Co-funded by the European Union

INNOVATION IMPACT REPORT

An initial benchmark of EIT Food's contribution to created benefits with a focus on climate change and healthcare cost mitigation

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EXECUTIVE SUMMARY

EIT Food supports impactful innovations from discovery to market launch and beyond. In 2024, EIT Food commissioned an independent impact assessment of its portfolio of co-funded projects, with a specific focus on carbon dioxide equivalent (CO_2-eq) mitigation[1] and health benefits to consumers.

Projects were reviewed to assess their impact alongside the cost to EIT Food. Desk research and consultations with the beneficiaries were used to develop the assessment.

The Return on Investment (ROI) is presented in two parts:

- Firstly, an ROI based on the innovation case studies relative to individual project costs.
- Secondly, an ROI based on grossing up to the wider EIT Food Innovation Programme.

Total Innovation programme costs 2018–2024 were EUR84m.

To assess climate impacts, the carbon savings linked with these innovation projects are converted into economic terms using government-published costs for tonnes of carbon as credits. The ROI calculations also considered the predicted market benefits linked with carbon and health innovations, along with money saved by healthcare providers through evidenced reduction in required interventions.

The results show an ROI of EUR8.6 per EUR1 invested after 15 years after the initial investment from EIT Food. A relatively low ROI of 0.6 at 10 yrs is due to the longer timeframes common with agrifood product development, with most benefits happening only after several years. It is clear from the results that EIT Food's interventions have significant potential to deliver health and carbon benefits to the European economy.

Return on Investment 5 case studies	10 yrs	12 yrs	15 yrs
Total	0.6	2.5	8.6

In order to identify an indicative assessment of the impact of the whole programme, the consultants recommended using a co-efficient of 2.5. This co-efficient considers any bias in the selection of initial case studies, coupled with the likelihood of other projects generating impacts that have not been shared with EIT Food. Our experience has shown that whilst many innovation projects will not succeed directly in generating significant impact within the first few years of funding, several will, and these impacts can be substantial.

As with all social benefit analyses, a number of simplifications and methodological compromises are necessary to produce a quantitative estimate of the SROI. For this reason we propose that the figures provided are utilised more as a reasonable estimate that can readily be used for future comparison and progression tracking.

[1] CO_2-eq is a unit that translates the impact of various greenhouse gases into a single standard measure. It expresses the warming effect of each gas as the equivalent amount of carbon dioxide that would cause the same impact. Emissions from different sources can then be compared on a like-for-like basis and complex environmental data can be simplified into a figure that represents the overall contribution to global warming.

The total impacts rise to EUR1.8bn with a return on investment ranging from 1.6 at 10 yrs to 21.5 at 15yrs.

Net Benefits Whole Programme (EUR)	10 yrs	12 yrs	15 yrs
Carbon Benefits	14,322,755	110,668,489	509,990,386
Health Benefits	70,845,353	292,692,364	980,264,507
Market Benefits	45,629,089	131,258,529	324,318,219
Total	**130,797,197**	**534,619,381**	1,814,573,112

Return on Investment Whole Programme	10 yrs	12 yrs	15 yrs
Total	**1.6**	**6.3**	**21.5**

A summary of the specific 15-year benefits attributable to individual projects is set out below. This includes the five innovation projects, and one startup project assessed for comparison purposes.

Project or programme (EUR)	CO_2-e (tonnes)	Health impact mitigated €	Economic impact from revenues €
SustainFEED	1,049	-	-
Salus Optima Personalised menus		392,105,803	15,151,719
Ullmanna AI Weeder	33,243		81,814,969
UnderPRESSURE	392,549		
Gavan Technologies - Fatrix[2]	373,681	120,000,000	
Scaling the Bump cap: Mimica	460,797		32,760,599
Total	**1,261,319**	**512,105,803**	**129,727,287**

[2] *This project is a start-up not an innovation project but was included as data became available for comparison modelling.*

INTRODUCTION

Brookdale Consulting was commissioned by EIT Food to undertake an impact assessment of carbon dioxide equivalent (CO_2-eq) and Health benefits resulting from EIT Food's investment. This report presents the findings of that quantitative assessment.

This work builds on an earlier impact report[3] which benchmarked the economic impacts of EIT Food investment in startups. That report estimated a Return on Investment (ROI) of EUR6–13 per EUR1 invested over 10–15 years based on economic (market) impacts only. Qualitative information on further CO_2-eq and health impacts was collected but not quantified.

Over the period 2018–2024, 252 Innovation projects were funded to a total cost of EUR84m with average funding of EUR334k per project. EIT Food selected projects for Brookdale to review and a detailed exercise was undertaken in reviewing the selected projects.

Shortlisted projects were taken forward for modelling with the impacts quantified. This report contains lessons learned, short case studies of each project along with an assessment of the total returns generated and a projected ROI for the whole portfolio.

METHODOLOGY

The work began with EIT Food providing Brookdale with a database of the innovations most likely to have reached potential beneficiaries: 108 of the 252 funded Innovation projects. EIT Food then undertook a funnelling exercise to identify promising innovation projects for Brookdale to review. This was guided by available information on the project outcomes such as market launch data and identifying those that might specifically yield health or carbon impacts.

Alongside the database, detailed project management and monitoring information was used by Brookdale to create a short summary of each project. This provided the assessment team with an understanding of the types of projects, their inputs, activities, outputs and potential outcomes and impacts.

Based on this information, some projects were removed from the shortlist, for example, if they had discontinued or did not appear to lead to any substantive outcomes. Where appropriate, project leads were then contacted to set up a consultation to understand how the project had developed and any actual or potential impacts. For those projects where participants responded, and where things had been taken forward, an assessment of the scale and impact of the projects was undertaken to identify CO_2-eq and health benefits. Where identified, economic benefits were also calculated with all benefits being presented separately.

