

State of the European Alternative Protein
Research Ecosystem 2020-April 2024



Research and Innovation funding landscape analysis



Introduction

The European funding landscape for alternative proteins has developed rapidly over the last five years. This report explores the detail of what European research and innovation (R&I) funders have prioritised across the three pillars of plant-based, fermentation-made and cultivated meat, seafood, eggs and dairy.

Why alternative proteins?

Alternative proteins offer a promising solution to meet the projected growth in the global demand for meat while building a more sustainable food system. Plant-based and cultivated meat could help satisfy demand for meat with up to [90% less land](#), and fermentation can help Europe achieve a circular bioeconomy, using crops and other byproducts that would otherwise go to waste.

However, to achieve widespread uptake, alternative proteins must compete on taste, healthiness, and price as well as being widespread and available to purchase. European consumers report [taste and price as the main barriers](#) to trying and continuing to purchase these products. Yet in order to meet these expectations, key technological hurdles must be overcome.

Why does public funding matter, and what role can Europe play?

Europe is a global research and innovation powerhouse, accounting for over [20% of global R&I investment](#). The EU is second only to China in terms of scientific output and [responsible for 18% of global scientific publications](#), while [half of the world's top 10 universities are in Europe](#).

This scientific leadership has been reflected in Europe's world-leading innovation in many sustainable technologies. The EU, for instance, has [29% of the global patent filings relating to renewables and 24% of those relating to energy efficiency](#) – but it took significant and sustained public investment in scientific R&I to achieve this. To develop the scientific ecosystem and achieve similar levels of leadership in the alternative protein industry, Europe must make strategic public investments.

Public investment in forward-looking, open-access R&I designed to maximise public benefits can accelerate progress by ensuring that results are made available for everyone. Many of the most pressing research questions that must be addressed to achieve taste and price parity with conventional meat, seafood, eggs and dairy are those that individual companies are not necessarily incentivised or equipped to address on their own. When such technological bottlenecks are left to industry to overcome through private funding, research progresses in a fragmented way. Public funding is essential to ensure research data is shared freely and that alternative proteins reach their full potential.

The [Global Innovation Needs Assessment on Protein Diversity](#), published by ClimateWorks Foundation and the UK's Foreign Commonwealth Development Office (FCDO) in 2019, estimated that in order to unlock the full climate and economic benefits of alternative proteins, global public spending on R&I would need to reach an average annual figure of \$4.4 billion in the years 2022-2050. To contribute proportionately to this global total, Europe would need to invest an average of €760 million per year through public funding.¹

What we hope to achieve with this analysis

This report aims to describe and analyse the public and nonprofit research funding landscape for alternative proteins across Europe over the last five years.

Using publicly available funding data, compiled in GFI's [global research grants tracker](#), public and nonprofit funding for alternative proteins awarded over the period of January 2020-April 2024 is analysed below. Funding is broken down by alternative protein pillar as well as specific research focus, or 'technology sector'. For a full list of countries covered by this report, the full methodology, and the limitations of the analysis, please see the Appendix.

We can expect the trends highlighted here to bear fruit in the alternative protein research landscape for years to come. An accompanying report, the [State of the European Research Ecosystem: Publishing Landscape Analysis](#), which analyses the research publications in Europe over a similar period to this report, offers a glimpse of the early impact of the research funding so far.

¹ This figure is based on Europe contributing a proportionate share of the global investment, using an estimate of Europe's global share of R&D of 20.4%, in 2022, www.oecd.org/en/data/datasets/main-science-and-technology-indicators.html.

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01 What are alternative proteins?

By 2050, global meat demand is set to grow by 52%² which current production methods cannot sustainably grow to meet. Instead of asking people to give up the foods they love, alternative proteins enable the development of tasty, affordable meat, seafood, eggs and dairy to reduce reliance on intensive animal agriculture and build a more resilient food system. Alternative proteins fall into the following main categories:

Plant-based meat, seafood, eggs and dairy are produced directly from plants but look, taste, and cook like conventional animal products.

Image: Juicy Marbles



Image: Mosa Meat

Cultivated meat and seafood. Foods like chicken, pork, beef and fish that are produced by cultivating animal cells directly, thus replicating the sensory and nutritional profiles of conventional meat and seafood.

Fermentation-made protein and ingredients.

Fermentation is used in three primary ways. *Traditional fermentation*³ uses intact live microorganisms to modulate and process plant-derived ingredients. *Biomass fermentation* leverages the fast growth and high protein content of many microorganisms to efficiently produce large quantities of protein. *Precision fermentation* uses microbial hosts to produce specific functional ingredients which are important for the manufacture of alternative protein end products.



Image: Perfect Day

² FAO, *The future of food and agriculture*, 2018

Cross-cutting: Cross-cutting projects are those that apply more than one production technique³: one common example of a multi-pillar research area is traditional fermentation, in which commonly used strains of yeast or other microorganisms are applied to enhance the flavour, texture or other characteristics of a plant protein product. Similarly, cellular agriculture often refers to the combined approaches of precision fermentation and cultivated meat development, sometimes in mutually supportive ways. For instance, this could mean recycling the waste media from a cultivated meat bioprocess as a feedstock for fermentation. Meanwhile, there are fully cross-cutting projects which are those projects which seek to understand an aspect, such as a social science question, across the entirety of the alternative protein field.

Alternative protein technology sectors

As part of this analysis, it is helpful to assess the technological advancements that can move alternative proteins closer to taste and price parity with conventional protein sources. This report uses ten ‘technology sectors’ to classify these research areas (summarised in Table 1). In addition, there are general areas of research such as health and nutrition, consumer research, environmental research and food safety and quality.

Table 1. Technology sectors analysed for this report.

Technology sector	Description	Primary AP pillar(s) that this applies to
Bioprocess design	Innovations in bioreactor design, and both upstream and downstream process innovations.	Fermentation Cultivated Plant-based ⁴
Cell culture media	Reducing cell culture media costs and increasing their availability by characterising and validating novel sources of growth factors, amino acids, and other media components.	Cultivated
Cell line development	Optimising new and existing cell lines to achieve faster cell growth, greater stability and stress tolerance, and higher cell density in terrestrial and aquatic cell lines.	Cultivated
Crop development	Breeding of crops and increased use of underutilised protein crops for higher protein yields and functionality.	Plant-based

³Throughout this report, projects of this type are defined as "cross-cutting". However, one exception is the pillar deep dives on pg 14-26, where traditional fermentation and cellular agriculture approaches are split out into plant-based, cultivated, and fermentation, as appropriate.

⁴Refers to the use of traditional fermentation techniques to modulate or enhance the characteristics of plant proteins.

End product formulation & manufacturing	Process and formulation innovations including (but not limited to) novel texturisation methods such as extrusion, electrospinning, 3D printing, and enzymatic processing to match the texture of animal protein.	Plant-based Fermentation Cultivated
Feedstocks	Innovations in media or feedstock utilisation strategies (including the use of alternative feedstocks) to achieve higher efficiency, greater scale, and bring down costs.	Fermentation
Host strain development	Screening and optimisation of novel strains to identify the most efficient pathways for producing targets.	Fermentation Plant-based
Ingredient optimisation	Improved protein fractionation and functionalisation to achieve higher-quality ingredients with less processing. Also covers the development of novel ingredients to augment nutritional profiles and enhance the sensory experience of alternative protein products.	Plant-based Fermentation
Scaffolding	Improved scaffolding biomaterials that support cell adherence and differentiation to allow the replication of complex animal meat structures.	Cultivated
Target molecule selection	Target identification and validation to broaden the scope of food ingredients produced by precision fermentation.	Fermentation

02 Europe-wide trends in alternative protein funding

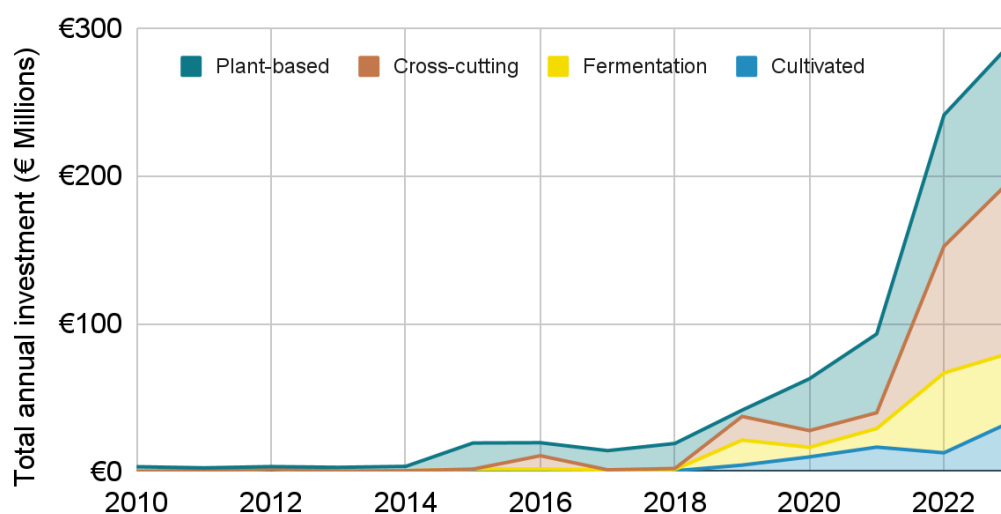
In 2023, European research funders invested €290 million in alternative protein research and innovation (R&I), more than in any previous year. With major investments expected or in progress in the second half of 2024, such as the [€50 million in public investment from the European Innovation Council](#) and the [\\$30 million \(€27 million\) Bezos Earth Fund Centre of Excellence](#), 2024 is on track to equal or surpass 2023 as the highest investment year so far. This would make five straight years of increasing public investment in Europe in alternative proteins and reflects a maturing academic field which is starting to match the rapid growth of the industry since 2020. Over the 4 years from 2020, Europe has averaged a 70% annual growth rate in funding. Annual investment has increased by €230 million, from a starting point of €63 million in 2020.

While plant-based remains the highest-funded pillar over the period considered, with over €300 million in cumulative funding since 2020, it is noticeable that as investment has grown, governments across Europe have increasingly embraced the newer technologies of fermentation and cultivated meat. 2024 marks the year that fermentation can expect to top €100 million in annual funding.

However, this growth and diversification has not been consistent across Europe. As funding has grown, variations in regional funding strategies and expertise have become apparent. The regional sections of this report explore the strengths and strategies of the most active countries in this field.

Figure 1: Investment by European public and nonprofit organisations in alternative protein R&I over time (2010-2023). 2024 is not shown but total investment was at €100 million as of April 2024.

This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europe@gfi.org or submit it directly to the [tracker](#).

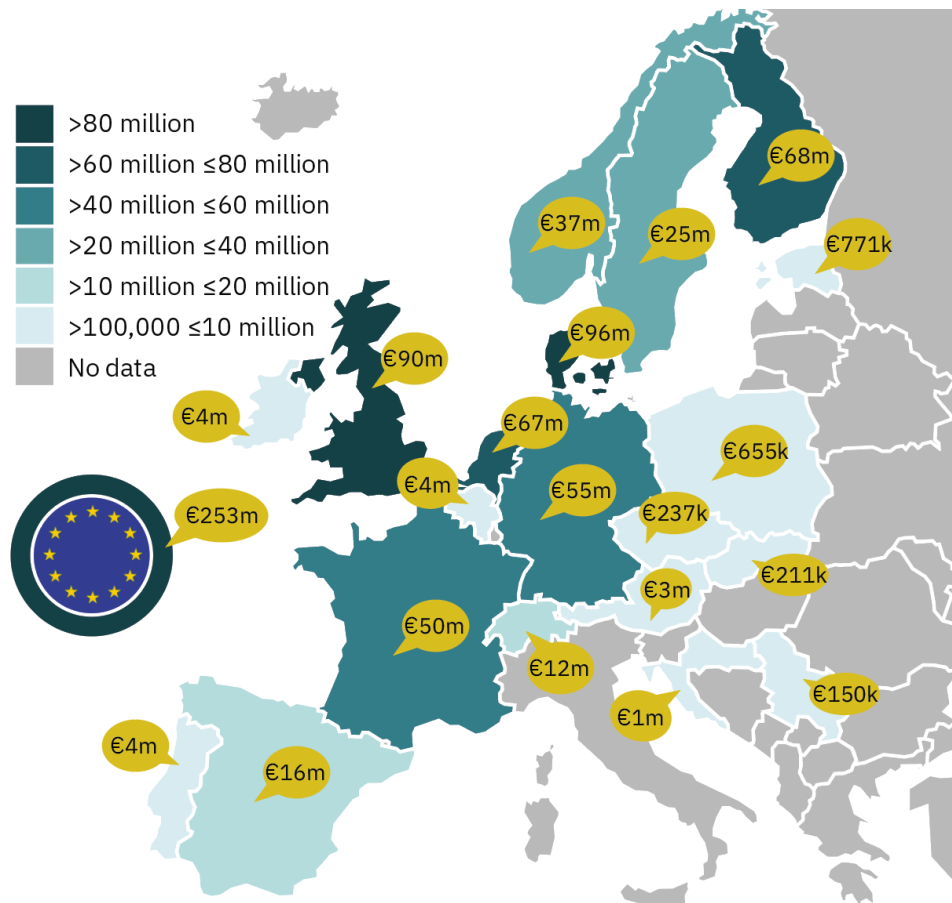


Investment by region

Total investment

The European Commission has led the way in investing in alternative proteins, committing €252 million over the past four years. The UK and Denmark are close in the race for second place (with funders in Denmark investing €96 million, including both government and nonprofit contributions, and the UK not far behind with €90 million). The top five are rounded out by Finland and the Netherlands (€68 million and €67 million, respectively). See the Appendix for exact figures for the rest of the top 10.

Figure 2: Regionality of public and nonprofit alternative protein R&I investment in Europe (January 2020-April 2024). Not all European countries were included in this analysis due to availability of data. See the Methodology section of the Appendix for a full list of included and excluded countries. *This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europa@gfi.org or submit it directly to the [tracker](#).*



Across Europe, both island and landlocked nations of all sizes have funded research in this field. Of the regions considered, the Nordic region is the most consistent in embracing alternative proteins, with each country in the region making significant investments since 2020. However, even in the Nordic region, a mix of investment strategies is evident.

While plant-based products are often thought to be a mature technology, as they are already on the market, only 30% of the total European funding for plant-based alternative proteins

comes from exclusively innovation funding bodies. European funders clearly recognise the need for early-stage, open-access field-advancing research.

Investment by Pillar

The European Commission is alone in being a top three public funder for all three pillars, while strengths at the national level differ. The Netherlands tops investment in cultivated followed by the UK (€67 million and €37 million respectively, including both the UK's [Cellular Agriculture Manufacturing Hub](#) (CARMA) and the [€60 million National Growth Fund allocation](#) in the Netherlands). Plant-based is led by Denmark (€73 million) followed by France (€44 million). Finland (€54 million) and the UK (€26 million) join the EU (€49 million) to make up the top three in fermentation investment.

Where research involves multiple pillars, covering a combination of cultivated, fermentation and/or plant-based technologies, it is listed as “cross-cutting”. For example, the EU has invested heavily in cross-cutting approaches, to the tune of more than €117 million since 2020 – such as using traditional fermentation as a method for transforming sidestreams or reducing food waste – while countries such as the Netherlands have tended to focus on cellular agriculture, a mix of fermentation and cultivated.

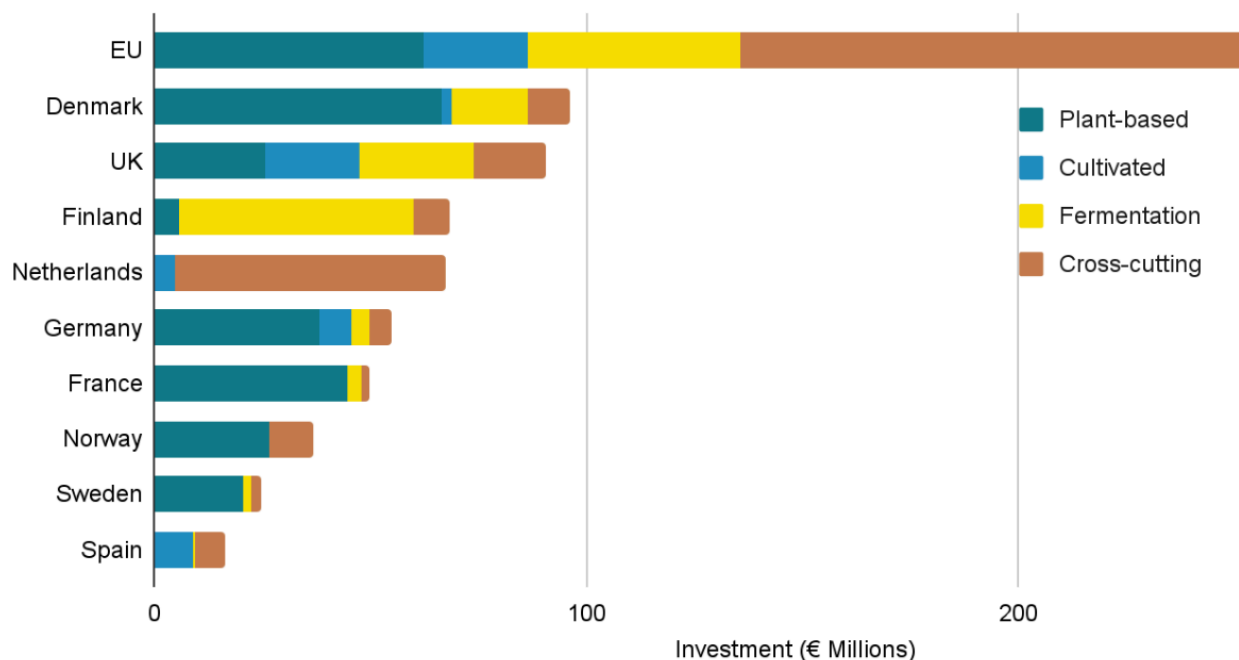


Figure 3: European public and nonprofit investment in the different alternative protein pillars by country (January 2020-April 2024). *This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europa@gfi.org or submit it directly to the [tracker](#).*

Headline commitments:

Governments across Europe have made national commitments to invest in alternative proteins in recent years. However, many of these are yet to reach the allocation stage. This report analyses funding allocated between January 2020 and April 2024, and so several of the commitments below are not included. However, they are highlighted here as they demonstrate the increasing level of ambition across Europe.

