BRABANT IS BRIGHT
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Foodtech: Making food production more resilient and sustainable in Brabant

The future is designed and made in Brabant

Global food production: the state of play

Foodtech innovators are developing novel ways to produce food that is nutritious, appealing, affordable and sustainable. And foodtech is going to become an integral tool in ensuring food security amid growing global pressures on existing supplies that are only expected to intensify in the years ahead.

According to the UN, the world's population could reach 9.8 billion people within the next 30 years. In order to feed them all, the World Bank estimates that food production would have to increase by about 70% from current levels.

Meanwhile, climate change is having a devastating impact on the environment, contributing to global temperature increases, and unpredictable and more frequent extreme weather events. In this environment, food production is increasingly difficult, as environmental disruption compromises the yield and nutritional quality of crops and reduces livestock productivity.

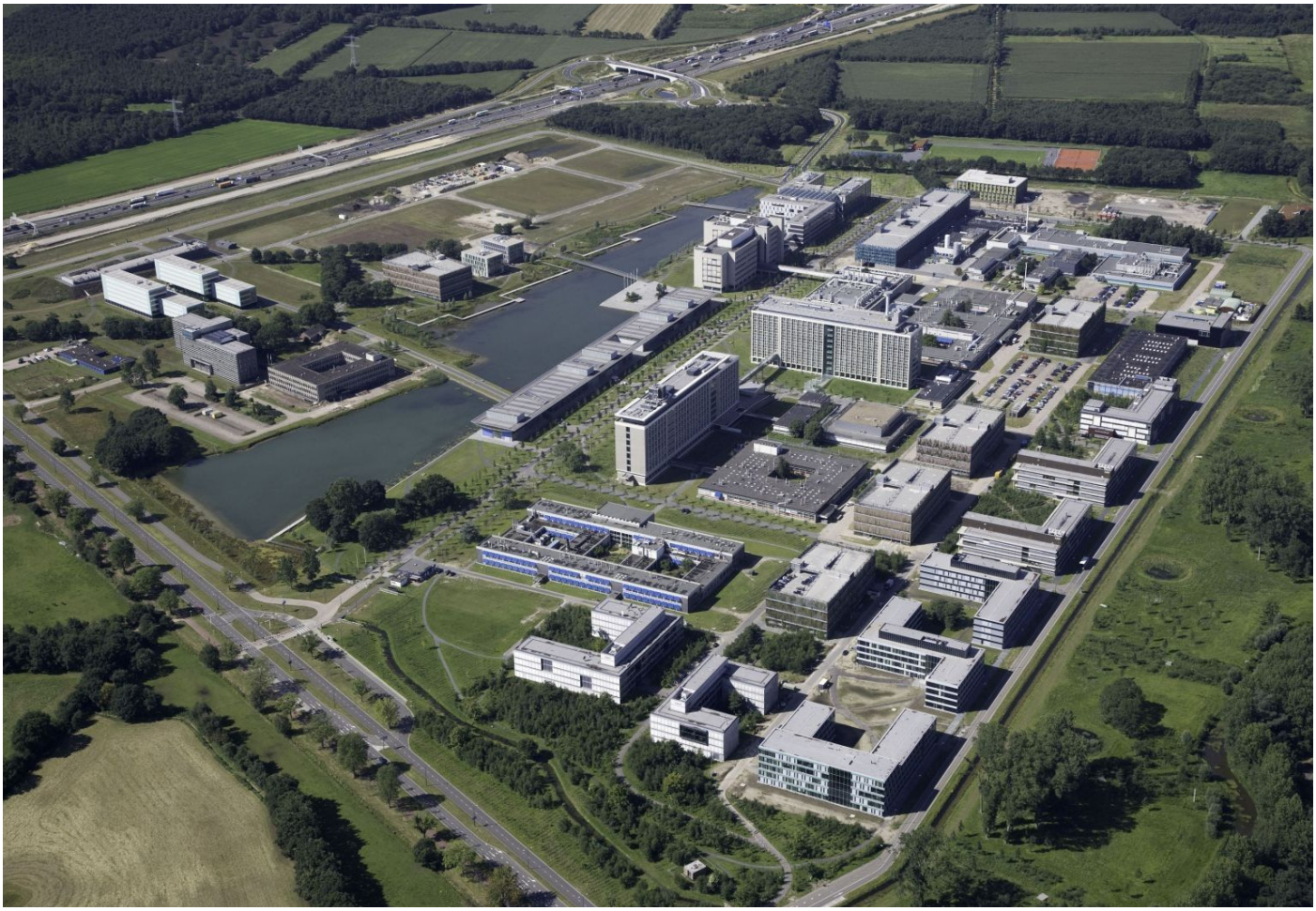
It is clear that food supply is one of the most pressing global challenges, and new solutions are urgently needed. The good news is that innovation in the food production and processing sector is surging. AgFunder reports that agrifood technology investments reached $51.7bn in 2021, an increase of 85% from 2020. Of that total, $9.2bn was invested in Europe. Foodtech involves deploying advanced technology to strengthen the food industry across the full supply chain.