Impact-focused funding strategies for innovation involve long-term responsible investment, where a diverse portfolio of innovations are supported at stages of Technology Readiness Levels (TRL) approaching market launch. Standalone, EIT Food innovation grants cannot always enable a market launch or guarantee commercial success, however, all EIT Food funding creates impact for the beneficiary organisations in the form of retained staff expertise, informed decisions on product or service development, method or policy development and network opportunities. A proportion of the innovations developed will additionally reach both market launch and achieve significant uptake. For the purposes of this assessment, the consultants were able to identify case studies as examples from the portfolio where the impact created from innovation funding was far greater in

[3] *Entrepreneurship impact report* https://www.eitfood.eu/reports/entrepreneurship-impact-report.

both reach and significance. For each of these case studies an in-depth calculation of the potential economic and social impacts has been valued against the cost of the project as a Social Return On Investment (SROI) figure.

In total, 27 projects were identified for full investigation, 16 were interviewed and 6 proceeded to full impact case studies, 5 being innovation projects and one being a startup for comparison purposes.

EIT Innovation Projects Portfolio	No. of Projects
Projects funded under the Innovation Programme	252
Projects in Innovation Programme Database	108
Innovation projects highlighted through EIT Food initial funnelling	27
Projects interviewed	16
Projects with substantial quantifiable impact benefits included as case studies	5

For CO_2-eq benefits, the assessment relied on independent Life Cycle Analysis (LCA) of carbon impacts already commissioned by project leads. The resulting carbon impacts were appraised using the carbon values and sensitivities 2010–2100 from UK Government Department for Energy Security and Net Zero (DESNZ) modelling. These figures are based on the Intergovernmental Panel on Climate Change (IPCC), the United Nations body for assessing the science related to climate change.

Health benefits were based on either the UK Department for Health and Social Care Calorie Model, which assesses the financial impact of calorie reduction on long-term health care costs, social care costs, productivity savings and Quality Adjusted Life Years (QALYs) or other high-quality scientific literature used to quantify healthcare cost savings. For example, the Personalised Menus project relied upon a peer-reviewed journal article[4] on the annual costs of obesity to the public health system in Europe.

The results were brought together in a bespoke economic model. Assumptions used in the model are laid out transparently for each case study. All the figures from the model are presented in today's terms as a Net Present Value (NPV) with appraisal periods of 10, 12 and 15 years from the start of the Programme in 2018 and a discount rate of 3.5% or 1.5% for health benefits (in line with UK Treasury Green Book).

The level of attribution of benefits to EIT Food was estimated by the project consultees who were asked to estimate how much of any current or future benefits they would attribute as directly caused by EIT Food support.

Persistence of benefits is also accounted for on a case-by-case basis due to the differing nature of the innovations.

[4] Lenoir-Wijnkoop I, Jones PJ, Uauy R, Segal L, Milner J. Nutrition economics – food as an ally of public health. British Journal of Nutrition. 2013;109(5):777-784. doi:10.1017/S0007114512005107.

The model results are presented as a return on investment (ROI), for every EUR1 spent by EIT Food, with benefits expressed in Euros. EIT Food is only one funder of the projects, and it has not been possible to identify all sources of project co-funding. However, it was observed during the assessment that balances of project costs were frequently covered by the beneficiaries themselves. The ROI is an indication of the estimated benefits attributed to EIT Food's support, relative to the amount of money invested. Two methods of ROI are presented.

- Firstly, an ROI based solely on evidence from the 5 Innovation projects assessed relative to the total programme costs.
- Secondly, an ROI based on grossing up the evidence available to a predicted wider programme impact level relative to the total programme costs.

The grossing up in the second method is based on Brookdale's experience of other relevant assessments. Selected projects met these criteria: a) they had achieved a validated 'marketed innovation' Key Performance Indicator (KPI); b) were likely leading to impacts; and c) had accessible contact details. In this sense, the selection was skewed towards higher-impact projects. However, the challenges of finding contacts and data for the projects and getting engagement from project participants, especially for older projects, means it is likely that some programme impacts have not been identified. On that basis, Brookdale Consulting recommend a conservative coefficient of 2.5 to gross up the 5 case studies to the whole Programme. Nonetheless, the figures should be used with caution and are considered a benchmark to be improved upon as further data becomes available.

POLICY CONTEXT

EIT Food is funded through the EU Horizon Europe research & innovation programme as one part of the European Institute of Innovation & Technology (EIT). EIT Food's vision is: **a world where everybody can access and enjoy sustainable, safe, and healthy food – with trust and fairness from farm to fork.**

The EIT Food Innovation programmes operate in a context where the global food sector faces unprecedented challenges including:

- **Feeding 9-10 billion people by 2050;**
- **3 billion overweight people;**
- **2 billion undernourished people;**
- **More than 30% of food wasted.**

EIT Food aims to put Europe at the forefront of addressing these challenges by stimulating innovation in the sector via three key Missions, as indicated below.

Improving the efficiency and sustainability of Europe's food system will contribute to other EU policy goals. For example:

- **EU Green Deal (by making food production and consumption more environmentally friendly)**
- **EU Circular Economy strategy (by reducing Food Waste & Food Loss and improving waste management and recycling).**
- **Competitiveness & innovation objectives through access to finance, developing new skills and creating jobs in both urban and rural areas.**

EIT Food also contributes to UN development goals including for Healthier Diets:

- **UN SDG 3.4: Addressing the food contribution to Non-Communicable Disease (NCD)**
- **UN SDG 2.2: Tackling Childhood Obesity**

And for Circular, Sustainable Food Systems:

- **UN SDG 12.3 Reducing Food System Climate Change Footprint**
- **UN SDG 2.4 Ensuring Food Security & Safety**
- **UN SDG 9: Enabling Transition to a Circular Economy through Capacity Building**

These wider UN development goals highlight that EIT Food's contribution can also be beyond Europe with innovations potentially adopted globally.

LESSONS LEARNED

A number of lessons were learned through the project consultations and reviews which are outlined below.

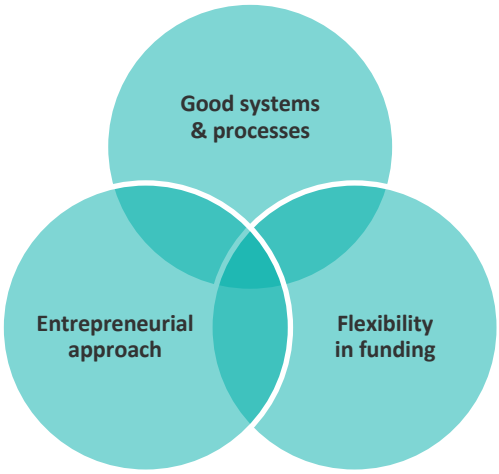
Project summaries – a lot of effort had to be expended in understanding even the basic details of the projects funded. Maintaining a portfolio of project summaries has been suggested to cover the basic qualifying information plus a short description of the project, its objectives and expected impacts.