Germany	In its 2024 federal budget, Germany announced an investment of €38 million in alternative proteins .
Netherlands	The Dutch Government invested €60 million via the National Growth Fund to support the formation of an ecosystem around cellular agriculture.
Switzerland and Sweden	Innosuisse recently partnered with the Swedish Vinnova, the Israeli Innovation Authority and Enterprise Singapore to fund alternative protein companies partnering in the four regions.
Denmark	In 2021, the Danish Government promised €168 million for plant-based foods . Of this multi-year commitment, €7.78 million was allocated to plant-based research in 2022, and €16.4 million in 2024.
UK	A £20 million (€23 million) commitment by UK Research and Innovation (UKRI) over 2022-2025 included £15 million (€18 million) for a national innovation and knowledge centre, which was awarded in September 2024 to a proposal led by the University of Leeds .
European Innovation Council (EIC)	In 2024, the EIC allocated €50 million to innovation projects making food from precision fermentation and algae .
Catalonia	In 2023, the Department of Climate Action, Food and Rural Agenda of the Regional Government of Catalonia and the region's Institute of Agri-Food Research and Technology (IRTA) invested €7 million in a Center for Innovation in Alternative Proteins (CiPA)

Investment by end-product focus and pillar

As well as the technology used, research projects vary by the end product they are seeking to produce. Of the research that had a clear target end product in mind, that was most often meat (65% by total investment value). Dairy was the second most represented (16%), while projects focusing on seafood made up only 8%, and eggs only 2% of the total. However, 72% of the total funding went to projects that were agnostic as to the end product, such as projects aimed at optimising protein ingredients or powders, or crop development. Interestingly, this varies significantly by pillar: over 95% of the funding for cultivated research was allocated to a specific end product.

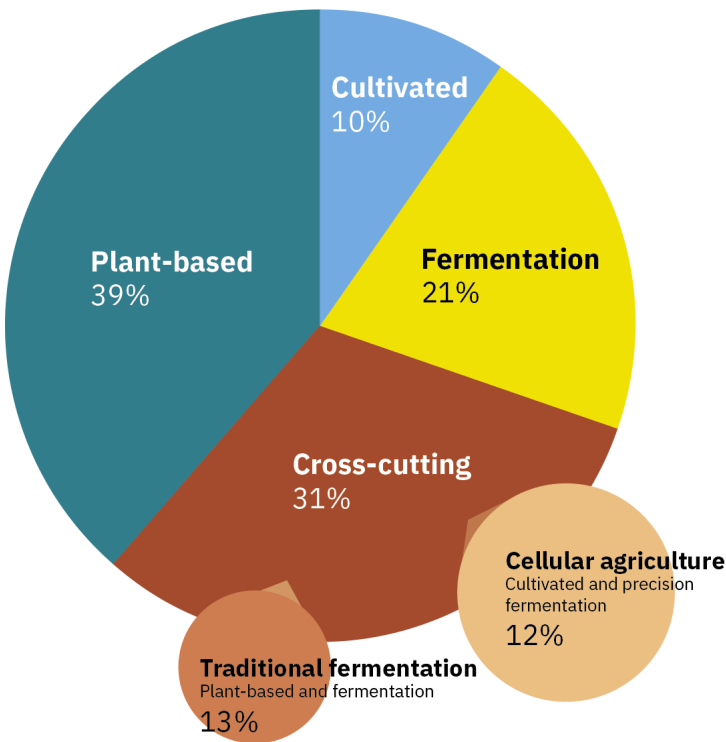
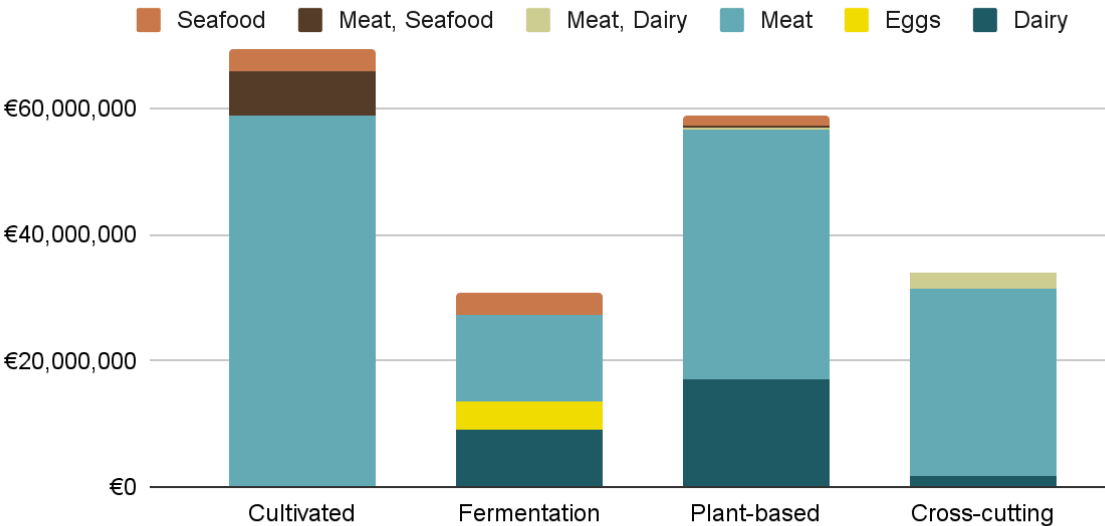


Figure 4: European public and nonprofit R&I investment, broken down by the production pillar of each grant.

Figure 5: European public and nonprofit R&I investment, broken down by the end product focus (where known) of each grant.



Plant-based

In the “What are alternative proteins?” section above, we categorised traditional fermentation of plant-based ingredients as “cross-cutting”. However, for the purposes of this section, traditional fermentation is included within the scope of “plant-based”.

Top funding jurisdictions

The top five jurisdictions funding plant-based meat, eggs and dairy in Europe between January 2020 and April 2024 were Denmark, the European Commission, France, Germany and Norway. Denmark and the EC are far ahead of the countries following, having both invested more than €60 million in public and philanthropic funding. France, in third, invested €45 million.

Plant-based is the most well-funded of the three pillars. With traditional fermentation alone receiving a total of €91 million, plant-based investment will hit a cumulative total of €390 million in 2024.

Much of that funding advantage compared to the other pillars comes from a higher historical starting base: in 2020, plant-based made up 56% of all funding for alternative proteins. However, with the increase in cultivated and fermentation funding in the years since, this figure has fallen to 32% in 2023. This is despite the year-on-year increase in investment, with 2023 the highest year to date.

End product focus

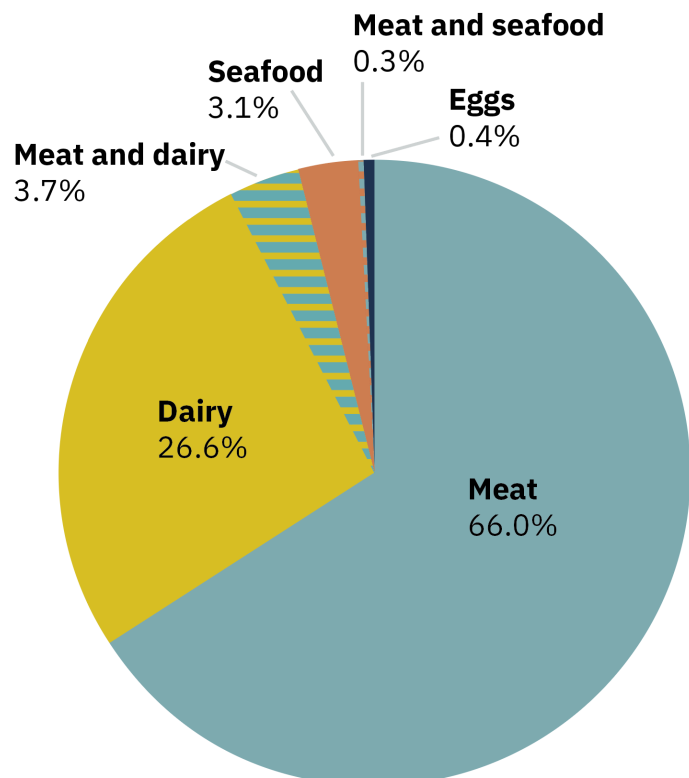


Figure 6: European public and nonprofit plant-based investment (including traditional fermentation) by end product focus, where known.

Plant-based projects were less likely to be focused on seafood than projects of the other pillars, making up only 3% compared to the 8% across all pillars. However, they were comparatively more likely to focus on dairy, perhaps reflecting the [growing success of plant-based milk and cheese with consumers](#).

The comparative lack of plant-based seafood research is a missed opportunity. Macroalgae in particular are an interesting source of protein biomass and ingredients such as colouring agents for plant-based meats. They have particular potential as a source for critical nutrients such as omega-3 fatty acids, which are [highly valued as ingredients in plant-based seafood](#), but appear underutilised based on this analysis, given the limited amount of plant-based seafood research that is taking place.

Research area focus

Plant-based meat, seafood, egg and dairy products are available commercially, but EU-funded research has shown that [improvements to price, taste and healthiness are needed](#) in order for products to find widespread consumer acceptance. Fundamental research is required to [optimise raw materials, find and adapt novel ingredients, improve protein fractionation and functionalisation, and develop novel texturisation methods](#). The breakdown of investment in plant-based research along the value chain reflects these priority research areas.

Research priorities for plant-based meat, seafood, eggs, and dairy:



Better raw materials through breeding of crops and increased use of underutilised protein crops for higher protein yields and functionality.

Learn more >>



Improved protein fractionation and functionalisation to achieve higher quality ingredients, better energy-efficiency, and a lower degree of processing.

Learn more >>



Novel ingredients to mimic animal fat properties, augment nutritional profiles, and enhance the sensory experience of plant-based meat.

Learn more >>



Novel texturization methods in addition to extrusion, electrospinning, 3D printing, enzymatic processing to match the texture of animal protein.

Learn more >>

Funding for plant-based R&I was most intensively distributed early in the value chain, particularly in crop development and ingredient optimisation. End-product formulation and manufacturing, critical for advancing the production of textured meat products to scale, received less funding than ingredient optimisation. Other apparent gaps in investment across Europe were research into sensory evaluation and plant-based food safety and quality. This

seems to be because these topics are generally only integrated as secondary themes in projects which are otherwise focused on product development and ingredient optimisation. The exception is the flagship [€10 million EU-funded project Giant Leaps](#), which was funded by the European Commission to explicitly address these areas identified as “gaps” in 2022. Giant Leaps has designed a research programme including, among other topics, method development for food safety and quality testing.

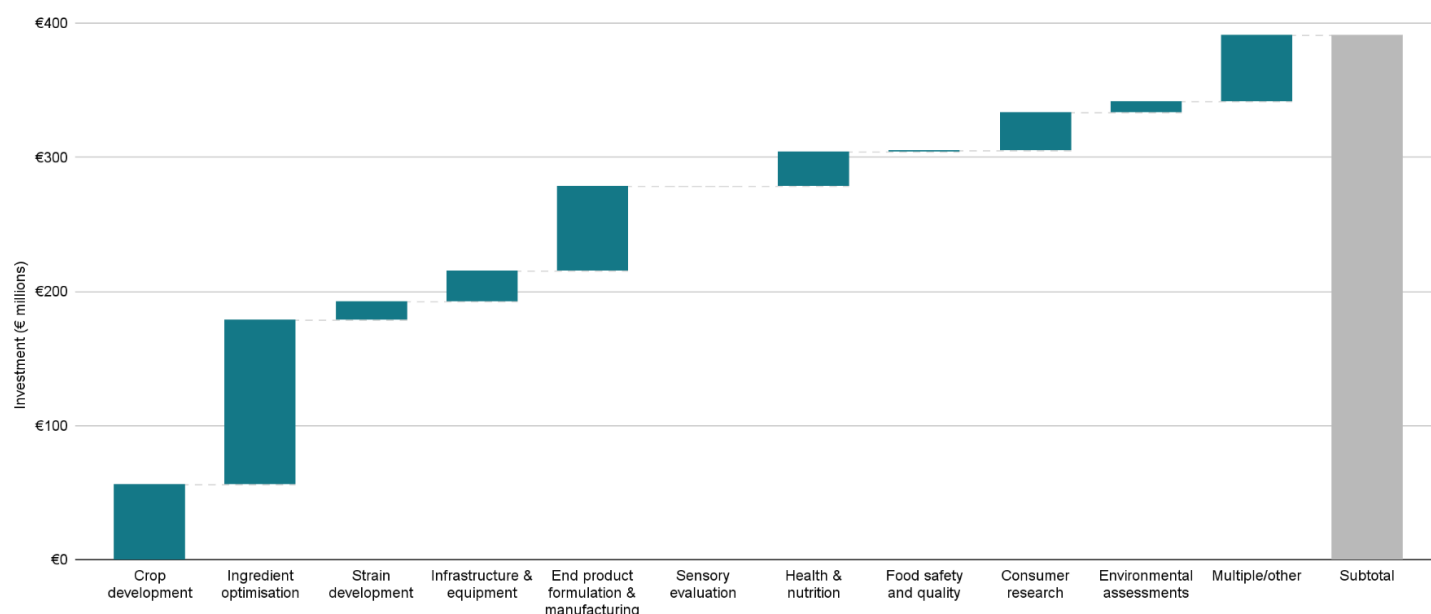


Figure 7: Public and nonprofit investment in plant-based R&I by research area, including funding for traditional fermentation (January 2020-April 2024). *This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europa@gfi.org or submit it directly to the [tracker](#).*

Research into crop development for plant-based products, totalling €56 million across Europe, included several landmark projects from the EU, including [ValPro Path](#) (€8 million), which aims to develop sustainable value chains for legume crops, as well as [SOYSTAINABLE](#) (€3 million of public funding, with a total project value of €8.4 million), funded by the French National Research Agency, ANR. Both of these projects aim to develop legume crops specifically for food rather than feed purposes. While some aspects of the research agenda for food and feed crops are shared, other critical topics, such as research into cultivars with reduced off-flavours, and developing bioprocesses relevant to food industry actors, are unique to food research.

Ingredient optimisation, a research area which has received €122 million in funding, again includes headline European projects such as [CIRCALGAE](#), a project to valorise algae waste streams (€8.5 million), as well as major national projects such as the €6.6 million Research

Council of Norway funded project Nofima, which aims to [develop Norwegian agricultural products and ingredients for a healthy and sustainable future](#).

Spotlight on traditional fermentation

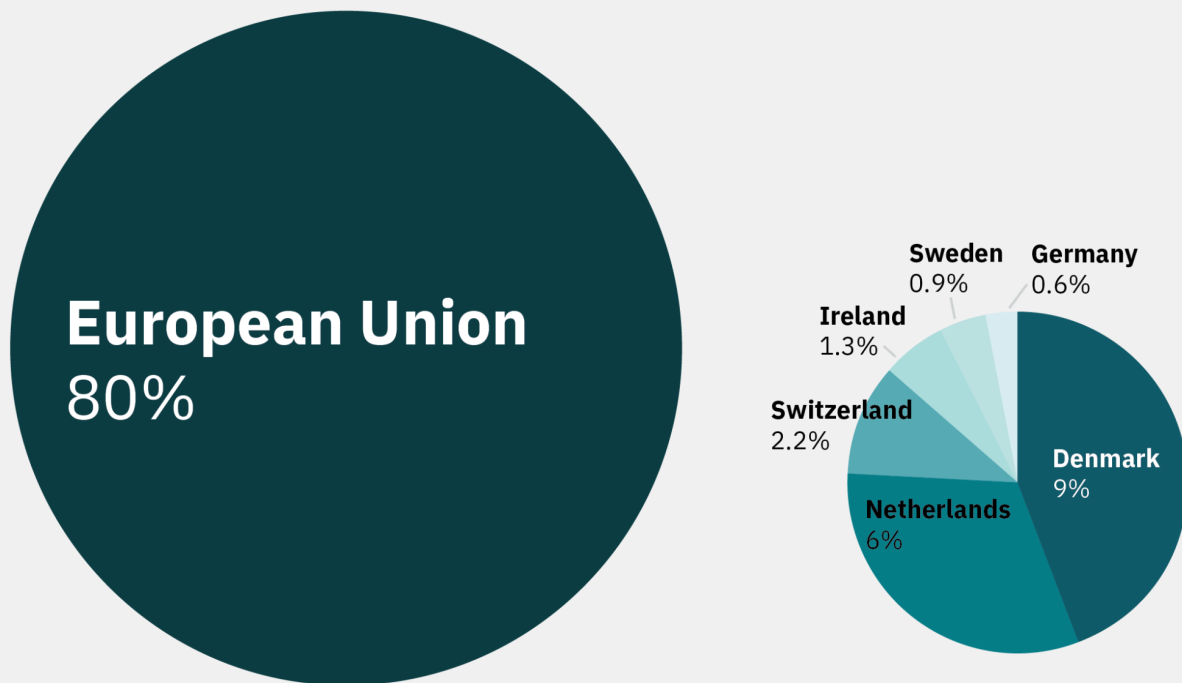


Figure 8: Funders of traditional fermentation

Traditional fermentation, unlike the other types of fermentation, is included in the plant-based research breakdown as it involves using fermentation to improve a plant-based substrate. Traditional fermentation approaches have been funded to the tune of €91 million, but only by a limited number of countries, with the EU contributing the lion's share of funds (80%) dedicated to the topic.

Cultivated

In the “What are alternative proteins?” section above, we categorised cellular agriculture as “cross-cutting”. However, for the purposes of this section, cellular agriculture funding was included as “cultivated” (except where clearly relevant to the fermentation section, below).

