The US is considered the destination market outside of Europe for many companies. Furthermore, companies are often in business with Canada, as it is a large-scale producer of raw materials.
- Many entrepreneurs expect Asia to become the biggest market soon. China, especially, is expected to grow exponentially. As the Asian market is more distant (geographically and culturally), many Dutch companies prioritise the US market over the Asian continent. Other interesting countries and regions include the Emirates, India, Korea, and Southeast Asia/ASEAN.
- In the African continent, the South African market is considered the most interesting for alternative proteins. Nigeria is also mentioned frequently as a fast-growing market.
- The Latin American continent is more of a long-term plan for most. Companies envision the Argentinian, Brazilian, and Mexican markets to become promising in the future.



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