Collecting impact data – there appears to be excellent knowledge amongst EIT Food staff about project performance, but many beneficiaries did not predict or report on the potential impacts. The development of impact report templates and mandatory submission as a deliverable has been suggested to improve data collection going forward.

EIT food revenue sharing – there was feedback from some beneficiaries that the challenge of explaining the success sharing mechanism to some potential business investors and commercial partners delayed some innovations reaching market.

Market view of innovations – there were several projects where significant funds had been committed only to find that the innovations were totally unviable. An example would be Black to the Future where the final project cost of Biochar was several orders of magnitude above the cost of alternative compost meaning it would not stand the test of market. It might be that an independent market view at an earlier stage could have avoided further project expenditure and been diverted to more viable projects.

Funding flexibility – in contrast to the point above, some projects were more complex than anticipated and funding had run out before the project had achieved its objectives and could realise its commercial potential, which remained valid. For some of these projects, flexibility to continue to fund them would have made a difference. This requires a more entrepreneurial approach to funding whilst also ensuring financial probity.



The adjacent diagram summarises the challenge for EIT Food – to maintain strong financial control but be flexible and entrepreneurial in its approach to projects. Ideally, the organisation would position its approach at the intersection of these three qualities.

Venn Diagram of Funding, Entrepreneurship and Systems & Processes

Value of EIT support beyond innovation funding – EIT Food is valued for its excellent networking events, training, education and enterprise support in addition to its core innovation funding. Examples are the OLEOGELS project where the team came together through introductions made at an EIT Food networking event and Mimica, an example of a startup who have benefitted from progressional project funding and which have benefitted from 4 EIT Food Fellows making a valuable contribution to the development of that business.

Continuing dialogue – projects are keen to maintain a relationship with EIT Food at the end of the funding period.

The capacity building dimension of innovation support – the nature of innovation is that for every project that succeeds in commercialising a new venture, many others will fail because of the inherent high risks involved. But participants can gain valuable knowledge from undertaking the project as well as making useful connections across Europe with other R&D institutions and customers. An example of this is the Black to the Future project where the parent company, Caviro, is committed to operating a circular economy model and although the EIT Food project has not progressed to market, the knowledge the company has acquired may contribute to carbon reduction goals in other ways.

Timescales to significant impact generation – compared with faster-to-market sectors such as digital, agrifood innovations take a longer development pipeline, more in line with the timeframes in health innovation development for example. As a result, a lag of approximately 6–10 years appears to be quite common in building up a commercial enterprise with revenues substantial enough to be considered successful.

ASSUMPTIONS FOR IMPACT MODELLING

The following 6 case studies are included in the assessment. Brief details of each case study are set out below along with the assumptions used for modelling.

1.

Project Name	SustainFEED
Sector	Aquaculture
Funding (EUR)	697,119
Timing	January 2021 to December 2022
Project Partners	• Instituto de Ciencias Marinas de Andalucía (ICMAN) and the Institute of Investigaciones Marinas (IIM), both part of the Spanish National Research Council (CSIC) • Università di Bologna (UNIBO) • Matís – Icelandic government-owned, non-profit, research company and analytical testing service. • Vaxa Technologies – producer of microalgae in Iceland using geothermal power • Roquette – a pea protein manufacturer with innovations in protein isolates, textured protein, protein formulations.
Project description and modelling assumptions	Aquaculture (fish farming) is a growing industry worldwide and an increasingly important part of global food supply, helping to ensure food security without depleting marine resources. However, fish feed normally contains ingredients, such as fish meal and soy-based products. These undermine sustainability in aquaculture, as they produce negative environmental impacts related to land use change, greenhouse gas emissions, water eutrophication and soil acidification. It is important to investigate alternative fish food ingredients with reduced environmental impacts. The case study focuses on the early hatchery stage, using microalgae to enrich artemia to filter feed Seabass and Seabream larvae – with associated carbon reductions.

Project description and modelling assumptions	1. Independent research has confirmed that Vaxa's microalgae production system is carbon neutral[5]. 2. Another study has found that the typical carbon emissions relating to normal microalgae production are 68.34 kg CO_2-eq/kg dry biomass obtained. Excluding the 1.72 kg CO_2-eq/kg emissions relating to construction gives a figure of 66.62 kg CO_2-eq/kg dry biomass for comparison, where electricity is the major contributor to overall emissions[6]. 3. Vaxa has calculated the volume of production required by industry for two major species - Seabream and Seabass. This is the market potential modelled and potential carbon saving if the technology is commercialised. 4. Vaxa identifies the market as 4,725kg of dry microalgae required for Seabream and 7,875kg for Seabass. Applying the 66.62 carbon saving to these figures gives 315 and 525 tonnes respectively if the whole market moved across to this system. 5. We assume a gradual market share build up until the whole market moves to sustainable microalgae production over a 25-year appraisal period. Whilst such a high market share might not be achieved, Vaxa also believe the technology could apply to other species not considered in the analysis. Setting these two factors off against each other, we leave the high market share assumption unchanged for Seabass and Seabream. 6. We apply the UK appraisal carbon price in Euros to the tonnes of carbon avoided. We assume 100% persistence. We do not apply the technology to other species, but it could happen subject to commercial trials.

[5] *https://doi.org/10.1007/s10126-022-10162-8.*
[6] *Carbon footprint of microalgae production in photobioreactor 5th International Conference on Energy and Environment Research, ICEER 2018.*

2.