Top funding jurisdictions

The top 5 jurisdictions leading the way in investment in cultivated meat in Europe are the Netherlands, the UK, the EU, Norway and Spain. All-time investment across Europe topped €160 million by April 2024. The biggest single commitment is through the Dutch National Growth Fund, which awarded €60 million to a consortium building a Dutch ecosystem for cellular agriculture, in particular cultivated meat, in 2022. The Cellular Agriculture Manufacturing Hub (CARMA) hosted by the University of Bath, with €14 million in public funding (and a total of €25 million including private contributions) follows some way behind. This level of funding makes cultivated meat the lowest funded of the three pillars, although the rate of funding is growing. In 2023, cultivated investment matched the funding allocated to plant-based in 2020 (approximately €33 million).

End product focus

Cultivated product types were less likely to be dairy than the other technology pillars (no projects were working on dairy alone, and less than 4% of funding went to projects with dairy included as a possible end product type, such as [this project](#) funded as part of the CellFood hub in Aarhus). They were also more likely to take a joint approach, looking at meat and seafood (9.3%).

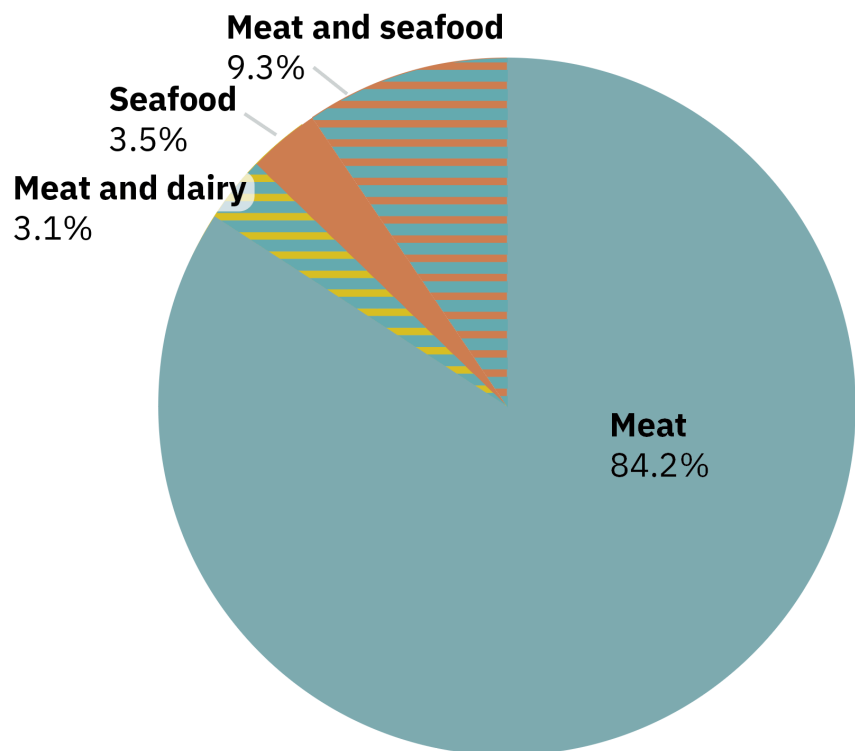
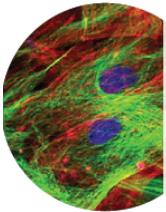


Figure 9: European investment into research on cultivated meat by end product type where known.

Research area focus

While the cultivated meat industry has grown rapidly over the past five years, open-access research into fundamental technologies underlying its production would reduce costs and increase yields, thereby bringing cultivated meat and seafood closer to the market. While economically viable production may not need fundamental breakthroughs over today's state of the art, cell line stability and growth, cell culture media costs, bioprocessing efficiency and scaffolding are all areas that [have been identified where advances would be of great benefit to the goal of commercial scale cultivated meat production](#). European public investment in cultivated meat research has been categorised along the value chain to reflect this.

Research priorities for cultivated meat, seafood, eggs and dairy:



Cell line development to achieve faster cell growth, greater stability and stress tolerance, and higher cell density in terrestrial and aquatic cell lines.

Learn more >>



Reduced cell culture media costs by bringing down the cost of growth factors and sourcing amino acids from cheap plant hydrolysates and other sources.

Learn more >>



Increased bioprocessing efficiency via innovations in bioreactor design and media utilisation strategies to achieve greater scale and bring down costs.

Learn more >>



Improved scaffolding biomaterials that support cell adhesion and differentiation which allows the replication of complex animal meat structures.

Learn more >>

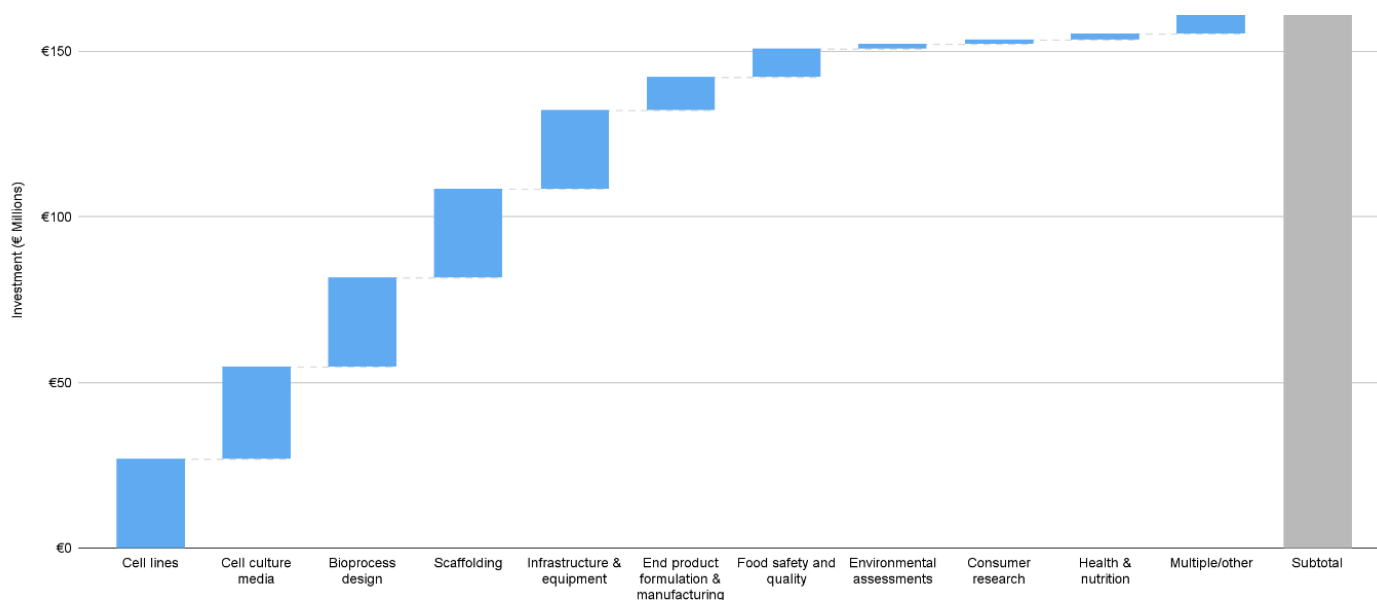


Figure 10: European investment in research on cultivated meat (January 2020-April 2024), showing allocation by research area. This analysis includes cross-cutting cellular agriculture initiatives.

Analysis based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europa@gfi.org or submit it directly to the [tracker](#).

Overall investment in cultivated meat unsurprisingly leans towards research early in the value chain, given the lower overall maturity of the technology. Cell culture media and components (€27.8 million) in particular have been the focus of significant investment, receiving more than twice the investment than has been directed towards cell lines (€7.5 million).

The cross-cutting [EU-funded project FEASTs](#) (€7 million) represents the biggest public investment into the food safety and quality of cultivated meat across Europe thus far. FEASTs, funded in 2023, aims to understand the state of play and future prospects in the EU for cultivated meat and seafood, including the regulatory, environmental, consumer and technical aspects.

In terms of research areas, bioprocess design, and infrastructure and equipment are both comparatively underfunded. [Bioprocess design](#), which encompasses bioreactor design, design solutions to allow continuous bioprocessing, modelling cell stress and growth, as well as scale-up, is a critical research area for the maturation of the cultivated meat industry and has thus far received only €26 million of funding across Europe. The biggest investment into bioprocessing for cultivated meat is the landmark €14 million investment in the Cellular Agriculture Manufacturing Research Hub (CARMA) by the UK's Engineering and Physical Research Council. Precision fermentation is also part of the CARMA research agenda, which is accounted for in the research area breakdown.

Fermentation

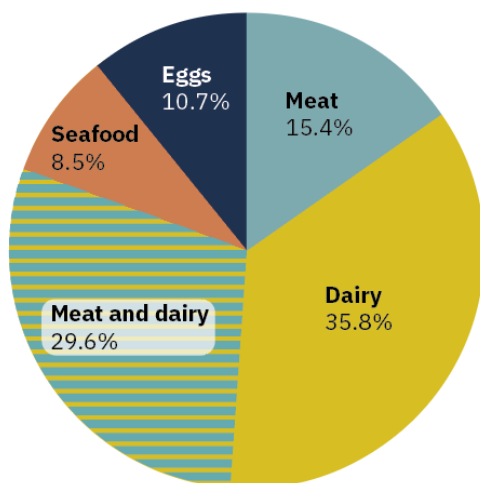
In the “What are alternative proteins?” section above, we categorised cellular agriculture as “cross-cutting”. However, for the purposes of this section, cellular agriculture projects that primarily focused on fermentation were included in this section “fermentation” (with the majority assigned to the cultivated section, above). Traditional fermentation approaches are included within the plant-based section, above.

Top funding jurisdictions

Fermentation has received €161 million in funding since 2020, making it second after plant-based in total funding terms. However, the proportion of the investment flowing to fermentation-related research has been growing, and in 2024 alone (based on data from January to April inclusive), it looks set to take over from plant-based research as the best-funded pillar. This is largely due to the commitments of the EU, Finland, the UK, and Denmark, which have funded more than 95% of Europe’s total funding for fermentation R&I.

End product focus

A.



B.

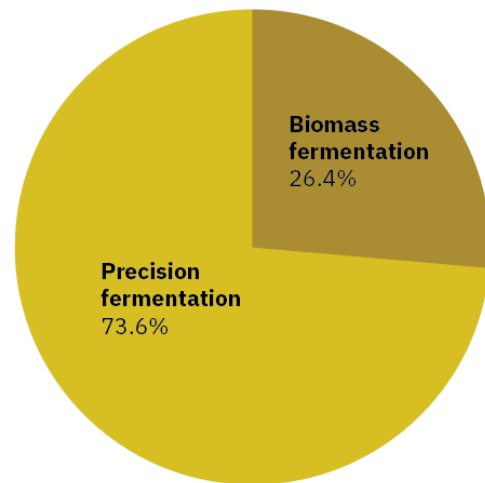


Figure 11: A) End product focuses of fermentation research, where an end product was specified. B) Funding to various branches of fermentation. *Traditional fermentation is excluded from this analysis, as it is included in the Plant-based section. However, the total investment for traditional fermentation of €91 million almost equals the €108 million towards precision fermentation.*

Fermentation research, compared with the other alternative protein pillars, is much more likely to focus on dairy, eggs or cross-cutting end products as opposed to meat. This is unsurprising given precision fermentation results in the production of ingredients rather than biomass. Biomass fermentation, which makes up 12% of the total fermentation investment, is most likely to be used for the production of meat (74% of the research with a defined end product was developing meat). In contrast, precision fermentation grants that had a defined end product were largely focused on dairy (45%) or meat and dairy combined (40%), with the remaining projects focused on eggs (5%).

Research area focus

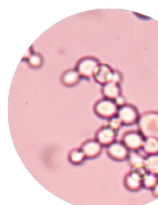
Fermentation has been used to produce proteins, enzymes and other functional ingredients for food for many years. Meat produced by biomass fermentation has also been on the market for decades, pioneered by Quorn in 1985. In this sense, it is a mature technology, although in the context of alternative proteins, there are still new challenges and potential for increased efficiency. In order to meet price parity for fermentation-made meat, proteins, fats, and other ingredients, [research is needed into priority topics](#) such as target identification and validation, screening and optimisation of novel strains, unlocking alternative feedstocks, and improved and more efficient bioprocess design. The breakdown of investment into fermentation research along the value chain reflects these priority research areas.

Research priorities for fermentation-made meat, seafood, eggs, and dairy:



Target identification and validation to broaden the scope of food ingredients produced by precision fermentation and unlock new experiences for consumers.

[Learn more >>](#)



Screening and optimisation of novel strains to identify the most efficient pathways for producing targets and introduce greater robustness to manufacturing processes.

[Learn more >>](#)



Unlocking alternative feedstocks by leveraging existing agricultural and food processing waste streams to cut costs, reduce waste, and improve sustainability.

[Learn more >>](#)



Improved bioprocess design to increase titers and yields, achieve more efficient scale-up, and drive down operating costs across the sector.

[Learn more >>](#)

In contrast to cultivated meat, investment in fermentation was concentrated in grants for infrastructure and equipment (€83 million). This includes several large awards for scale-up and facility development to European companies including Arbium, Enifer Bio, Onego Bio, Standing

Ovation, and Solar Foods. Bioprocess design for fermentation has received comparatively little funding across Europe. Feedstocks, a critical area to unlock the sustainability benefits of fermentation technology, have seen rapidly growing investment over the past two years (€21 million, of which €19 million was in 2023 or the first four months of 2024).

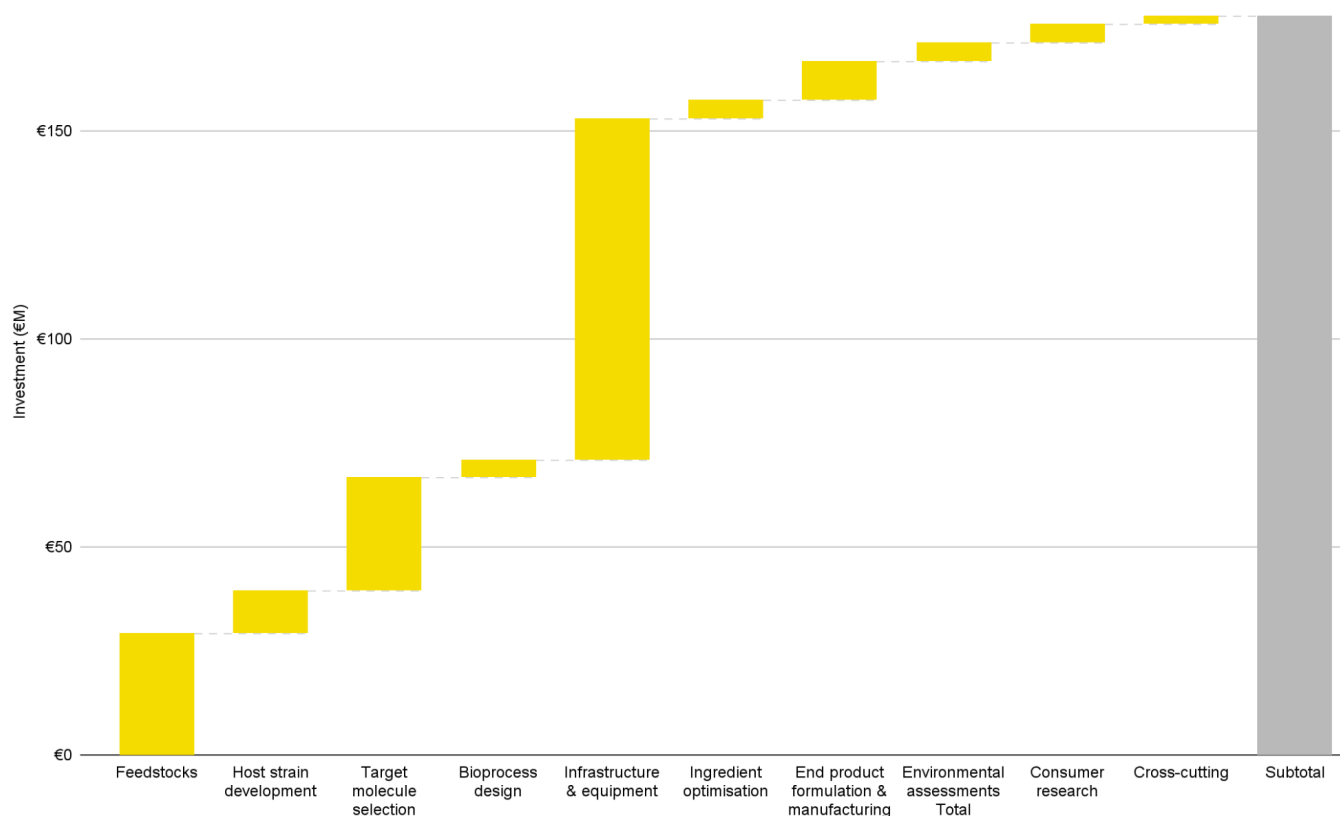


Figure 12: European investment in fermentation R&I by research area (January 2020-April 2024).⁵ This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europa@gfi.org or submit it directly to the [tracker](#).

Other areas only just beginning to attract public research funding are those later in the value chain, including environmental and consumer assessments, and end product formulation. The health and nutrition benefits of fermentation-made proteins are yet to attract significant public funding, although in the absence of this, there have been some [preliminary studies](#) in this area.

⁵ €2.4 million of the total funding of CARMA is allocated to precision fermentation here. This is an estimate and reflects a ⅓ allocation of the total funding, based on an equal division between the technology sectors covered by the project.

03 European Commission

Summary

Of the €250 million the European Commission has invested in research and innovation for alternative proteins since 2020, half came in 2023 and the early months of 2024. Similarly, half of this total investment has been allocated via Cluster 6 (Food, Bioeconomy, Natural Resources, Agriculture and the Environment) of the Horizon Europe framework programme, which has predominantly focused on plant-based foods or cross-cutting funding (investing €20 million in plant-based, and €110 in cross-cutting research).