A key aspect of this is the protein transition, which is a cornerstone of a more sustainable future of food. Alternative proteins are derived from non-meat sources with a far lower impact on the environment. According to PETA, a plant-based diet uses 75% less land than animal-based products. Furthermore, a 2021 study by Xu et al found that the greenhouse gas emissions from plant-based foods are half those of animal-based foods.

The impetus to develop alternative proteins is not only environmental. Market momentum for plant-based has also been building, and Bloomberg reports that it could account for 7.7% of the global protein market by 2030, up $132.6bn from 2020. A primarily animal-based diet is no longer the norm, GlobalData has found. Instead, "the future is flexitarian". A recent survey found that around half of global consumers adhere to some sort of dietary restriction regarding meat, with a sustainability motivation ranking third behind health and animal welfare, followed by price, taste, and safety.

To address many of these issues, there are numerous developments and advances in foodtech happening in the highly innovative province Brabant in the Netherlands. In the following document, we examine the companies and promising projects at the forefront of foodtech in Brabant.


The Foodtech value chain in Brabant
Start-Ups
Monkeys by the Sea
Sea So Good
Carezzo
BEEFYGREEN
Brands/Commercial/ Private label
REDEFINE MEAT
THE VEGETARIAN BUTCHER
HAK
Dalco food
HILTON FOODS
LIVEKINDLY Collective
schouten
meatless
a brand of beneo
MEATLESS FARM
vega insiders
THE BLUE BUTCHER
Future Food Group
NO MEAT TODAY COMPANY
Van Geloven
Facilities & Equipment
GEA
bodec
FOODTECH BRAINPORT
zonder verspilling, gezonde voeding voor iedereen
marel
dab DELTA AGRIFOOD BUSINESS
Cosun
VDL
Ingredients/Flavors
iff
DARLING INGREDIENTS
PeelPioneers
vanRijsingen green
the vegetable circle
PROTIX
DÖHLER
HUIJBREGTS GROEP
THE PROTEIN BREWERY
PECTCOF
TIME- TRAVELLING MILKMAN
SUSTAINABLE CREAMINESS
THOSE VEGAN COWBOYS



The importance of Brabant in foodtech innovations

The Netherlands is the world's second-largest agricultural exporter, behind only the US, which is all the more remarkable considering the Dutch nation has a 270-times lower landmass. How does a small country pack such a significant punch in food production? The answers lie in the Netherlands' rich heritage of agriculture, and now that long experience is being leveraged for the food transition, with high-tech innovation building on the foundations of this legacy.