Project Name	Project Salus - Personalising corporate canteen menus to reduce obesity
Sector	Foodservice
Funding (EUR)	375,011
Timing	May 2023 to August 2024
Project Partners	• Salus Optima • Compass Group • Centre for Exercise, Nutrition and Metabolism (CNEM) at the University of Bath
Project description and modelling assumptions	Obesity is a global challenge to enable individuals and communities to take control of their food intakes and lifestyles to improve their health. Salus's goal is to develop digital applications to empower individuals to achieve their own health and wellness goals. A mobile app (iOS/Android) integrating Compass Group's food menu systems was developed with personalised meal (and lifestyle) recommendations based on data from wearables and continuous glucose monitors (CGM), supported by behaviour change techniques and digital coaching to tackle obesity. Any corporation investing in this will be able to collect currently unobtainable data regarding their workforce's metabolic and nutritional demands, so they can directly cater for those demands via menu options in the staff canteen. Simultaneously, the menu options can be seamlessly integrated into personalised nutrition guidance accessed via employees' mobile phones about which dietary choices to make on any given day, alongside broader advice for fitting a healthy lifestyle around their work. 1. Revenues from project business plan were used to forecast uptake. Revenue forecasts are a combination of software license per user plus per territory deployment. Salus forecasts being deployed in 3 territories with 1,050,000 users by 2029. We have not risk adjusted this forecast but after 2029 have applied only a 5% ongoing increase which we view as very cautious. 2. Attribution to EIT Food was estimated by the Project Lead at 55%. 3. Health cost savings based on the estimated direct (e.g. medical/care) and indirect (e.g. absenteeism/productivity) annual costs per capita in the EU of obesity/weight management (I.e. $622 or €576 once exchanged to Euro - per person; Okunogbe et al 2021). 4. Persistence left at 100% as the 5% increase is very modest and this technology could be rolled out much more widely. 5. Health benefits are discounted at 1.5% instead of 3.5% for other benefits.

3.

Project Name	ULLMANNA AI Enabled Mechanical Weeder System
Sector	Agriculture
Funding (EUR)	1,396,555 Innovation grant in 2023: AROW plus 36,670 for participation in FAN 2022
Timing	May 2023 to August 2024
Project Partners	• Ullmanna • Newman
Project description and modelling assumptions	Organic food production systems are more sustainable and beneficial to human health. However, there is a significant price premium currently for organic food and this needs to come down so the benefits are more accessible to all. The EU aims to increase the area under organic agriculture but weed control is one of the greatest challenges, especially for sugar beet where hand weeding is expensive and time consuming. Ullmanna is a pioneering agritech company founded in 2019 with a mission to revolutionise farming through AI-driven solutions for sustainable agriculture. Its focus is on developing advanced, mechanical weeding systems that improve the efficiency and environmental impact of farming practices, and organic farming in particular. The company has brought 2 products to market to date: • **AROW** – an AI-enabled digital box containing high-resolution cameras, lights and advanced electronics. This can be attached to existing machinery to create a 'smart' precision-guided in-row mechanical weeding solution which is far superior to older mechanical weeders • **NEWMAN** – a collaboration with one of its customers. They provide the machinery and Ullmanna provides the AROW digital box, and the complete package is sold under the NEWMAN brand name. ULLMANNA's USP is its enormous image database of weeds which comprises up to 1 million annotated images and its proprietary AI-enabled software which has been developed to analyse the images and to 'teach' the software how to identify weeds in thousands of different scenarios. The software has such sophisticated control of the machinery that highly accurate, precision-guided weeding is possible not just intra-row but in-row as well – across a variety of challenging situations.

Project description and modelling assumptions	1. Company revenue forecasts - Ullmanna is assuming EUR10m sales pa by 2027 and EUR75m pa by 2030. This is a massive jump from EUR1m currently. We assume a slower rate of growth with annual sales of 75m being achieved in 2037 instead of 2030, this being a more conservative forecasting approach. 2. Cost savings forecasts - we assume these begin in 2027 when there start to be significant sales of the Ullmanna product. We assume that by 2030 25% of the EU land area under organic sugar beet production is using the Ullmanna system. 3. Carbon savings - We assume these begin in 2027 when there start to be significant sales of the Ullmanna product. We assume 2,000 ha converted from conventional sugar beet to organic sugar beet each year, based on customer data. Carbon saving is 791.8 kg CO_2-eq/ha (based on 3,959 kg CO_2.eq/ha for conventional sugar beet production and typical 20% lower kg CO_2-eq/ha for organic production). Convert to 0.7918 tonne CO_2-eq/ha x 2,000 ha in 2027 = 1583.6 tonne CO_2-eq. Each subsequent year adds 1583.6 tonne CO_2-eq to the rolling total. 4. We apply the UK appraisal carbon price in Euros to the tonnes of carbon avoided. Source: DESNZModelling, based on IPCC (Table 3: Carbon values and sensitivities 2010-2100 for appraisal 2022 £/tCO_2-eq). 5. We assume persistence of 100% for the next 10 years as i) Ullmanna has first mover advantage and ii) even if other products come to market - there is no reason this should significantly impact on the company's expected sales growth over the next 10 years because the market is so large. After 2034 - persistence reduces significantly dropping to zero by 2039. 6. Attribution to EIT Food was estimated by the Project Lead at 70-80%.

4.

Project Name	UnderPRESSURE
Sector	Food & drink manufacturing
Funding (EUR)	528,447
Timing	January 2019 to December 2020
Project Partners	• YPISCON a startup of the RisingFoodStars programme • ACESUR a food company producing sauces and • PURATOS a food company producing patisserie ingredients
Project description and modelling assumptions	Ultra high-pressure homogenisation (UHPH) is the treatment of a fluid where it is preheated to 90°C then given ultra high-pressure processing (>300 Megapascals). Temperature and pressure can be varied depending on the product and the desired results. The technology is an alternative to pasteurisation or UHT (ultra-heat treatment) with less spoilage of taste and quality. There is no requirement for steam so fossil fuel use can be reduced, although it does require electrical energy to create the high pressure. It can be used for a broad range of products (sauces, liquids, patisserie ingredients, creams, smoothies, spreads, desserts) meeting consumer demands for better taste, texture, shelf-life, stability and health whilst preserving vitamins and antioxidants. The startup YPSICON previously sold industrial UHPH units only for low-viscosity foods (juice, milk etc) due to technological limitations. The new ultra high-pressure homogenisation (UHPH) unit for high-viscosity products developed in underPRESSURE opens a new market and opportunity. 1. UHPH is a technology that uses a combination of pressure, temperature, cavitation shear and turbulence to achieve successful microbiological inactivation. Ypsicon is developing two machine sizes, 3,000 and 10,000 litres per hour with respective annual production of 17.87M and 57.76M litres per year. We assume an increase in machines in the marketplace and 1:1 ratio for litres to kg. 2. UHPH has 31% less emissions than UHT treatment. Literature[7] suggests carbon emissions of heat treatments for milk vary from 31.4g for UHT to 37.6g CO_2-eq/kg for HTST. We assume UHPH is 31% less than these, saving 9.7g and 15.9g respectively. We assume that the growth in Ypsicon UHPH machines displaces UHT and High temperature short time (HTST) equally (50% each) and that the figures for milk can equally apply to other products that might be treated.