Total Funding

Investment in fermentation and cultivated has increased in Europe in recent years (92% of all European fermentation funding and 44% of all cultivated funding has come since January 2023). As the European Commission has gradually increased its investment in alternative proteins, the number of separate funding instruments that have committed funds has also risen.

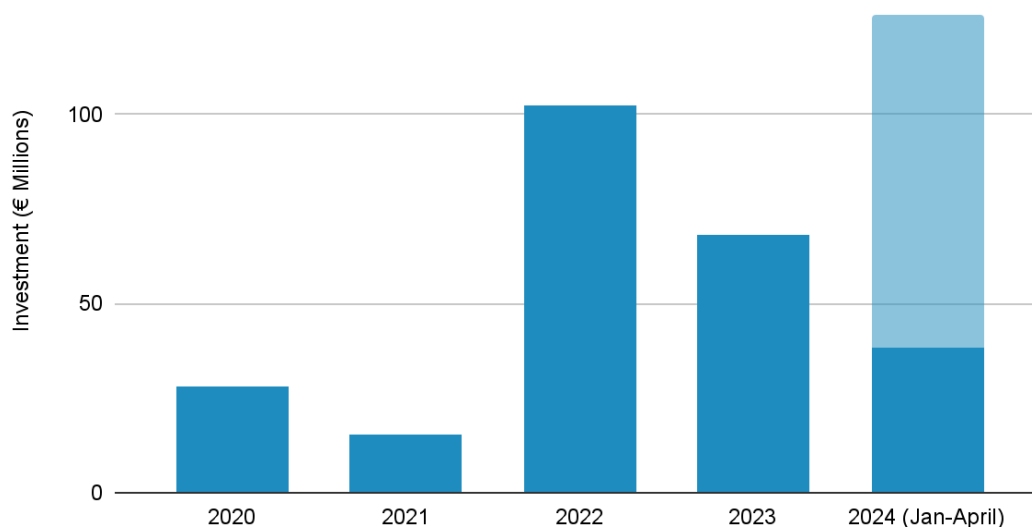


Figure 13: Investment by the European Commission (January 2020-April 2024). Lighter blue indicates the €50 million allocation by the European Innovation Council for precision fermentation and algae, which was in progress as of April 2024 and is yet to be awarded.

This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europe@gfi.org or submit it directly to the [tracker](#).

While the historical funding has largely come from Cluster 6: Food, Bioeconomy, Natural Resources, Agriculture and Environment, 2024 saw a significant investment in fermentation (€50 million) from the European Innovation Council. This major commitment, yet to be allocated, is not included in the figures below.

Funders

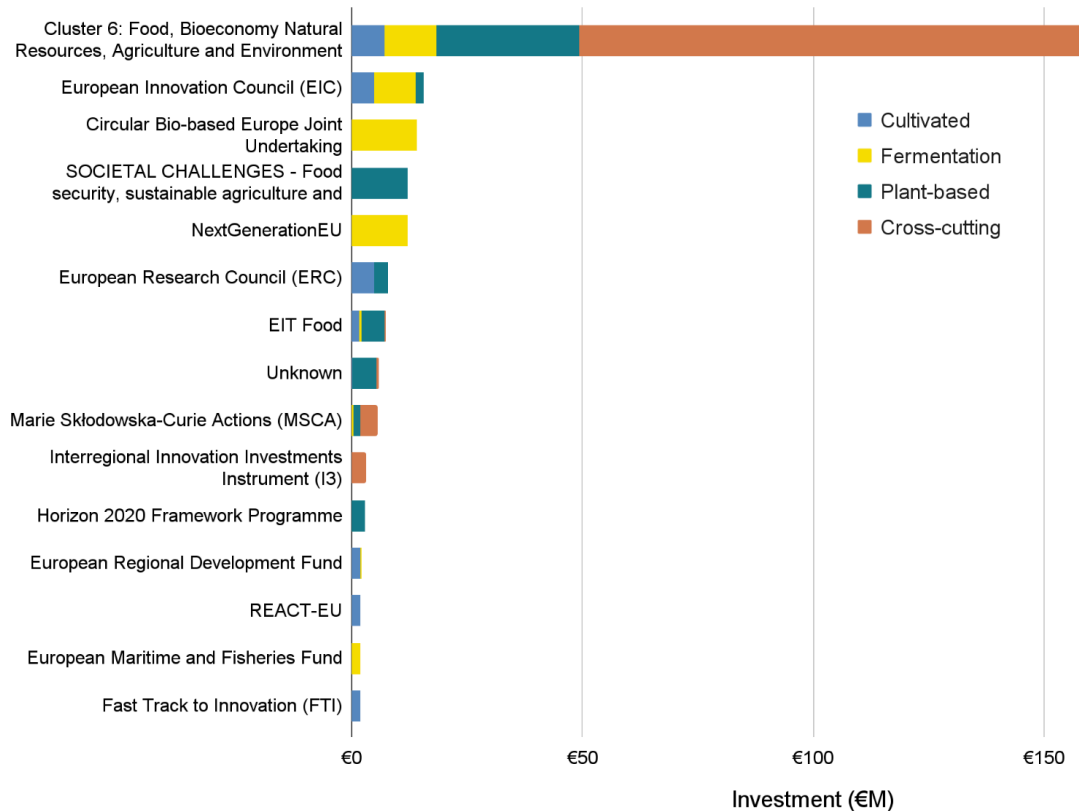


Figure 14: Investment by the European Commission between 2020-April 2024, showing instrument and alternative protein pillar. *This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europe@gfi.org or submit it directly to the [tracker](#).*

The €117 million the EU has invested in cross-cutting research makes it a leading funder of traditional fermentation, and it has also led in funding sociological and political impact analyses of these technologies.

The investment in this field from a variety of European funding instruments means there is good coverage of the full value chain, from early-stage research through to infrastructure (largely funded by innovation instruments). Interestingly, as with fermentation, much of the

investment in cultivated meat has not been under Cluster 6 (with the notable exception of the FEASTS project) but instead in the form of innovation funding from the European Innovation Council and EIT Food. As cultivated meat is at an earlier stage of development, early stage, open-access funding, such as through Cluster 6 is equally – if not more – pressing for the field.

Investment across the three pillars

A combined investment of €69 million into ingredient optimisation alone, approximately evenly split between plant-based and cross-cutting projects, makes up a quarter of the total allocated funding from the EU. Many of the cross-cutting approaches here are using fermentation to improve the quality, healthiness, and taste of the raw plant-based materials. Among them are the EU-funded projects [HealthFerm](#) (€10 million) and [DOMINO](#) (€11 million), which aim to improve the healthiness of plant-based options using fermentation methods.

Outside of traditional crop development, the European Commission has also invested heavily in the potential of aquatic photosynthetic organisms, with a total of €15 million in projects working with either macro- or micro-algae.

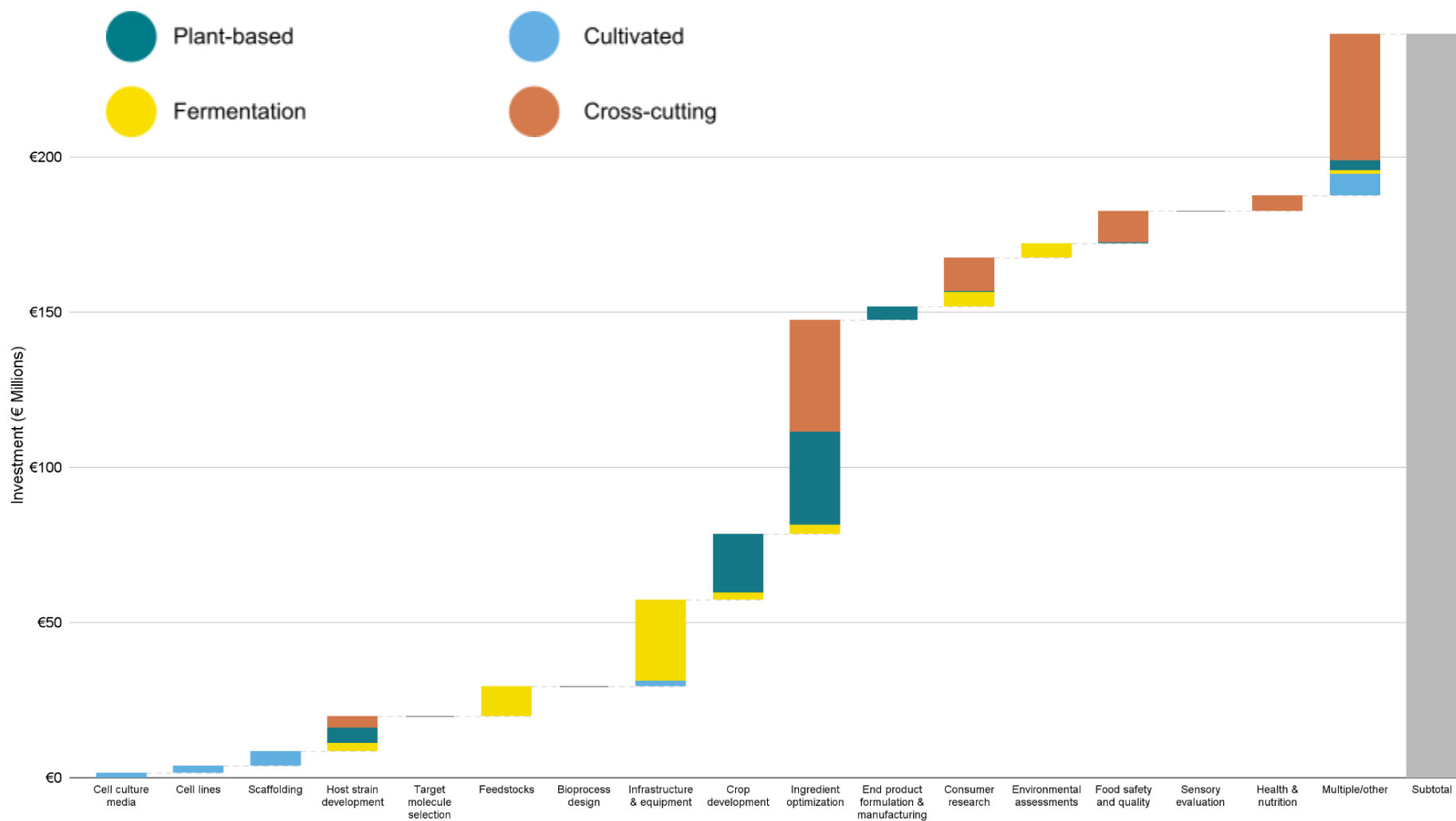


Figure 15: European Commission investment by research area (January 2020-April 2024). *This analysis is based on data from GFI's [research grants tracker](https://www.gfi.org/research-grants-tracker), which is a public resource. If you are aware of funding data that is missing, please let us know via europe@gfi.org or submit it directly to the [tracker](https://www.gfi.org/research-grants-tracker).*

Spotlight on major European Commission funded projects

<u>Smart Protein</u>	Completing 2024, Smart Protein aimed to develop plant-rich foods from plants, fungi, and byproducts from regeneratively farmed organic legumes grown in Europe.
<u>SYLPLANT</u>	SYLPLANT is a €14 million project, funded by the Circular Bio-Based Europe Joint Undertaking (CBE-JU), aiming to produce alternative food and feed ingredients using cellulose, crop and wood residues.
<u>Mushlabs</u>	Mushlabs, a Hamburg-based startup, received a €3.4 million EIC Accelerator grant for a project using the mycelium (or roots) of a mushroom to produce meat alternatives.
<u>Giant Leaps</u>	Giant Leaps develops methodology, datasets and innovations to accelerate the dietary shift towards sustainability and circularity, focusing on allergenicity, nutrition and food safety.
<u>HYDROCOW</u>	Funded by the European Innovation Council, this project is a €5.5 million consortium led by Solar Foods to produce fermentation-made milk using only carbon dioxide and hydrogen as feedstock.

Regional funding

As European Commission funding has been analysed and reported separately, it is not included in the regional figures. As a result, the regional allocations reported below reflect the commitments of the funders active in the country, rather than the total extent of research occurring in a given country.

In fact, analysis of where European Commission funding has tended to go reveals a different pattern of research concentration compared to the breakdown of local investment. France, Spain, Ireland, and Italy are all notable high performers when European Commission funds are analysed by the lead recipient. The companion report, the [State of the European Research Ecosystem: Publishing Landscape Analysis](#), presents an analysis of all research occurring across Europe, irrespective of the funder, and so presents a complementary picture of the research landscape at the national level.

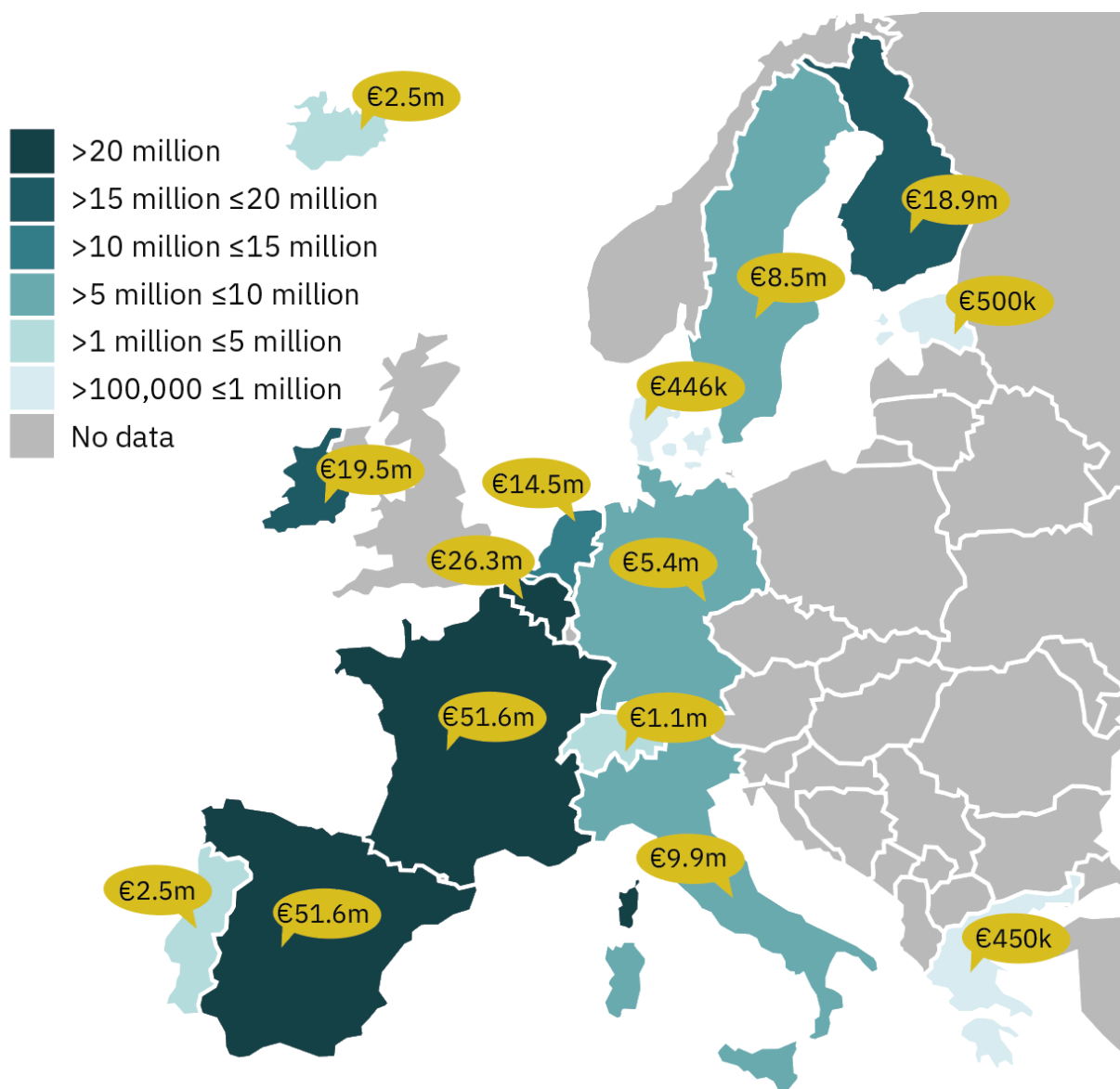


Figure 16: Total value of EU funding received in each European country based on the project lead (January 2020-April 2024). *This analysis does not take into account the breakdown of funding between the project leads and subsidiary consortium members (which are often spread across Europe) and is therefore only a rough approximation of the research occurring in many countries. UK funding via the Horizon Europe Guarantee is not included.*

This analysis of European Commission funding allocations shows that France and Spain are lead recipients on many EU-funded projects, with Ireland, Finland, the Netherlands and Belgium also performing strongly.

The following sections report the funding delivered only by public and nonprofit agencies based in the country of interest.

04 Nordics (Denmark, Sweden, Norway, Finland)

Summary

Collectively, Denmark, Sweden, Norway and Finland have invested over €220 million in alternative proteins, almost a fifth of the total across Europe. All four countries are in the top 10 in Europe, making for notable combined regional strength. Denmark in particular is a regional powerhouse for plant-based proteins, while Finland's funding has tended to focus on fermentation.

Total Funding

Research and development investment across the Nordic region is led by Denmark, which has allocated €96 million since 2020. This includes €24 million of the landmark promise by the Danish Government to invest €160 million in plant-based foods over nine years. As a demonstration of the strength and depth of the region's funding, this only places the Danish Government fourth after the Novo Nordisk Foundation, Business Finland, and the Research Council of Norway, for total investment in the region.

The Novo Nordisk Foundation has funded over €60 million in research, primarily for plant-based and fermentation research, and is the third-largest European funder overall. This investment from the Novo Nordisk Foundation, alongside smaller grants from other nonprofits such as the Carlsberg Foundation, makes Denmark the country with the largest nonprofit investment in the sector across Europe. Similar to public funding, philanthropic funding can play a crucial role in catalysing and derisking innovation, as has been witnessed in many other fields, particularly health and sustainability. The Novo Nordisk Foundation has worked together with other foundations, including the Bill and Melinda Gates Foundation, helping to steer critically needed funding into the highest priority research topics. With the Bezos Earth Fund (BEF) making its first investment in alternative protein research in 2024, it is reasonable to expect more philanthropic investment in both the Nordic region and the rest of Europe in the years to come.