Located in the south of the Netherlands, Brabant is a globally recognised hub for developing and manufacturing high-tech systems. At the same time, the province is home to the entire food value chain, from the development and production to the application and upscaling of alternative proteins. This means that foodtech innovators can tap into a wealth of existing, world-class infrastructure. Consequently, there are significant cost savings in using existing facilities, meaning that it is not so expensive for companies and start-ups to establish their operations.

Brabant is well-known for cross-sector collaboration with the Triple Helix of universities, business and government coming together to supercharge innovation. An ecosystem of businesses, educational and research institutions enables a flow of start-ups and scale-ups, which are set to transform food production for a changing world.

Key stats about Brabant

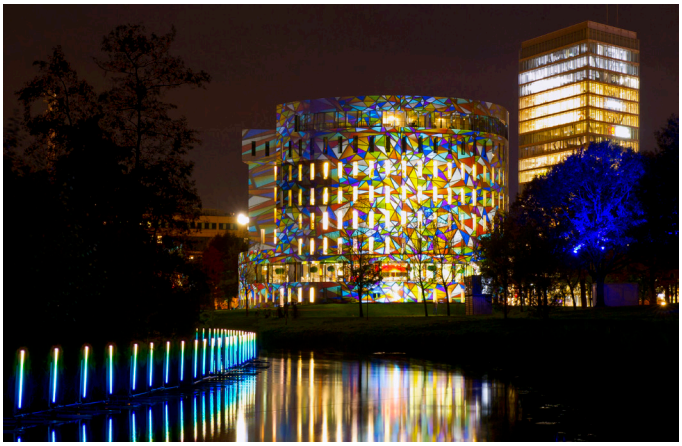
50%
Of all Dutch EU patents are generated in Brabant

30%
Private R&D expenditure NL is disbursed in Brabant

7th
Where Eindhoven ranks when it comes to the most promising global 'science hubs'

#4
Where TU/e ranks worldwide in collaboration with the industry

ASML
Brabant is home to ASML, which manufactures machines are so critical to our everyday lives that they influence world geopolitical equilibrium



A region with a taste for innovation

Brabant is the site of 33% of all private research and development (R&D) spending in the Netherlands. Now, food innovators are building on Brabant's agricultural tradition to establish the next generation of foodtech.

Brabant's well-developed high-tech and agrifood value chains comprise approximately 14,000 companies employing more than 81,000 people. The foodtech cluster in Brabant has the optimum combination of a fully developed traditional protein value chain for both animal and plant-based foods. In addition, the innovative power of high-quality foodtech disruptors developing new concepts such as the Protein Brewery, the Vegetarian Butcher brand, and Bodec are further expanding the potential of sustainable foods.

Specialist knowledge institutions in Brabant include Brainport Industries Campus and the High Tech Campus, which is home to 250 businesses and is a cornerstone of the Brabant technology ecosystem. Other specialist sites for foodtech research in the province include Food Tech Brainport, Green Protein Excellence Center (GPEC), Delta Agrofood Business (DAB), and the most recent addition of Side Stream Innovation Valley in Rodenburg.

KEY FACTS

13,912
companies

15.7%
of the total Agrifood sector in the Netherlands

12%
growth of the sector from 2014-2018

7.3%
growth of total Agrifood sector in the Netherlands

#1 province in production value
in the Netherlands

16.3 billion euros
in 2017

JOBS

34.3%
in the food processing industry

33.5%
in the primary sector (plants & livestock)

141%
job growth in prepared meals and snacks since 2014

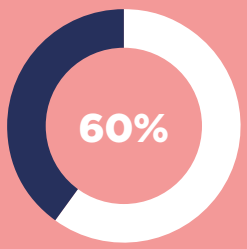
81,160
jobs

17.3%
of the total Agrifood sector in the Netherlands

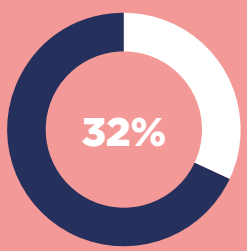
5,370
jobs in the largest primary sector (dairy farming)