[7] *http://dx.doi.org/10.1016/j.jclepro.2016.11.059 and https://doi.org/10.3168/jds.2013-7546.*

Project description and modelling assumptions	(Computer simulation of energy use, greenhouse gas emissions, and costs for alternative methods of processing fluid milk). 3. We also assume that application of Ypsicon's technology avoids the need for cold chain requirements for the pasteurised product. This is calculated at 0.32kg CO_2-eq per kg of product (based on International Institute of Refrigeration April 2021; The Carbon Footprint of the Cold Chain 7th Informatory Note on Refrigeration and Food). They estimate 813Mt food generated 261Mt of emissions (261/813=0.32). This figure is based on 2017 data[8] and emissions have fallen since then. Brookdale moderated the figure by a third from 300g to 200 g per kg CO_2-eq. 4. The technology also improves taste, quality (in terms of nutrients) and shelf life. Health/nutritional benefits are not quantified. 5. We assume 55% attribution to EIT Food based on the views of the project team. 6. We assume that the persistence of the benefits tails off as alternative technologies take over.

[8] *https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emission-intensity-of-1.*

5.

Project Name	Gavan Technologies
Sector	Food & drink manufacturing
Funding (EUR)	€31,101 for participation in FAN 2022
Timing	January 2019 to December 2020
Project Partners	• YPISCON a startup of the RisingFoodStars programme • ACESUR a food company producing sauces and • PURATOS a food company producing patisserie ingredients
Project description and modelling assumptions	1. Gavan Technologies make plant proteins behave like fat. Through support from EIT Food's FAN programme, they have been able to commercialise a butter replacement known as Fatrix. 2. This technology allows replacement of animal fat - Solid at a high temperature, mimicking the texture and performance of butter. It can enhance the food experience - as a carrier for ingredients to improve the sensory and nutritional profile. 3. This is a clean food label with only three ingredients: plant-based proteins, vegetable oil, and water. 4. The technology allows replacement of butter with Fatrix at a 1:1 replacement ratio. 5. 1 kg of butter has 16.93 kg CO_2-eq emissions and 7,857 calories per kg 6. 1 kg of Fatrix has 1.32 kg CO_2-eq emissions and up to 50% fewer calories - we assume only 40% fewer calories to be conservative so 4,714 calories per kg. 7. Gavan Technologies expect to be commercial in 2025. 8. In 5 years, the company projects sales of 8,000t of Fatrix. We assume a conservative 5% increase year on year after this and a gradual build up before this. 9. This translates to 124.88 million kg CO_2-eq emissions in 2030 (16.93-1.32)*8,000,000. 10. It also translates to 25.144bn calories less consumed[9]. 11. Reduction of saturated fats up to 4x is not quantified. 12. The total attributable calorie reduction delivered is calculated as follows. Reducing by 5kCal at the England population level is worth £2,668m over 25 yrs based on the DHSC Calorie Model 2018 before figures brought into today's prices using the GDP deflator (ONS) Across the 25-year period we estimate 276bn calories saved by European consumers. This is based on the 8000 tonnes per year by 2030 with 5% annual growth times the 3143 kcal saved per kilo and equates to 0.53 calories per day per person using the English population as a proxy c13% of EU worth EUR378m.

[9] *Calorie reduction is just one proxy for estimating the impact of improving diets. Other factors can also be examined.*

6.

Project Name	'Bump' by Mimica
Sector	Food & drink labelling
Funding (EUR)	€1,148, 146
Timing	2021 to November 2025 (ongoing)
Project Partners	• ABP Food Group • University of Reading
Project description and modelling assumptions	In the EU, over 59m tonnes of food waste are generated each year, worth an estimated EUR132bn. It is estimated that 60% of this is still perfectly edible, driven by expiry dates based on near-worst-case temperature scenarios. Short expiry dates also lead consumers to choose processed, less nutritious foods, which have a carbon footprint seven times higher than fresh alternatives. Processed foods now make up half of the calories consumed in the EU. 'Bump' by Mimica was initially conceived as an aid for those with visual impairments to be able to access food expiration information via touch. However, it quickly became apparent that the technology had wider applications. An initial proof of concept using orange juice yielded impressive results, allowing 97% of households sampled to enjoy it for up to 6 days past its expiration date. Building on the success of this trial, Mimica is now expanding into high-value, high-carbon-footprint products such as meat and fish, where overcaution in expiry dates is even more significant. This work is currently supported by the EIT Food Impact Funding Framework. This is a full-scale commercial pilot project with partner ABP Food Group which is a €5bn food processing business providing beef and other meat products to customers across the world. 1. Company revenue forecasts - Mimica is assuming 13.25m sales pa by 2029 with 3 initial customers for Bump Tag. Together they represent maximum annual sales potential of more than €100m of Bump Tags. Mimica believes a reasonable aspirational target for the next ten years would be to capture 33% of this potential, as well as making significant inroads into the vast wider market estimated to be 2.6bn globally. Based on the 3 initial customers a forecast of €33.3m should be attainable by 2034. Thereafter it is assumed the business adds a further €10m to turnover each year to a maximum of €100m annually. Given the size of the potential global market this is very attainable.