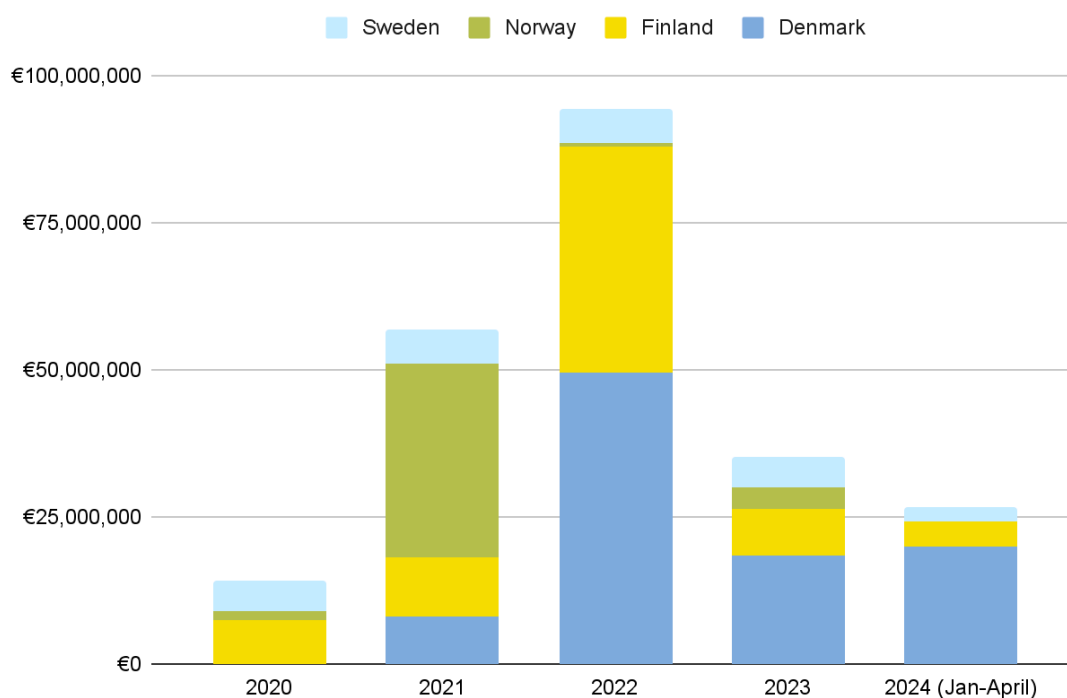


Figure 17: Investment by Nordic public and nonprofit funders (January 2020-April 2024).

This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europe@gfi.org or submit it directly to the [tracker](#).

However, both Finland (led by Business Finland) and Norway (the Research Council of Norway) are also in the top 10 European countries funding alternative proteins (fifth and seventh, respectively). The focus on plant-based research in Denmark is contrasted by a focus on fermentation in Finland, which has been a hot spot, particularly for precision fermentation over recent years, and has produced a number of successful startups. Sweden holds ninth place, with €24 million invested over the period analysed.

Funders

While national strategies differ, there is a strong regional focus on scale-up of fermentation, led by investment from Business Finland, as well as significant support for plant-based research from Norwegian, Danish and Swedish funders.

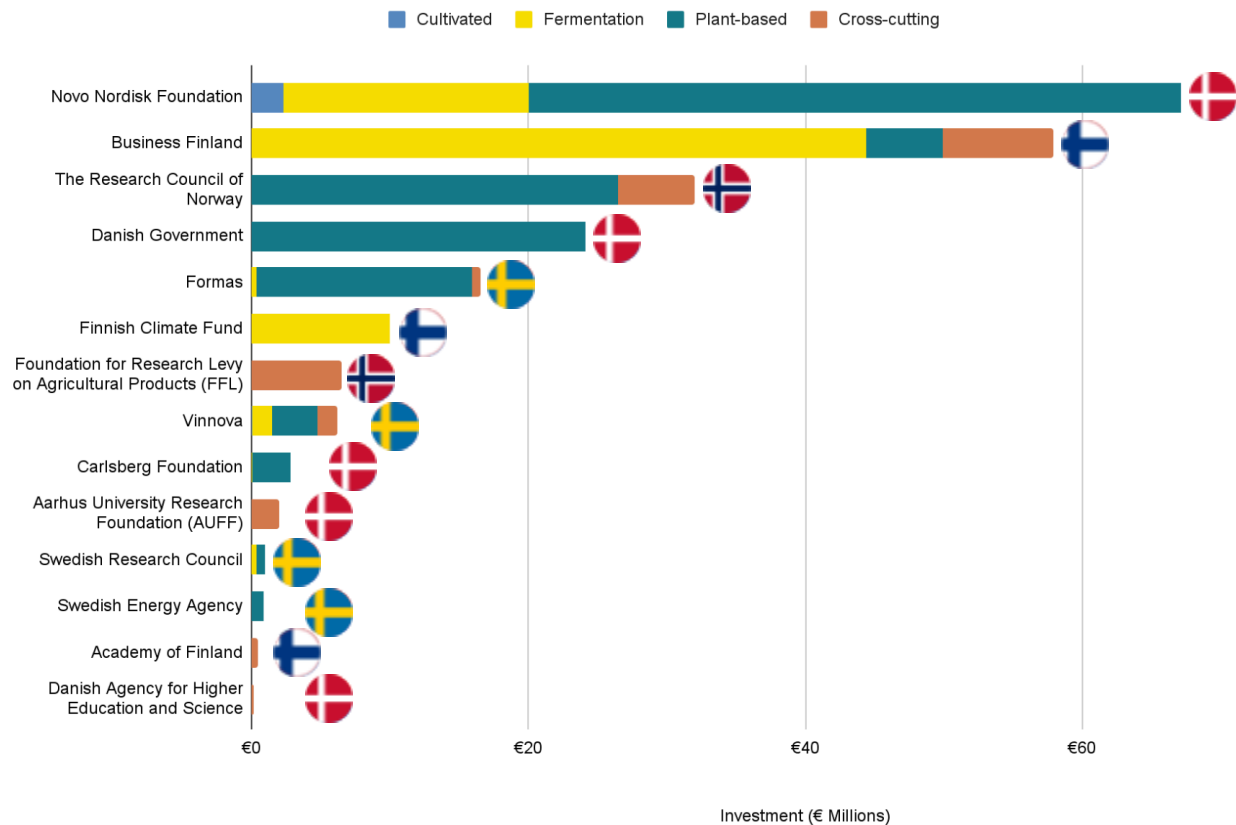


Figure 18: Investment by public and nonprofit funders in the Nordic region (January 2020-April 2024). This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europe@gfi.org or submit it directly to the [tracker](#).

Investment across the three pillars

There is very little funding thus far for projects specifically focused on core technologies for cultivated meat, such as cell line development and scaffolding. Alongside the Netherlands, the region has embraced the approach of funding several projects focused on cellular agriculture, covering both cultivated meat and precision fermentation within their scope.

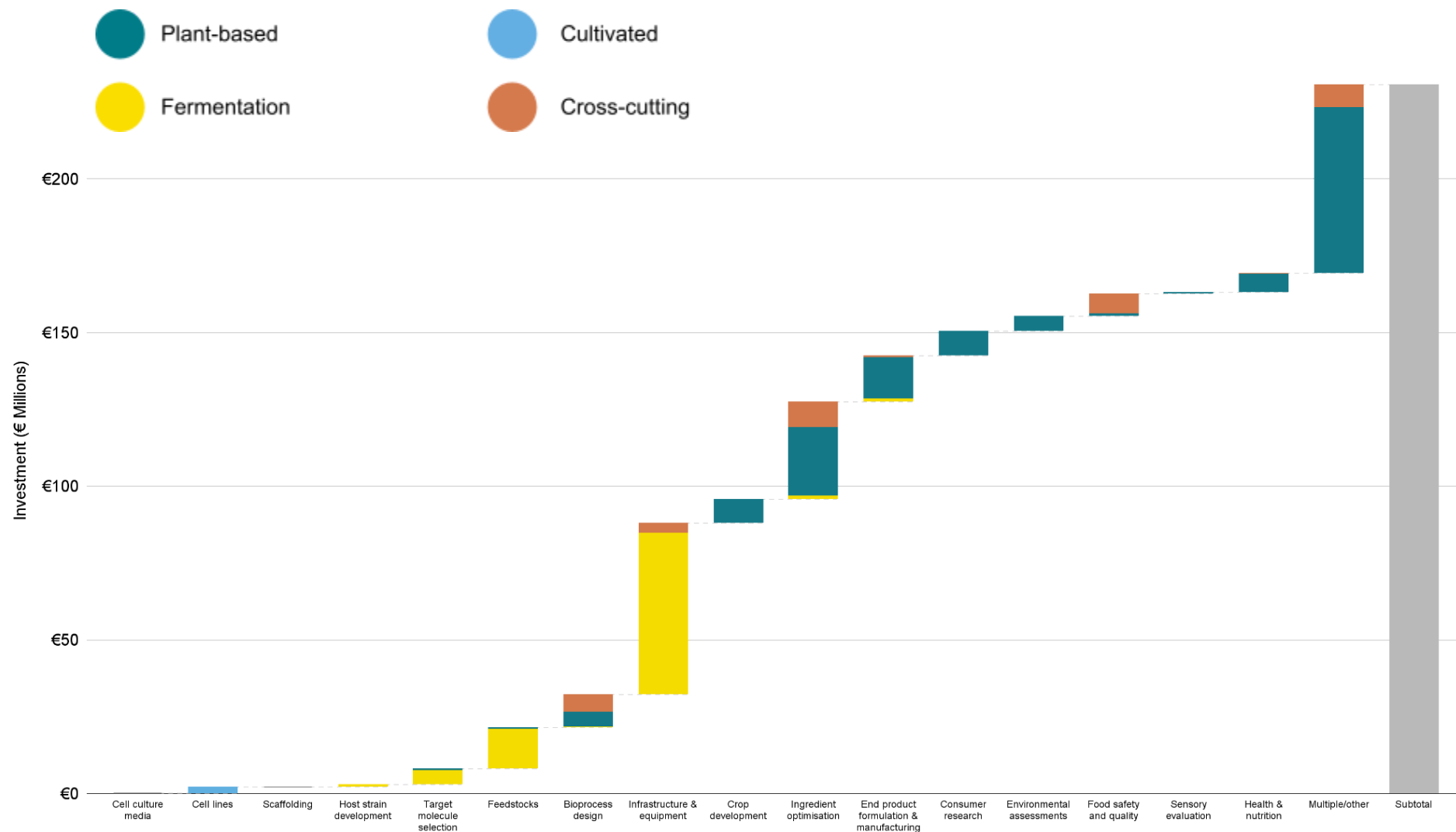


Figure 19: Total Nordic investment into R&I by research area (January 2020-April 2024). *This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know at europa@gfi.org or submit it directly to the [tracker](#).*

Key projects by country

Denmark

The Novo Nordisk Foundation, together with the Gates Foundation, invested €12 million in [a centre exploring the use of CO2 for sustainable feedstocks](#). This funding positions Denmark as a leader in the space.

[Plant2Food](#) and the [CellFood Hub](#) are two other multi-million euro projects supported by the Novo Nordisk Foundation, both involving Aarhus University.

Finland

Finland, via Business Finland, has funded bioprocess design to the tune of €8.3 million. The Technical Research Centre of Finland, VTT has been the major beneficiary of this and has rapidly developed into a local centre of expertise, as well as seeding the startup ecosystem in Helsinki.

Sweden

Sweden's funding thus far has largely been directed to crop development and ingredient optimisation. Development of legume crops such as peas and faba beans has been the subject of €4 million in funding.

Sweden has also funded a significant amount of research focused on health and nutrition (€5.8 million), including countering nutrient deficiencies and population-based health.

Norway

Norway has explored data-driven approaches for cellular agriculture, headlined by [a €6.5 million investment in a project spearheaded by Nofima](#). Nofima, Norway's largest food science research institute, is also leading an [€8.2 million project on consumer research and sensory perception](#).

05 DACH (Germany, Austria, Switzerland)

Summary

Across Germany, Austria and Switzerland, a regional focus on plant-based food is evident, from crop development through to end product formulation and manufacturing. With the government's major commitment to alternative proteins in 2024, Germany has moved ahead of its neighbours in terms of total investment, and if it took a broader approach to funding, it could match Switzerland and Austria's existing funding for cultivated meat and fermentation.

Total Funding

Germany leads the way in the region, with a total of €54 million allocated to projects over the past four years. In 2024, Germany also [committed €38 million for the protein transition](#) in the federal budget which, alongside support for farmers to transition, will support a national research centre as well as research to advance the field. Because it was announced so recently, the amount of funding that will be directed towards research is not yet known. It is not included in the analysis below but is a positive sign of Germany's commitment to being a leader in the field.

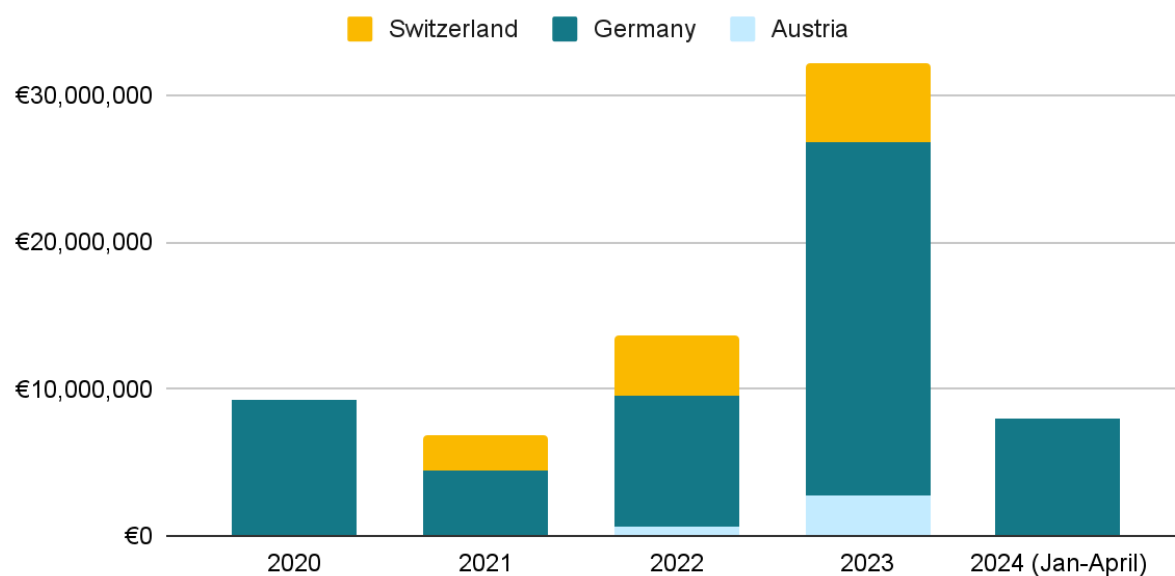


Figure 20: Investment (committed and allocated) by Germany, Austria and Switzerland (January 2020-April 2024). This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europa@gfi.org or submit it directly to the [tracker](#).

Funders

The majority of German funding has been committed by BMEL, the Federal Ministry of Food and Agriculture, while in Switzerland, Innosuisse and the Swiss National Science Foundation have been roughly equivalent in their investment. The Austrian Research Funding Agency (FFG) has invested more in fermentation than any other funder in the region.⁶

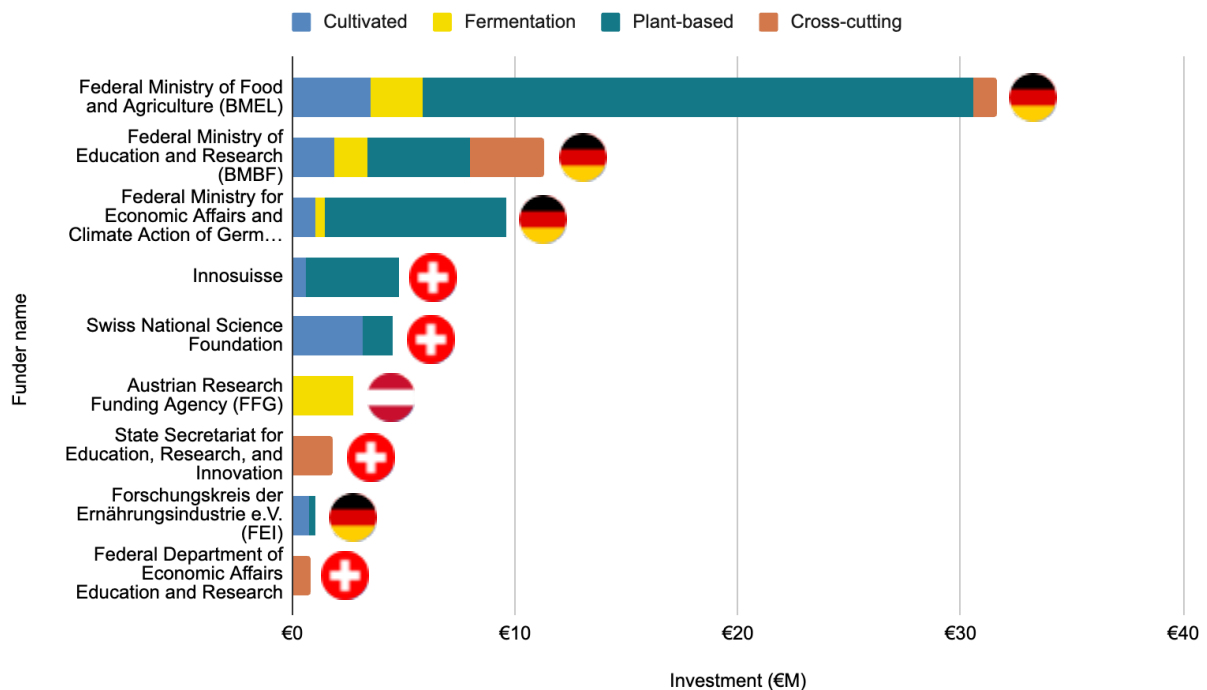


Figure 21: Investment by public and nonprofit funders in the DACH region (January 2020-April 2024). This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europa@gfi.org or submit it directly to the [tracker](#).