30%
of the 1,600+ hightech companies are active in the Agrifood sector (27,000 jobs)

BRABANT PATENT SHARE IN THE NETHERLANDS



Animal health



Meat processing

Showcase: Schouten

Schouten is a prime example of how a company can start on a small-scale, family-run operation in Brabant and grow into a business with a global footprint. With its roots in agriculture and evolution into more science-based food production, Schouten is a clear representation of how industries in Brabant have moved away from the fields and into the labs. Schouten is a specialist provider of foods made from plant-based proteins. In fact, the company is a pioneer in meat substitute products, having started developing innovative plant-based foods back in 1990, almost 30 years before much of the rest would start embracing vegan and vegetarian alternatives. The forward-thinking company recognises that global demand for meat is not sustainable at current levels given the vast amounts of land and water required, even highlighting the significant emissions from livestock on the company's website. Schouten has an open mind towards different types of food from around the world and is always on the lookout for inspiration for its next flavoursome innovation.

This infrastructure empowers the scale up of advanced technology developments driven by the region's wealth of agri-food research institutions, including knowledge hubs, R&D infrastructure and agrifood clusters and campuses. The nearby Wageningen University & Research (WUR) is the world's top agricultural research institution and home to innovation hub, Food Valley. More than 1,000 projects have been exported from WUR to more than 140 countries, contributing to the Netherlands' global footprint.

Brabant is situated within an even broader world-renowned ecosystem for food innovation, which extends across the Netherlands and Flanders. Nearby Delft and Ghent Universities have world-class expertise in fermentation technology and biotechnology, which is being put into practice for food processing in Brabant.

Showcase: Bodec

A partner of food processing technology cluster Food Tech Brainport, Bodec connects the food processing industry – ranging from corporates to SMEs and start-ups – both inside and outside Brabant to innovative technology and knowledge institutions. Innovators have access to facilities for laboratory, pilot, and production scales, enabling them to expand operations. Testing and production spaces, temporary or permanent residences and a showroom for advanced technologies are all available through Bodec at Food Tech Brainport. Bodec brings process optimisation expertise to the food industry in pursuit of its mission: “Healthy food for everyone, without waste”. For more than 25 years, Bodec has converted process technology innovations and opportunities into practical solutions. Spin-offs from WUR and Brabant-based independent research organisation TNO can receive Bodec support to validate their pioneering processes on a larger scale and de-risk their investments. The innovators can take care of the first conceptual development steps, and Bodec provides the launchpad to scale up development and start a production line.

Cross-sector collaboration underpins innovations in Brabant, and new technologies are adopted and adapted in the foodtech sector to respond to today’s biggest challenges. For example, cell-based alternative protein technologies are derived from the pharmaceutical industry.

While fermentation has been embraced and modified by the foodtech industry from breweries and developed into a high-precision process. The basics of the technology are old, but innovators in Brabant are finding a new method of application.

Showcase: Redefine Meat

Redefine Meat uses 3D-printing to produce meat substitutes with flavour, taste, and texture comparable in quality to animal meat. Its 'New-Meat' aims to go beyond today's alternative meat products to provide the full sensory experience of meat, including flavour profile, texture, and aroma. New-Meat is already commercially available within food services in the Netherlands, Germany, Israel, and the UK, while also featuring on the tables in high-end Dutch restaurants. Redefine Meat established operations in a former meat processing plant in Brabant to launch in the Netherlands, with the aim to serve the growing demand for sustainable meat products in Europe and solidify its roadmap to become "the world's largest meat company, harnessing technology instead of animals". Having existing facilities in place enabled Redefine Meat to grow its operations, adapting old infrastructure for plant-based alternatives. Thanks to the marriage of old and new, the former meat processing location is now reaching a new market.

Exporting new food processing technologies developed and scaled in Brabant to other regions enables the foodtech transition to go even further. In Brabant, companies have the opportunity to scale up their production of plant-based products and introduce them to commercial market around the world.