Project description and modelling assumptions	2. Carbon savings - Reduction in Consumer Beef Waste in the UK. 29% of avoidable beef waste is associated with date labels (9.86 million kg of beef annually). If use of Bump Tag gradually reduced waste to eliminate 50% by 2041 this equates to annual carbon emission savings of up to 159.7 million kg or 159,732 tonnes of CO_2-eq by 2041 (4.93 million kg = 4,930t of beef waste x 32.4 kg of CO_2-eq/ kg (carcass weight) = 0.0324t Source of emissions data AHDB UK. 3. Carbon savings - Reduction in Retail Beef Waste in the UK. The annual amount of meat and fish retail waste is 12,000 tonnes. The main causes of retail food waste relate to either product damage or the product being 'out of code'. In the case of meat and fish products, waste is much more likely to be due to 'out of code' issues than damage e.g. breakage. If it is assumed that Bump Tag could prevent 50% of current meat and fish retail waste in the UK by 2041 – this would equate to 6,000 tonnes annually. To estimate the impact on beef waste specifically, data from the Grocer 2024 shows beef represents 27% of retail sales of the main categories of meat, poultry and fish products sold in the UK. Thus, we estimate 1,620 tonnes of retail beef waste could be prevented annually. This equates to annual carbon emission savings of up to 52.48 million kg of CO_2-eq or 52,480 tonnes (1.62 million kg of beef x 32.4 kg of CO_2-eq / kg (carcass weight)). Source of emissions data AHDB UK. 4. Carbon Savings - Reduction in waste in all Meat, Poultry, Fish products in UK - based on grossing up the data for beef to represent all the main categories of meat, poultry and fish products in the UK (beef represents 27% of market) so multiply by 3.7. 5. Persistence - we assume that the technology tails off from 2039 as other alternatives emerge. 6. Attribution to EIT Food was estimated by the Project Lead at 60%.

IMPACT OF EIT FOOD INVESTMENTS ON CARBON AND HEALTH IMPACTS - ROI

The ROI is presented in two parts as follows:

- Firstly, an ROI based on the case study projects relative to Programme costs.
- Secondly, an ROI based on grossing up to the wider Programme.

This ROI is based on five of the six case studies versus the associated innovation programme costs. One of the case studies is from the EIT Food startup programmes so cannot be included in the Innovation Programme totals. Total Innovation programme costs were EUR84m as shown in the Table below.

Programme costs (EUR)	10 yrs	12 yrs	15 yrs
Direct costs EUR	84,335,291	84,335,291	84,335,291

The model shows impacts of EUR52m at the European level over 10 years rising to EUR725m over 15 years. The impacts are split between health benefits (EUR392m), carbon benefits (EUR204m) and market benefits (EUR130m). The bulk of the health impacts come from Project Salus Personalising Corporate Canteen Menus based on it reaching 1m users then growing at 5% per year and helping users to change their eating habits and lifestyles. For carbon impacts, Mimica is the biggest contributor at EUR98m over 15 years assuming it can reduce waste by half in beef and other meats with a third of market share.

Net Benefits 5 Case Studies	10 yrs	15 yrs	25 yrs
Carbon Benefits	5,729,102	44,267,395	203,996,154
Health Benefits	28,338,141	117,076,945	392,105,803
Market Benefits	18,251,635	52,503,412	129,727,287
Total	**52,318,879**	**213,847,753**	**725,829,245**

The results show a return on investment ROI of EUR 0.6-36 per EUR1 invested over a 25-year period. A relatively low ROI of 0.6 at 10 yrs is due to the longer timeframes common with agrifood product development, with most benefits happening only after several years. The ROI at 15 yrs is 8.6. It is clear from the results that EIT Food's interventions have significant potential to deliver health and carbon benefits to the European economy.

Return on Investment 5 case studies	10 yrs	12 yrs	15 yrs
Total	0.6	2.5	8.6

As explained in the methodology, we also gross up the 5 case studies to the whole programme using a coefficient of 2.5. This represents our judgement and experience in such assessments taking account of the bias in selection of initial case studies plus the likelihood or there being other projects with impacts we are not aware of. It provides an indicative assessment of the impact of the whole programme and highlights the speculative nature of funding innovation projects – many will not succeed directly in generating impact, but some will, and the impacts can be quite large.

The total impacts rise to EUR1.8bn with a return on investment ranging from 1.6 at 10 yrs to 21.5 at 15 yrs.

Net Benefits Whole Programme (EUR)	10 yrs	12 yrs	15 yrs
Carbon Benefits	14,322,755	110,668,489	509,990,386
Health Benefits	70,845,353	292,692,364	980,264,507
Market Benefits	45,629,089	131,258,529	324,318,219
Total	**130,797,197**	**534,619,381**	**1,814,573,112**

Return on Investment Whole Programme	10 yrs	12 yrs	15 yrs
Total	**1.6**	**6.3**	**21.5**

A summary of the specific benefits attributable identified across the different projects reviewed is set out below over 15 years.

Project or programme (EUR)	CO_2e (tonnes)	Health impact mitigated €	Economic impact from revenues €
SustainFEED	1,049	-	-
Salus Optima Personalised menus		392,105,803	15,151,719
Ullmanna AI Weeder	33,243		81,814,969
UnderPRESSURE	392,549		
Gavan Technologies - Fatrix	373,681	120,000,000	
Mimica	460,797		32,760,599

APPENDIX: CASE STUDIES

Ullmanna:

Revolutionising organic farming with ai-powered weeding

LEAD ORGANISATION: Ullmanna (established in 2019)

CONSULTEE: Martin Ullmann, CEO & Co-Founder.

COUNTRY OF IMPACT: Ullmanna is based in Czechia and currently has collaborations and customers in Czechia, Poland, Austria, Germany, Switzerland, Belgium, France, Italy and most recently Japan.

WEBSITE LINK: https://www.ullmanna.eu.