The direct investment in Germany via government (rather than via a research funding body) is similar to that of Denmark, resulting from the strategic adoption of support for alternative protein R&I as part of the nation's sustainability commitments.

Switzerland's total investment since 2020 is above €11 million, with investment almost evenly split between Innosuisse and the Swiss National Science Foundation (SNSF). Interestingly,

⁶ Note that both the German Research Foundation and Austrian Research Funding Agency do not publicly release their funding allocations, and are therefore only included where the information on individual projects was available elsewhere. Only limited analysis of Austrian investment is therefore possible, and figures are likely to be an underestimate.

while Innosuisse has largely supported plant-based companies, such as a [€2 million grant to Planted to develop their biostructuring process for whole-cut plant-based meat](#), SNSF has led cultivated meat investment in the DACH region. The fact that this investment came from the research funder rather than the innovation funder in Switzerland is a positive sign given the cultivated meat field's need for early-stage, fundamental research. One such research project involves the use of [machine learning to improve the biofabrication of muscle tissues](#).

Investment across the three pillars

The breakdown of the region's investment shows a comparative focus on end-product formulation, particularly for plant-based, which includes texturisation technologies. Paired with investment in ingredient optimisation, this is promising for the development of next-generation structuring technologies, such as improved extrusion, as well as novel alternatives such as electrospinning and 3D printing.

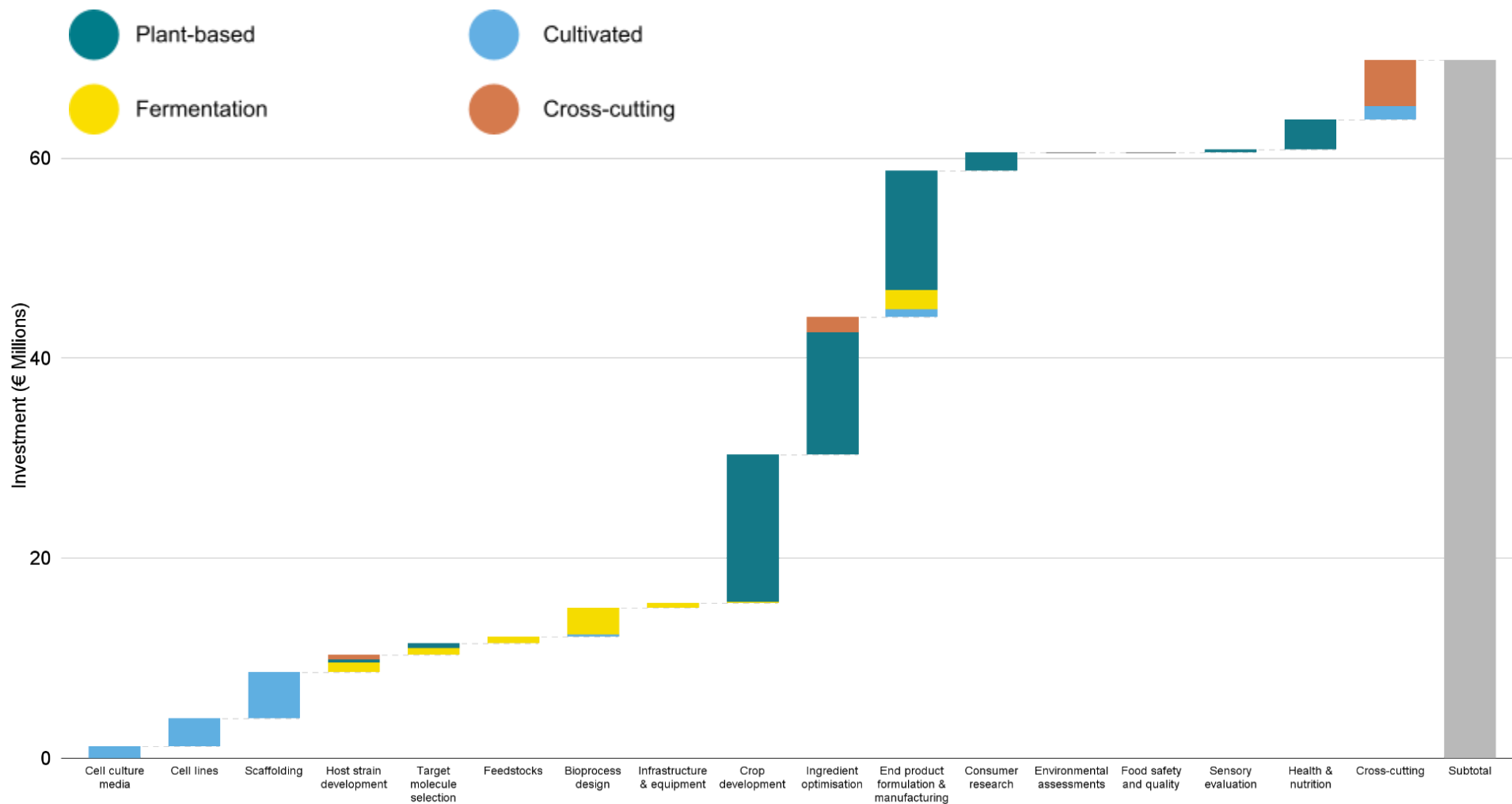


Figure 22: Investment by funders in Germany, Austria and Switzerland into R&I by research area (January 2020-April 2024).

This analysis is based on data from GFI's [research grants tracker](https://www.gfi.org/research-grants-tracker), which is a public resource. If you are aware of funding data that is missing, please let us know via europe@gfi.org or submit it directly to the [tracker](https://www.gfi.org/research-grants-tracker).

Key projects by country

Germany

Germany stands out for investment throughout the value chain for plant-based, in crop development (€14 million), ingredient optimisation (€12 million) and end product manufacturing (€11 million).

Germany has embraced the circular bioeconomy approach: the 2021 call launched by BMEL funded several projects focused on upcycling sidestreams to provide proteins for human nutrition, including one project using the [sidestreams from bioethanol production](#).

Switzerland

Switzerland is second only to the EU for investment in cultivated meat scaffolding solutions (~€3 million).

Switzerland has also embraced texturisation technologies for plant-based foods (€2.6 million), making it a regional strength.

Switzerland's investment covers a balance of topics, including key technologies essential for the development of the circular bioeconomy, such as feedstock development and optimisation for fermentation, and bioprocessing. However, to date, there has been no Swiss investment in strain development for fermentation, which is an enabling technology that could support the wider alternative protein sector.

Austria

Austrian funding data is limited, and so conclusions cannot be drawn from that which is available.

However, projects in areas such as precision fermentation-made casein and 3D-printed plant-based seafood, are in progress in the country. The University of Vienna and the Austrian Centre for Industrial Biotechnology are the locations of much of this activity.

06 UK & Ireland

Summary

Over the past four years, the UK has invested a total of €90 million (£75 million) into alternative proteins. This has been primarily via UKRI, in particular via the Biotechnology and Biological Sciences Research Council (BBSRC), which invested €29 million (£25 million) and Innovate UK, which invested €53 million (£46 million).⁷ Ireland, meanwhile, has fallen behind in the field over the past four years.

Total Funding

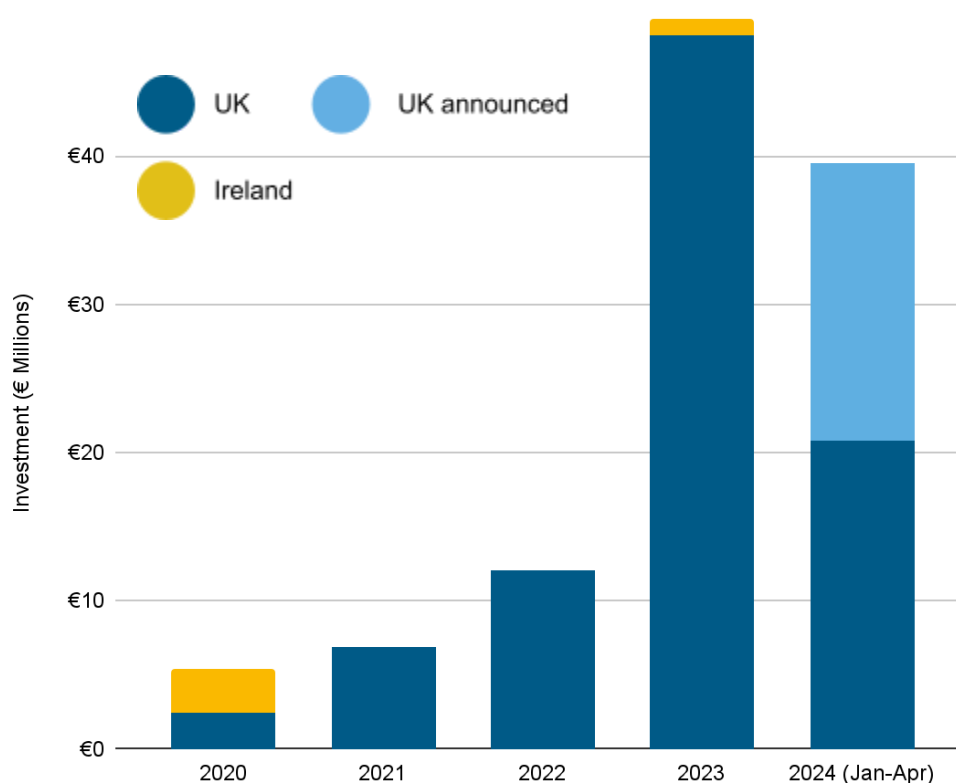


Figure 23: Investment by Ireland and the UK (January 2020-April 2024). Light blue indicates the €18 million allocation by UKRI to the [National Innovation and Knowledge Centre](#), which was yet to be awarded as of April 2024. This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europe@gfi.org or submit it directly to the [tracker](#).

⁷ Note that some shared Innovate & BBSRC investments may be listed as being delivered by a single funder.

Over the four years considered in this report, the funding landscape has changed rapidly in the region. Whilst the UK has ramped up its strategic investment in the field, Irish funding has comparatively dropped behind. However, as individual grants are not publicly reported by the relevant agencies in Ireland, figures are limited and likely to be underestimated. The [State of the European Research Ecosystem 2019-2023: Publishing Landscape Analysis](#) presents a comparative analysis of the research publications across Europe, which gives an indication of the state of Irish research funded by both local and international funders. The rest of this analysis focuses on the UK only.

Funding landscape in the UK

R&I funding in the UK is balanced across all three pillars and innovation stages, making the country the fifth-highest funder for plant-based, third for fermentation and second for cultivated, and behind only the European Commission and Denmark for overall investment.

Both pre-commercialisation (via BBSRC and Engineering and Physical Sciences Research Council, EPSRC) and innovation funders (Innovate UK) have made significant investments. Unlike other regions, there has been little direct investment by government bodies, with the Department for Environment, Food and Rural Affairs committing less than €2 million to the field.

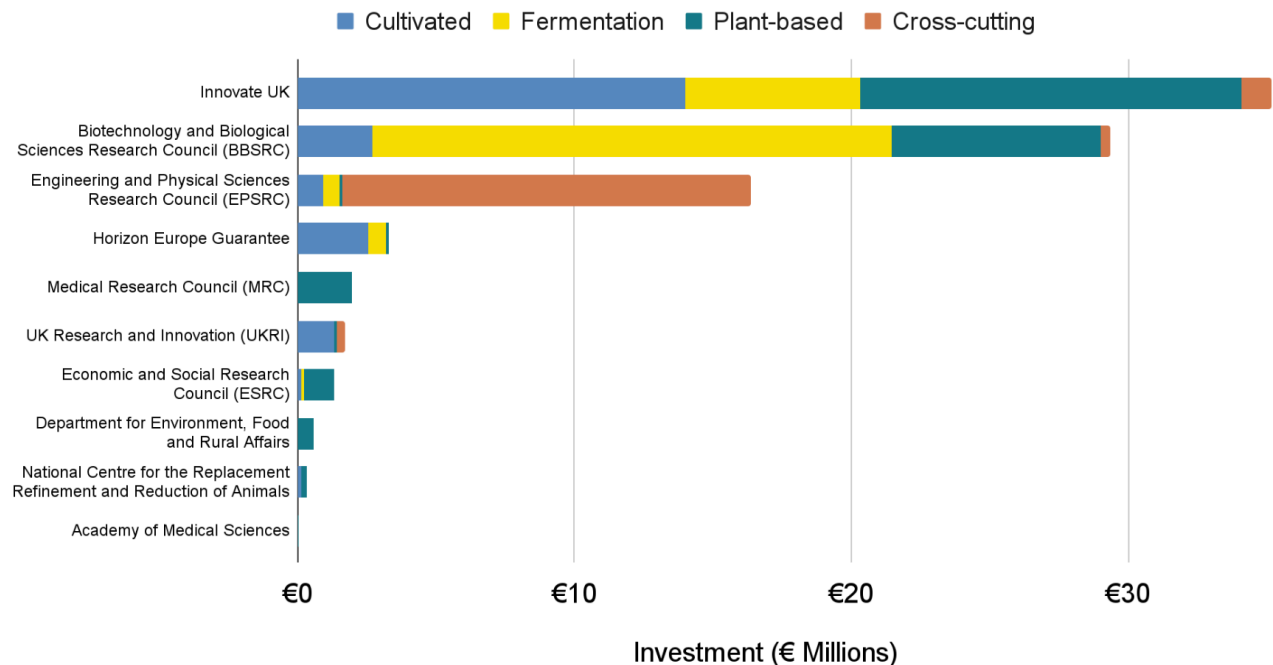


Figure 24: Investment by funders in the UK by pillar (January 2020-April 2024). Irish funding is not included in this figure due to the limited data available. *This analysis is based*

on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europe@gfi.org or submit it directly to the [tracker](#).

Investment across the three pillars

Particularly in the last two years, the UK has made strategic investments in priority areas for both cultivated meat and fermentation (CARMA, hosted by the University of Bath and the Microbial Food Hub, at Imperial College London). As a result, the UK tops investment across Europe into media development for cultivated meat (approximately €10 million), and cell line development (€5.5 million). The centre-based model means the funding is spread across the value chain, including areas of comparative neglect across Europe, particularly bioprocess design in cultivated meat and strain engineering in fermentation. Note that the Bezos Earth Fund investment into the Bezos Centre for Sustainable Protein is not included in this report, as it was not announced prior to April 2024.

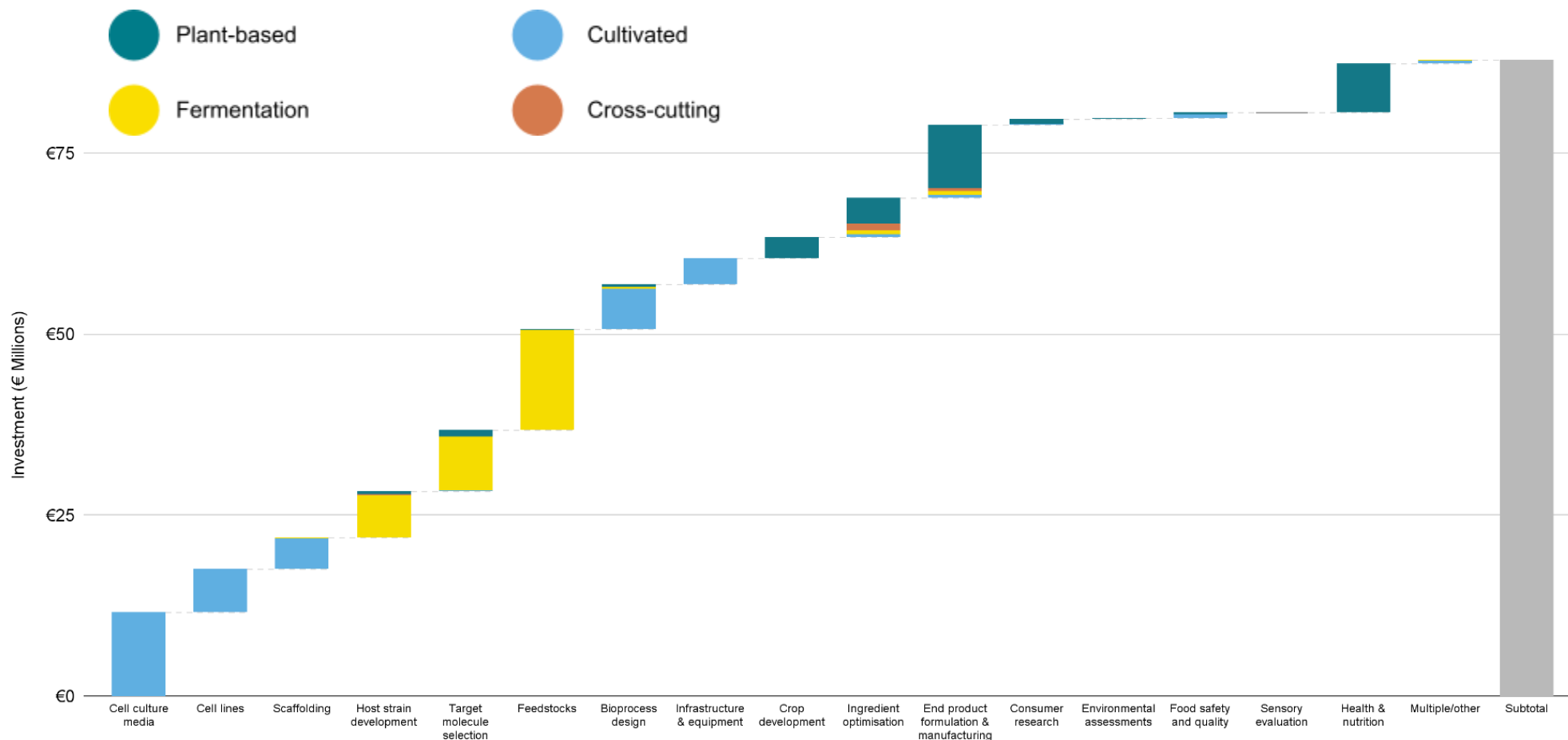


Figure 25: Investment by funders in the UK by topic and displaying production pillar (January 2020-April 2024).⁸ *This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europa@gfi.org or submit it directly to the [tracker](#).*

⁸ Note the Microbial Food Hub and CARMA investments have been split across relevant areas. The funding allocated to the Innovation and Knowledge Centre is not included.