Pioneers in food production

Alternative proteins are growing in importance for changing diets, and can be plant-based, fermentation-based or cell-based. Fermentation uses micro-organisms to transfer feedstocks into proteins and is a particularly promising route for innovators, at the sweet spot of being technically viable while allowing room for further innovation.

For innovative food processors, Brabant offers a wealth of existing equipment and infrastructure across the entire value chain, lowering development risks and speeding up time to market. This infrastructure can take food innovators all the way from development to distribution. The region is already a gateway to Europe, providing easy access to a population of 170 million European citizens within a 500km radius, and food producers can also benefit from well-established food-grade logistics infrastructure, which includes specialised packaging and the cold chain. The leveraging of existing infrastructure is part of Brabant's wider culture of pooling resources, knowledge, and facilities to achieve greater growth.

Showcase:

The Protein Brewery: Founded in 2020 on BioscienZ technology, the Protein Brewery serves as proof-of-concept of the efficacy of fermentation technology in Brabant, with the aim to develop novel ways of producing plant-based, nutritious food ingredients. Its mission? To contribute to the transition to future-proof, nutritious and sustainable foods across the globe. Since the Protein Brewery spun-out of BioscienZ, it has worked towards commercialising plant-based ingredients derived from fermentation. Its certified pilot plant opened in Breda in June 2021, designed to facilitate the full process behind champion product Fermotein®. This product is an alternative source of proteins, fibres, essential amino acids, vitamins and minerals, characterised by healthy cholesterol, neutral flavour, high-performance and non-GMO. In January 2022, the Protein Brewery began building its scale up brewery for the commercial production of Fermotein®.

Cosun: Royal Cosun was founded 125 years ago and has since become a leading international agricultural cooperative of more than 8,400 sugar beet growers. Now, Cosun has launched a new business line focusing on the protein transition, with the vision to "unlock the full potential of plants in a transparent and circular way" and convert them into sustainable solutions. Cosun is working to realise new applications for arable crops including sugar beet, chicory, and potatoes out of its state-of-the-art innovation centre. By building an innovation ecosystem of business groups, customers, knowledge institutions and investors, Cosun aims to bring potato products, plant-based proteins, and dietary fibres to the market. At the end of 2021, Cosun introduced a new protein isolate, derived from the Fava bean. Fava protein is climate-friendly, offering a neutral taste, high solubility, and good nutritional value. Its first commercial production began in 2022.

GEA: Another Brabant company with a global reach, GEA estimates that as much as 70% of all products sold in supermarkets may have encountered its food processing technology. Given the extensive range of equipment the company provides, it's easy to see why. Equipment available from GEA includes blenders and mixers, centrifuges and separation units, cleaners and sterilisers, liquid processing systems, milling systems, membrane filtration equipment, slicing and loading, and vacuum systems. GEA equipment can handle preparation, separation, processing, preservation, packaging, and temperature-controlled required for virtually every type of food from meats, seafood, and oils to fruit and veg, powders, dairy items, and bread. More recently, the company has been working closely with customers to develop solutions for plant-based foods. A common obstacle for new businesses is scaling up tasty recipes made by hand to batch production on an industrial scale. GEA collaborates closely with customers to develop solutions that deliver replicable results in food production with the necessary precision while optimising materials and energy consumption.

Taking alternative proteins to the next level

Food transformation is underway, and the future is taking shape. Brabant envisions a balance between old and new, where innovation helps to substantially lower the climate impact of the whole food system. Alternative proteins are set to play an increasingly important role in future diets, while advanced technologies will help make animal-based production less pollutive and more sustainable.

As the initial 'hype' around alternative proteins begins to wane, and the adoption curve normalises, the question is: what comes next? In order to maintain momentum, protein pioneers must leverage ongoing innovation to reach the next level when it comes to scale, price, and quality. Brabant is home to all the infrastructure, feedstocks, and support, as well as the spirit of collaboration and innovation. All these factors will help drive food innovation to the next level.