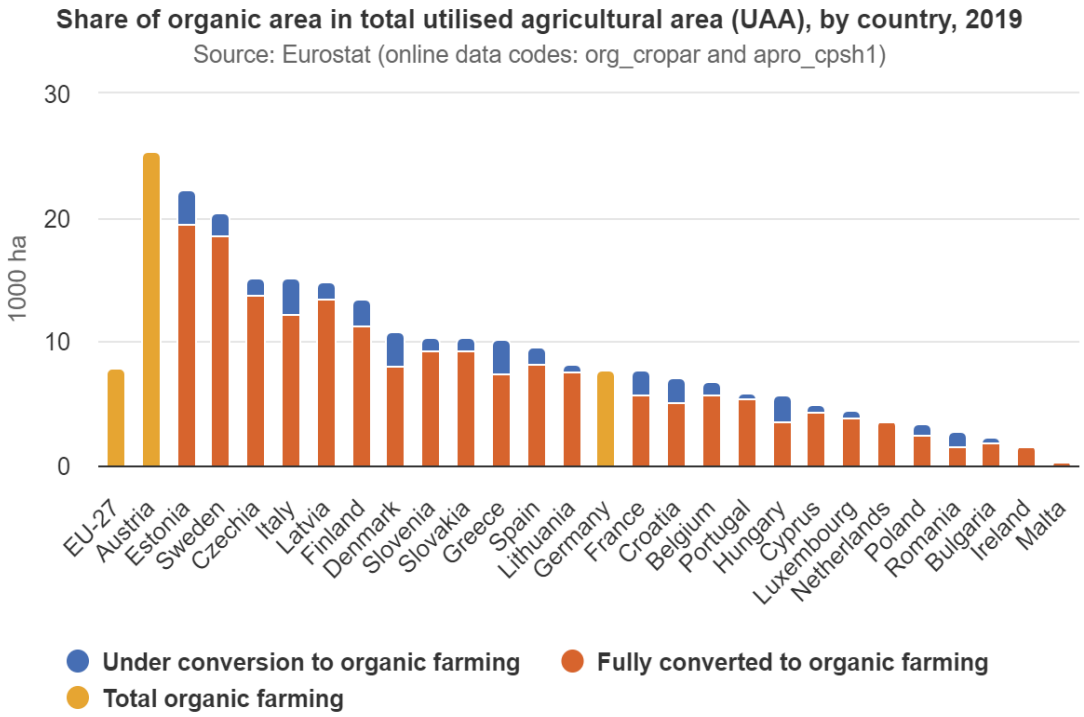
UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS: Contributes to UN Sustainable Development Goals 2 (sustainable agriculture), 3 (good health and wellbeing), 12 (sustainable consumption and production), 13 (combat climate change) and 15 (sustainable use of land). **IMPACT MEASURED BY:** business sales, reducing organic farming costs, increasing organic farming yields, conversion of more land to organic and consequent reduction in greenhouse gas (GHG) emissions.

PROJECT NEED *(benefit and why it matters)*

Organic food production systems are more sustainable and beneficial to human health. However, although organic farming generally creates lower GHG emissions per tonne (up to 20% lower for crops and 4% for livestock), it also produces less food energy output per hectare. Some researchers argue that the increased land area needed to compensate for lower food production levels, means organic farming systems will only be more sustainable if accompanied by a corresponding major increase in organic yields[10]. Similarly, the health benefits will be limited unless costs can be brought down to a level where prices are affordable for the majority of people. There is a significant price premium currently for organic food and this needs to come down so it is more accessible to all.

Under the EU Green Deal *Farm to Fork Strategy*, the European Commission has set a target of 'at least 25% of EU agricultural land being under organic farming by 2030'. The goal is to produce healthy food with lower environmental impacts – not just GHG reductions but other benefits such as biodiversity protection (land farmed organically has about 30% more biodiversity than land farmed conventionally). The EU has a comprehensive action plan to achieve this goal[11]. Some of the key points are:

- The EU area under organic farming has increased by almost 66% in the last 10 years - from 8.3 million hectares in 2009 to 13.8 million hectares in 2019. It currently accounts for 8.5% of the EU's total 'utilised agricultural area'
- This increase has been matched by a substantial increase in retail sales. These have doubled in value in the last 10 years, from approximately EUR 18 billion in 2010 to more than EUR 41 billion in 2019
- The large differences in organic farming rates across different member states as shown below



[10] *Cranfield University, Press release PR-SWEE-19-126, 22 October 2019*
[11] *An Action Plan for the Development of Organic Production, European Commission 2021*

Assuming current trends continue, the share of EU agricultural land in organic use is expected to reach 15%-18% by 2030. To close the gap between this business-as-usual projection and the goal of 25% by 2030 "extra effort" is necessary. One of the extra effort measures is an EU commitment to increase the share of research and innovation resources focused on organic farming – there is a commitment that at least 30% of the EU RDI budget for agriculture, forestry and rural areas should be directed at work on increasing yields and productivity in the organic sector.

Weed control is one of the biggest headaches and costs for organic farmers. A review of the EU organic sugar beet market in 2020 identified weed control as the most significant challenge and cost area for organic farmers:

"In the case of sugar, the most significant challenge faced by European organic sugar beet farmers during or after the conversion period is the removal of weeds using manual labour. This necessary step mobilizes a large number of people over a large number of hours and is therefore considered as a key "economic challenge" to lower existing production costs of organic sugar beets. According to our information and despite significant variations depending on seeding techniques used, manual labour charges for the removal of weeds generally accounts for about 50 - 70% of organic sugar beet production costs."[12]

Hand pulling weeds is very labour intensive, and labour is also scarce and hard to come by in Europe. Preventative management practices are important but organic farmers also need better mechanical weeding solutions to reduce costs, improve yields and critically to improve the overall economic viability of organic farming to work towards the EU target of 25% of land being organic by 2030. The Ullmanna AI-enabled mechanical weeding system, supported through EIT Food's innovation programme, is addressing this need.

PROJECT INNOVATION *(how they removed barriers etc)*

Ullmanna is a pioneering agritech company founded in 2019 with a mission to revolutionise farming through AI-driven solutions for sustainable agriculture. Its focus is on developing advanced, mechanical weeding systems that improve the efficiency and environmental impact of farming practices, and organic farming, in particular. The company has brought two products to market to date:

- **AROW** – which is an AI enabled digital box containing high-resolution cameras, lights and advanced electronics. This can be attached to existing machinery to create a 'smart' precision-guided in-row mechanical weeding solution which is far superior to older mechanical weeders (see below)
- **NEWMAN** – this is a collaboration with one of its customers. They provide the machinery and Ullmanna provides the AROW digital box, and the complete package is sold under the NEWMAN brand name.