The investment in bioprocess engineering via CARMA, awarded by EPSRC in 2023, still makes up the vast majority of EPSRC funding for the field of alternative proteins (€14 million of approximately €16 million total). Alongside CARMA, EPSRC has funded a number of studentships (based at the University of Oxford, University College London, Aston University and the University of Birmingham), but thus far, no other major awards have been disbursed for cultivated meat bioprocessing.

Plant-based funding has largely flowed into end product development, rather than end product formulation and manufacturing or sensory-guided research.

Key projects by country

UK

Cultivated: The UK is top across Europe for investment into cell culture media (€11 million), cell lines (€6 million) and bioprocess design (€5.5 million). However, it is behind both the European Commission and Spain on infrastructure and equipment investment for cultivated meat.

Plant-based: The UK has invested more than €8 million into end product formulation, the most in Europe, but far less than other countries in ingredient optimisation and crop development (€3 million compared to France's €14 million).

Fermentation: Thanks primarily to the Microbial Food Hub, the UK tops the field for early-stage investment (feedstocks, strain engineering and target molecule selection) but is only beginning to invest in infrastructure. One example of such investment is the [€2.3 million](#) from the local government, the Tees Valley Combined Authority, to the Centre for Process Innovation.

Ireland

One headline project in Ireland is [U-Protein](#) (Unlocking Protein Resource Opportunities To Evolve Ireland's Nutrition) a multi-disciplinary collaboration with over €3 million in funding from the Department of Agriculture, Food and the Marine. It involves Teagasc, University College Cork, NUI Maynooth, NUI Galway, University of Limerick and Queen's University Belfast, as well as industry partners, and involves work on extraction of protein from crops and waste biomass valorisation.

07 South-west Europe (France, Spain, Portugal)

Summary

France, Spain and Portugal have taken different approaches to funding alternative protein research. France has a national focus on plant-based, and particularly foundational aspects such as legume crop development. This funding has largely been delivered via the national investment bank, Bpifrance, as part of the [‘France Relance’ plan](#). Meanwhile, in Spain, regional governments have shown an interest in developing the more nascent technologies of fermentation and cultivated meat. Portugal is at an earlier stage of investment.

Total Funding

The funding in the region shows a lot of variation, but France in particular has emerged as a champion in the plant-based space. In Spain, headline investments from the governments of Catalonia and the Basque Country mean there are pockets of regional excellence, which are likely to grow over the coming years. The National Agency of Portugal does not publicly release funding information, so figures are likely an underestimate.

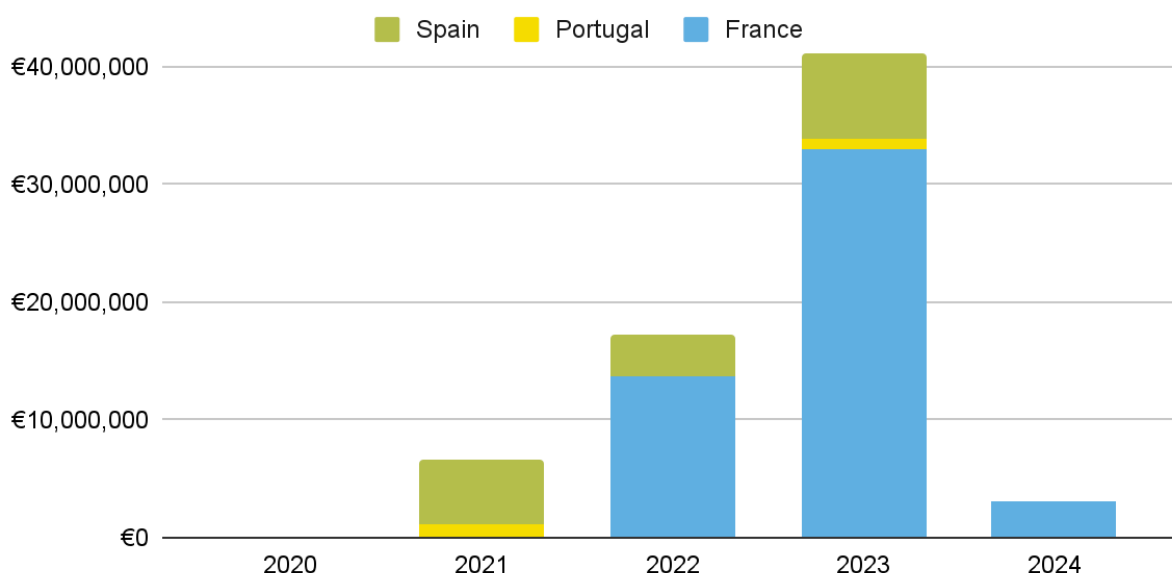


Figure 26: Investment by France, Portugal and Spain (January 2020-April 2024). This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europa@gfi.org or submit it directly to the [tracker](#).

Funding landscape in France

Much of the investment in France has come from the national investment bank, Bpifrance (€38 million, or 60% of the total funding in France), but the Agence Nationale de la Recherche (ANR) has recently begun to fund significant plant-based research, committing €16 million in 2023 alone. National investment has unlocked matching contributions regionally, for example from the Grand-Est Region government. As yet, no French public investment in cultivated meat has been recorded, and there has been very limited investment in fermentation.

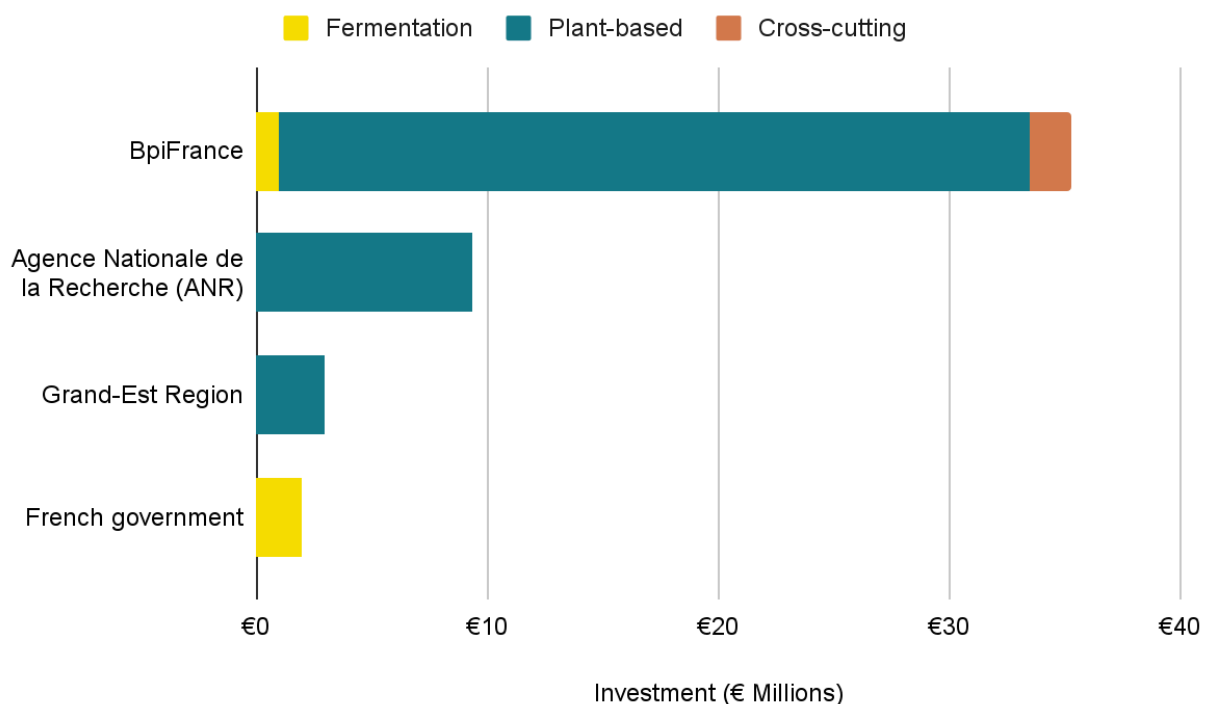


Figure 27: Investment by funders in France by pillar (January 2020-April 2024). *This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europe@gfi.org or submit it directly to the [tracker](#).*

Funding landscape in Spain

Unlike France, which has a national plan in place for plant-based research, regional governments have taken the lead in Spain in the absence of a national policy stance. Both the Basque and Catalan Governments have made major investments – cross-cutting in the case of Catalonia and in cultivated meat in the Basque Country.

The figures presented below suggest there has been limited funding for plant-based research. Projects working to develop innovative processing techniques for plant-based meat such as [Meating Plants](#) from CARTIF Technology Centre, have been carried out in Spain, but no public funding information is available. [LUPIPROTECH](#), financed by the Ministry of Innovation, is developing functional lupin isolates.

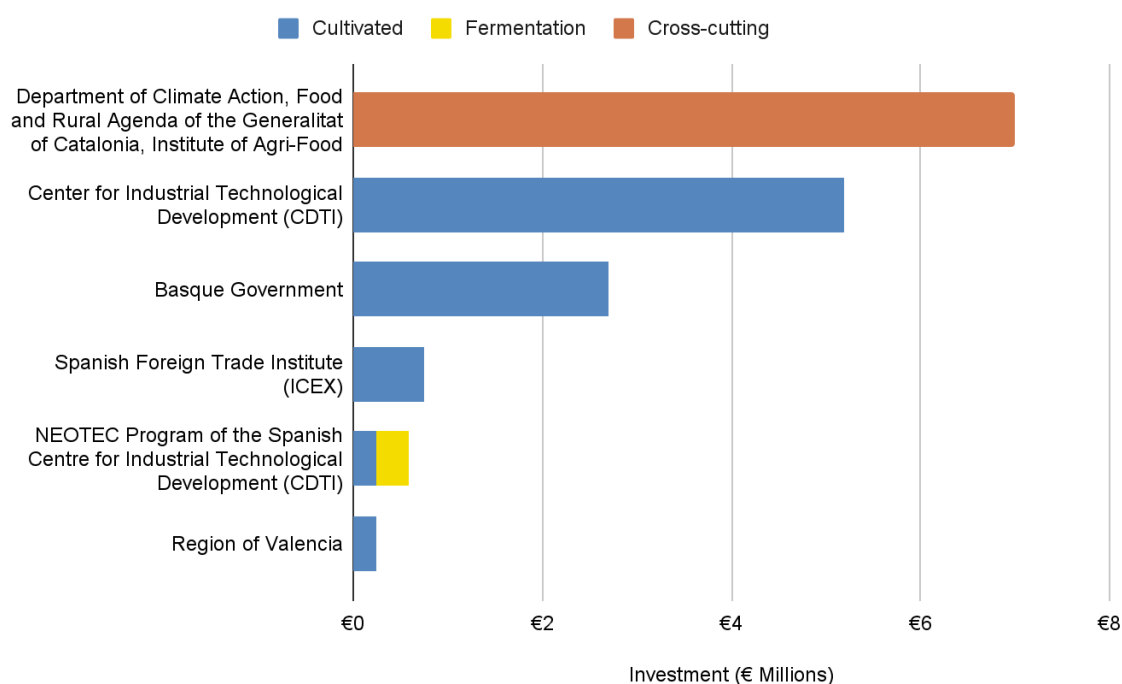


Figure 28: Investment by funders in Spain by pillar (January 2020-April 2024). *This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europe@gfi.org or submit it directly to the [tracker](#).*

The €7 million investment from the regional government of Catalonia to form an [alternative proteins centre](#) (CiPA) at the Institute of Agrifood Research and Technology (IRTA), will support research into food waste reduction, transforming agricultural surplus into plant-based and fermentation-made products. IRTA will draw upon their links to many European-funded projects, including Giant Leaps, and FERMICEL, a project developing solid-state fermentation. In 2023, the Region of Valencia also made an initial investment into cultivated meat R&I, via the project [SMARTFARM](#) to AINIA.

Investment across the three pillars

Following the announcement in 2020 of a national plant protein investment plan, France kicked off significant funding allocations, primarily for plant-based research. In contrast, the investment in Spain and Portugal has been steadier over the years covered by this report.

The scale of investment in infrastructure and equipment (over €23 million) makes the region a leader in that area across Europe. However, it is not coupled with the significant investment in end product formulation and manufacturing that would help bring second-generation plant-based texturing technologies through the stages of development to reach maturity and commercial readiness, as was seen in Germany.

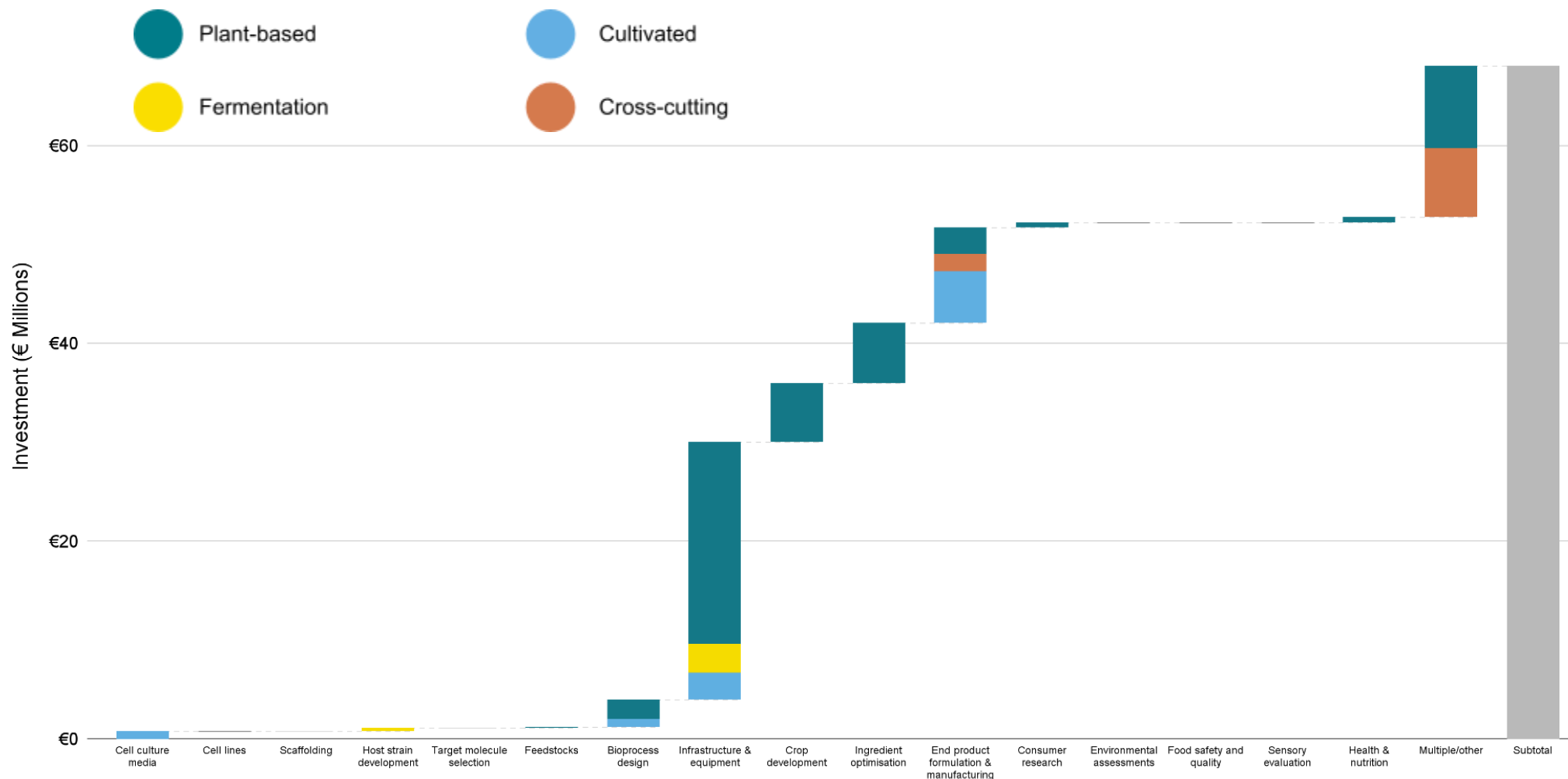


Figure 29: Investment by funders in France, Portugal and Spain by topic and production pillar (January 2020-April 2024). *This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europa@gfi.org or submit it directly to the [tracker](#).*

Key projects by country

France

The French Government's €3 million grant to startup Standing Ovation for scaling their precision fermentation product is the most significant such investment in the region.

French investment in plant-based research has been strong across the board, investing in ingredient optimisation (€5.8 million), crop development (€5.9 million) and cross-cutting initiatives (€8 million). Where they shine, however, is in infrastructure investment, with the plant-based company Umiami alone receiving over €20 million in public funds for infrastructure expansion.

Portugal

Portugal's funding for alternative proteins is just getting started, but there are promising signs, as the Foundation for Science and Technology (FCT) has funded several projects on bioprocessing and scaffolding for cultivated meat production.

As individual grants are not publicly reported by the relevant agencies in Portugal, the figures reported above are limited and likely to be an underestimate. The [2019-2023 State of the European Research Ecosystem: Publishing Landscape Analysis](#) presents a more complete picture of the research ecosystem in Portugal.