At present, the alternative protein market remains relatively small. If it is to continue to grow, a vital step is to drive down prices and further enhance taste in order to drive up sales. This is especially important at a time of high inflation across Europe and the world. On average, plant-based meat is around twice as expensive as beef and more than four times as expensive as chicken by weight, according to the Good Food Institute.

Plant-based food processors need to capitalise on economies of scale by upscaling their operations to become competitive with animal-based options. Already home to large-scale meat processing equipment and machinery providers such as Marel International and GEA, Brabant is a location for experts in efficient food production. Brabant provides support for businesses to take a step-by-step approach to scaling up, with a long-term vision in mind, avoiding premature scaling and preparing for growth that lasts.

As the hype wears off, customers will also demand improved flavour, texture, and nutrition from alternative proteins. To avoid one-time purchases and prevent adoption tailing off, food processors must continue to improve their products. For example, while the focus has typically been on protein alone so far, food alternatives that offer a combination of nutritional value for the right price point are more likely to appeal to customers in the long run.

"Alternative proteins are set to play an increasingly important role in future diets"

Showcase: IFF

A global leader in food, beverage, health, bioscience and sensorial experiences, International Flavour and Fragrances (IFF) is bringing more advanced flavour innovation to meat alternatives. The company believes that customers will not be satisfied with straightforward mimicking, but they demand more novel experiences from meat alternatives. Some of the innovations at the IFF R&D facility in Tilburg include working with umami and fats to improve the flavour profile of alternative proteins. IFF's considerable manufacturing capacity is ideal for large-scale production and set up for continued growth.

In Brabant, a pipeline of start-ups is focusing on additional innovations to solve issues of taste, texture, and nutritional value. And there is the infrastructure in place to enable these new businesses to grow in Brabant. Within the province, there is also rapid growth in the number of institutions with field labs and companies involved in process technologies and innovations for food production. Technologies such as fermentation, extraction, distillation, and mild preservation all contribute to increasing both food security and safety. For example, they help add value to side streams and residual flows from food production and make new plant-based products such as meat and dairy substitutes tastier and healthier.

More advanced innovation demands new value chains and closer collaboration than ever. And BOM, the Brabant Development Agency, helps facilitate an environment in which the future of food production can be forged.

Investment: a key enabler for future foodtech

Investment is a fundamental building block of innovation. Brabant is home to a dynamic ecosystem, which connects businesses, from established food processing companies to innovative start-ups, with the investment community. Brabant collaborates with investors with national, European, and even global ambitions. Investors in Brabant are patient, enabling companies to upscale in a way that is smart, steady, and sustainable. Companies also benefit from Netherlands-wide initiatives, such as the Dutch Government's National Growth Fund, which will allocate €20bn to projects categorised as either R&D and innovation or developing knowledge in specialist areas between 2021 and 2025.

Another cornerstone of the Brabant community is its knowledge institutions. Members of the ecosystem, such as Bodec, help bridge the gap between lab-scale pilots and full-scale production, contributing to de-risking of investments in innovations and shortening the time to market.

BOM facilitates the connections between existing facilities, established food processing companies and innovators, which drive knowledge-sharing and empowers upscaling. BOM also offers new and existing foreign companies support in finding sites for operations, buildings and environmental permits, labour market analysis, talent acquisition, assistance for logistics, employment regulations, bespoke research, as well as relevant contacts in public and private sectors.

In a changing global environment with an escalating human population, the food revolution has become vital. Not only is it possible to completely reimagine what nutrition looks like, but it is actually happening in real-time. Some of the world's most promising foodtech innovators are scaling up in Brabant, providing a new vision on the future of food. Now, even as global currents continue to shift, foodtech is going to go a long way in providing the necessary stability of supplies and food security to meet the dietary demands of a growing population in a sustainable way.

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