Spain

The Basque government investment of €7.8 million through two grants to BioTech Foods in San Sebastian, makes Spain a leading country in cultivated meat. As yet, little has gone into supporting this grant by developing the underlying technologies of cell line and cell culture media development.

The Catalan Government has matched this with €7 million to form an alternative protein centre at the Institute of Agrifood Research and Technology (IRTA), which will largely focus on plant-based and fermentation technologies.

08 Netherlands, Belgium

Summary

Both the Netherlands and Belgium have world-leading strength in food science R&I, and funders in the region have embraced alternative proteins over the past four years. In 2022, the Dutch Government made the largest-ever investment in cultivated meat, while on-the-ground funding for plant-based research has been strong for several years. Similarly, Belgium has a strong track record of funding plant-based research.

Total Funding

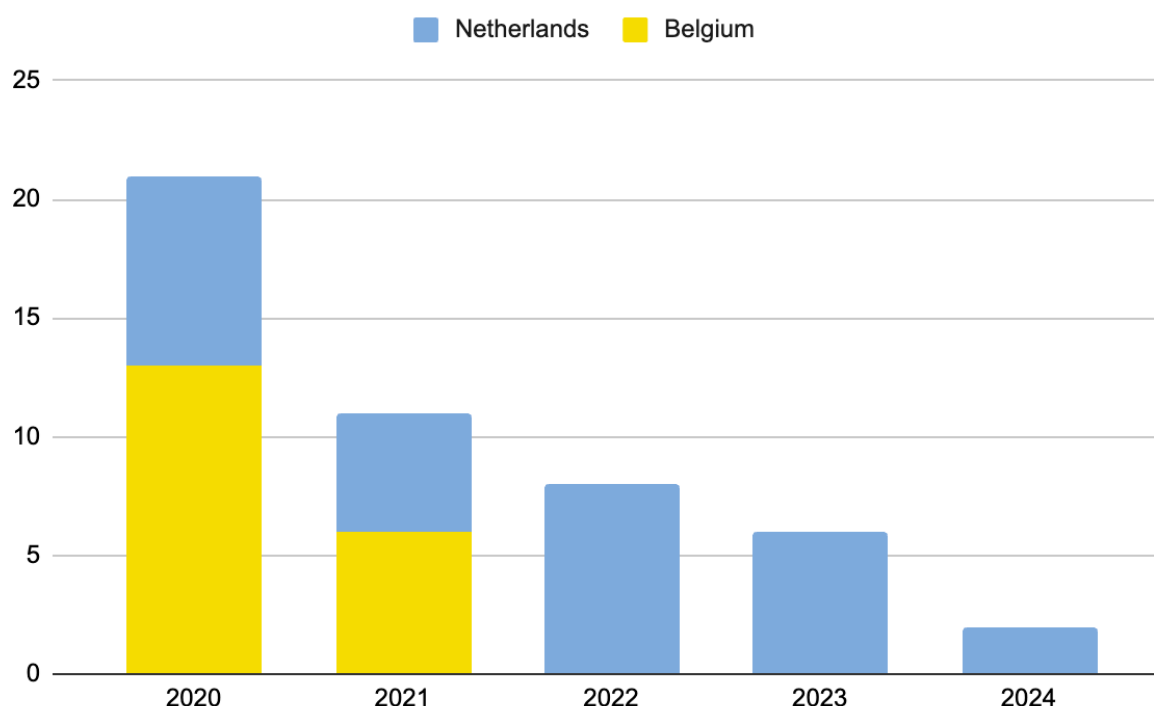


Figure 30: Number of research projects funded in Belgium and the Netherlands (January 2020-April 2024). Due to the absence of funding information for Flanders Research Foundation and BELSPO, funding totals have not been given, and instead, the number of projects is presented. The 2023-2024 information for Belgium is likely an underestimate, as there is a delay in grant information being published. *This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europa@gfi.org or submit it directly to the [tracker](#).*

The headline investment in the Netherlands is the €60 million Cellular Agriculture project funded by the Dutch Government via the National Growth Fund. This project dwarfs the investment from the other national funders and comprises the majority of the total known public investment in the Netherlands, currently standing at €67 million.

However, a significant number of smaller projects have been funded by the Dutch Research Council (NWO) as well as the Flanders Research Foundation. In order to show the diversity of activities in the region, which would not be reflected accurately by the known funding amounts, the number of projects is instead presented.

Perhaps unsurprisingly, given Wageningen University and Research's global leadership in the field, a significant number of plant-based projects have been supported in the Netherlands. Funders in Flanders, the Belgian national government, and the Netherlands have supported cultivated meat projects.

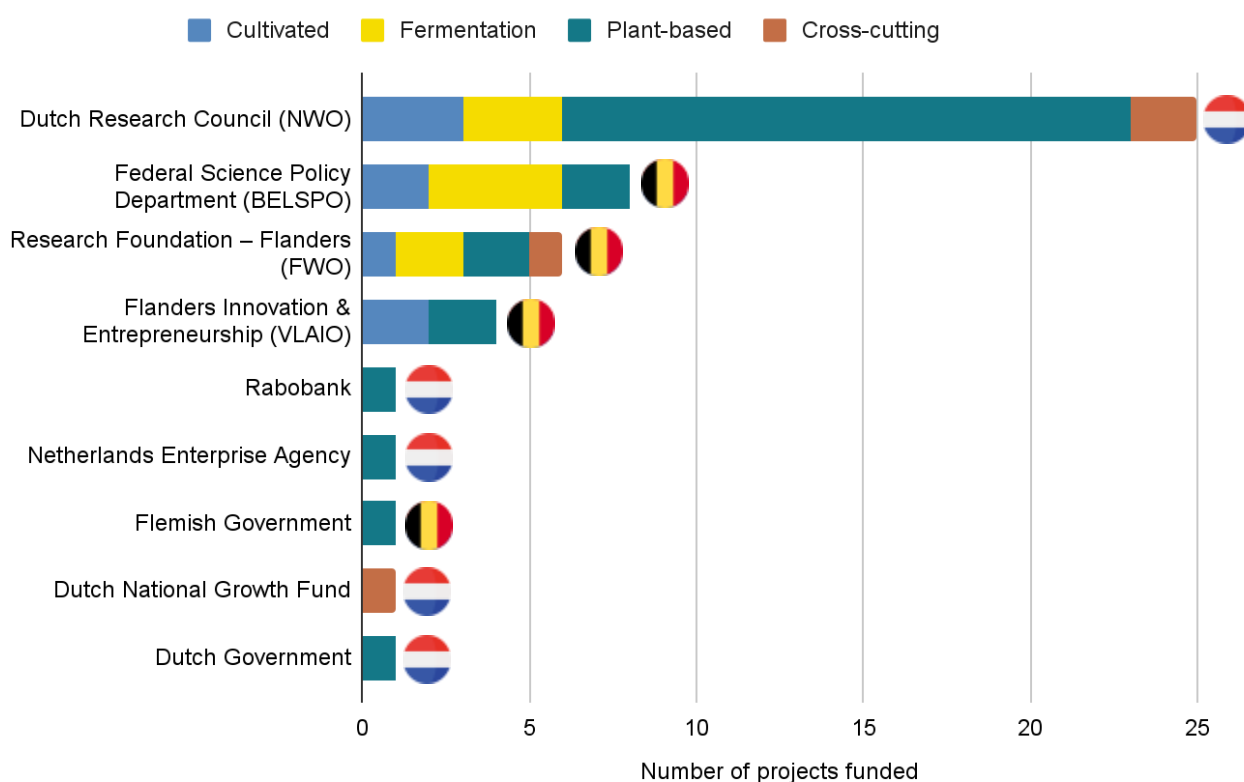


Figure 31: Number of research projects funded by public agencies in Belgium and the Netherlands (January 2020-April 2024). This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europe@gfi.org or submit it directly to the [tracker](#).

Investment across the three pillars

Research projects in Belgium and the Netherlands span all three pillars and the full range of technology areas. Whilst Belgium has funded research projects across all three pillars evenly, the Netherlands is weighted towards plant-based in terms of the number of projects funded, and outside of the large National Growth Fund investment, relatively few cultivated meat research grants have been awarded. The Netherlands has funded over 20 plant-based projects in the last four years, and only three in each of cultivated and fermentation.

Keeping in mind the relative scarcity of funding data for the region (and excluding the National Growth Fund), the Netherlands has still invested over €1 million into scaffolding for cultivated meat and is third across Europe for funding bioprocess design (€3 million).

Belgium has made a more even investment across the three pillars, with cellular engineering emerging as a speciality field, having funded several projects in each of cell line development and strain development.

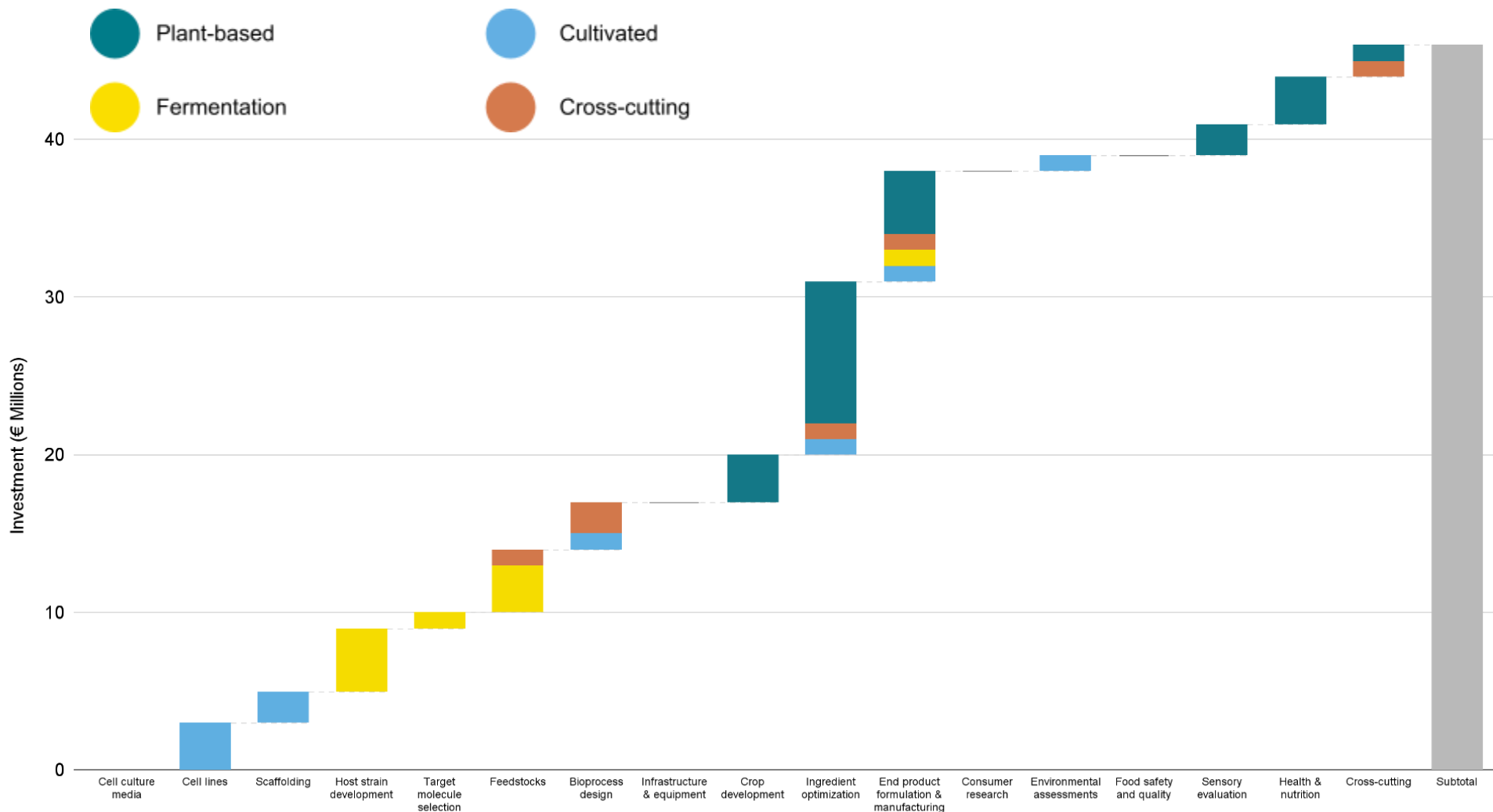


Figure 32: Number of projects funded in Belgium and the Netherlands by topic and production pillar (January 2020-April 2024). This analysis is based on data from GFI's [research grants tracker](#), which is a public resource. If you are aware of funding data that is missing, please let us know via europa@gfi.org or submit it directly to the [tracker](#).

09 Conclusion

From January 2020 to April 2024, Europe witnessed significant growth in available funding for alternative protein research. That funding spans across many of the major regions of Europe and demonstrates that governments and funders are exploring the potential of newer technologies while continuing to support research and innovation in plant-based meat, seafood, eggs, and dairy.

While there have been some headline-grabbing funding commitments in recent years, it's evident that behind the scenes many national innovation agencies and research funding bodies have quietly increased their allocations to alternative protein researchers, as the field has matured. The [State of the European Research Ecosystem 2019-2023: Publishing Landscape Analysis](#) shows that the level of readiness of the scientific and industry community has grown exponentially over the same time period, and now can compete with more established fields to secure funding through competitive grant processes.

However, public funding is key to unblocking technical bottlenecks, and supporting open science creates an industry that benefits all. To ensure that Europe reaps the benefits of the burgeoning industry, dedicated funds set aside to target the most pressing research priorities remain critical.

10 Appendix

Methodology

Data was sourced from public releases and websites from grant recipients and public funders, and Dimension.ai. These databases were searched using a series of keywords relating directly to alternative proteins to generate a shortlist of projects that contained these keywords (i.e. in the title or description of the project). These projects were then reviewed manually to confirm their relevance for alternative proteins research, searched for duplicates, and compiled in GFI's [global research grants tracker](#). Research was included if 1) it has already or might benefit alternative proteins for human consumption in a clear, plausible way, and 2) alternative proteins were at least one, but may not have been the entire, intended application for the research. Alternative proteins were defined as described earlier in the report, as either plant-based, fermentation-made, or cultivated meat, seafood, eggs, and dairy. Research concerning the production of alternative proteins for animal feed was only included where it had a clearly relevant secondary impact on food. Research involving insects for either food or feed was not included.

The results reported are inclusive of January 2020 through April 2024. The report covers Austria, Belgium, Denmark, the European Commission, Finland, France, Germany, Ireland, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the UK. As a result of insufficient data, Czechia, Italy, Poland, and Turkey were included in the total figures but excluded from the deep dive sections.

To be eligible for inclusion, research funding must have been allocated. However, in some cases, the breakdown of allocated funds per project was not publicly available. In this case, the total value of the call was still included in the analysis. Calls that were not yet closed, or were yet to be awarded as of April 2024 (inclusive), were not included. Research grants then were categorised manually as one of four pillars (plant-based, fermentation, cultivated, or cross-cutting) according to the “What are alternative proteins?” section above. Fermentation grants were categorised by sub-type (biomass or precision), and in the case of projects in the cross-cutting pillar, into one of several sub-categories (traditional fermentation to produce plant-based meat, cellular agriculture, including both cultivated and fermentation-made products, and those grants that were genuinely cross-cutting all three production pillars as “all”). They were then sub-classified by grant title into a segment of the research pipeline (“technology area”), listed in Table 1. Where this was uncertain, the abstract was analysed if available, and if not possible, the grant was classified as unknown/other. Grants over €1 million may be classified under several topics, in which case the total grant value was split evenly between the selected topics.

Limitations

Funding is reported by the country of the funder

It is important to note that the regional analysis above was performed on the basis of the country of the funding body. This means that the total funding in a given region will not reflect all the funding that has gone into that region from external funders, and excludes all funding from the European Commission.

For the purpose of this report, funding from the European Commission was analysed as a separate jurisdiction. In the case of the UK, for the period of non-association with Horizon Europe, funding for EU-awarded projects is listed under the UK total as funded under the Horizon Europe Guarantee.

Inconsistent levels of public funding data

For some countries, data coverage is significantly worse than others (particularly where the public funder does not release detailed funding information). This is noted throughout the report where applicable.

Factors that influenced data availability for this report included the presence or absence of funding databases for national and nonprofit funders, the sensitivity of those funding databases to our chosen keywords (partly but not exclusively linked to the language of the database), and the architecture of the funding database (including the availability of funding information).

Dimensions.ai was used to supplement the data available from public databases, but many of the same limitations apply.

Subjectivity of scope decisions

While all efforts have been made to ensure the data presented in this report is accurate and consistent, the decision about the inclusion of a given project is subjective. While the decision-making rubric is provided in the methodology section, the following limitations apply:

- Relevance to alternative proteins may only become clear from the results of a project. Many fundamental research projects may ultimately have applied relevance.
- Not all projects with relevance are described in language (in the project title) that makes this obvious to the reader.
- Relevant research may occur under the umbrella of larger research grants, in which case the relevant aspect of the research may not be identified.

Supplemental data

Table 2: Top funders across Europe

Rank	Funder name	Contribution (EUR)
1	European Commission	€343,936,649
2	UK Research and Innovation (UKRI)	€100,875,065
3	Novo Nordisk Foundation	€67,110,810
4	Dutch National Growth Fund	€60,000,000
5	Business Finland	€59,035,699
6	The Research Council of Norway	€35,610,464
7	BpiFrance	€35,274,000
8	Federal Ministry of Food and Agriculture (BMEL)	€31,631,491
9	Danish Government	€24,130,000
10	Formas	€23,501,678

Table 3: Investment by country

Rank	Jurisdiction of Funder	Contribution (EUR)
1	EU	€343,824,491
2	UK	€107,983,731
3	Denmark	€96,755,864
4	Finland	€77,767,439
5	Netherlands	€73,936,002
6	Germany	€59,742,734
7	France	€50,560,505
8	Norway	€42,128,691
9	Sweden	€34,879,987
10	Spain	€16,305,505

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