ULLMANNA's USP is its enormous image database of weeds which comprises up to 1 million annotated images and its proprietary AI-enabled software which has been developed to analyse the images and to 'teach' the software how to identify weeds in thousands of different scenarios. The software has such sophisticated control of the machinery that highly accurate, precision-guided weeding is possible not just intra-row but in-row as well – across a variety of challenging situations. The technology is transformative in its range of capabilities and the efficiency savings that can be achieved.

[12] *https://www.artb-france.com/images/syntheses/4-marches-international/Organic_sugar_in_the_EU_-_Sep_2020.pdf.*

PROJECT OUTCOMES & IMPACT *(reach and significance)*

i) Business sales

The company has grown steadily over recent years. It employs a multidisciplinary team of ca 7 FTEs in Czechia with experience in electronics, software, and crop science. In addition, there are ca 15 casual staff who annotate the constant stream of new images being added to the database. The company's main customers are agritech machinery manufacturers – Ullmanna sells them the AROW box technology to incorporate into their existing and new products. This year the company has generated sales of ca €700k to date (180+ AROW boxes and 5 NEWMAN) and expected this to reach ca €900k by the end of 2024. By 2026, the company is targeting annual sales of €6m which will put it on a firm footing to become self-financing (and less reliant on the innovation grants which support this early-stage business currently). Looking further ahead to 2030, the company is expecting to sell over 13 000 AROW boxes generating over €75 million in revenue.

ii) Reducing organic farming costs

Using sugar beet as an example, Ullmanna estimates that its technology can reduce annual weeding costs by up to 80%, compared to the alternative of manual hand weeding. This is a game-changer because weed control is one of the largest costs for organic farmers (as highlighted previously). In Germany and Austria, a hand weeding worker costs about €15 / hr and each hectare of sugar beet requires ca 180 hrs of weeding per season. The Ullmanna mechanical weeding system can take out these costs which are in the region of €2,000 / hectare[13] because of its highly accurate intra-row and in-row weeding capability. This translates into a cost saving of up to €31 million pa from widespread adoption of precision-guided mechanical weeding solutions such as those being brought to the market by Ullmanna (based on 15,512 ha of EU land being cropped for organic sugar beet in 2022 (incl area under conversion)[14].

The lower labour inputs which are needed when Ullmanna's 'smart' precision-guided in-row mechanical weeding technology is used, not only bring down costs for organic farmers but they also help to overcome a key production constraint, which is finding people to do this type of work. Temporary agricultural workers are in short supply and the availability of labour will continue to constrain organic farming systems which rely on manual hand weeding. One farmer who has used Ullmanna's weeder said he was able to produce his crop without any hand weeding and the company is getting similarly positive results for organic pumpkins.

ii) Increasing organic yields

Again, using sugar beet as an example, a comparative trial[15] looked at the differences in organic sugar beet yields from a conventional cultivation process and a robotic-assisted process (for seeding and weeding). The main difference between the two systems was that for the conventional process, sowing was carried out using a tractor, sugar beet seeder and a row spacing cultivator, with a harrow used (2 times per season) for mechanical weed control alongside hand weeding (2 times per season) to control weeds in the crop rows. The robotic system used an autonomous solar-powered robot for both sowing and weeding. The results showed higher yields of

[13] The cost savings reported by Ullmanna for sugar beet weeding have been triangulated with other independent research which looked at the use of robotic for organic sugar beet production in France. This found that it takes between 20 to 200 hours of manual work to maintain one hectare of sugar beet, equating to around €4,000 of additional costs, which is even higher than that assumed by the company. (Source: Bručienė, I, Savickas, D, Šarauskis, E (2024) Comparative environmental analysis of sugar beet production using a solar-driven robot and conventional systems from a sustainability perspective. Cleaner Environmental Systems, Volume 13, 2024,100186, https://doi.org/10.1016/j.cesys.2024.100186)

[14] https://www.organic-world.net/index.html

[15] Bručienė, I, Savickas, D, Šarauskis, E (2024) Comparative environmental analysis of sugar beet production using a solar-driven robot and conventional systems from a sustainability perspective. Cleaner Environmental Systems, Volume 13, 2024,100186, https://doi.org/10.1016/j.cesys.2024.100186.

76.5 tonnes per hectare for the robotic system due to more effective weed control compared to 54.5 tonnes per hectare for the conventional system.

A feature of the Ullmanna mechanical weeder is its precision-guided in-row weeding capability. Therefore, similar yield improvements as for the robotic weeder in the research trial would be expected. If an organic sugar beet farmer could achieve an additional 22 tonnes per hectare, this equates to a net financial gain of €3000 per hectare (based on 2024 sugar beet price of €46 and a typical 3x price premium for organic). This translates into additional annual revenue up to €47 million pa from widespread adoption of precision-guided mechanical weeding solutions such as those being brought to the market by Ullmanna (based on 15,512 ha of EU land being cropped for organic sugar beet in 2022). An additional benefit of the Ullmanna system is its practicality and speed. As it is designed to operate behind a tractor, it can be used in all types of weather conditions and is much faster than robotic systems which are still very slow.

iv) Increasing the amount of EU land in organic production and associated greenhouse gas reductions

Innovations that reduce costs and improve yields (such as those brought to the market by Ullmanna) mean it becomes more attractive for farmers to convert to organic farming systems.

Using sugar beet as an example, in the three-year period 2019-2022 the EU area under organic cultivation increased by ca 1,000 hectares annually. If more favourable economic conditions from new technologies such as Ullmanna accelerated this to 2,000 hectares annually, it is estimated that ca 790,000 kg CO_2-eq carbon savings could be achieved per annum (based on 3,959 kg CO2e/ha for conventional sugar beet production[16] and typical 20% lower kg CO_2-eq/ha for organic production[17]).

In this analysis we have considered only sugar beet, but Ullmanna's technology can be used for multiple crop types (further information on the breadth and coverage of the company's image database is provided in Annex 1). Organic vegetable crops (which are similar to sugar beet in requiring a lot of weeding), accounted for 214,000 hectares of EU land in 2022 – much larger than the 15,500 hectares under organic sugar beet currently. Thus, the benefits from Ullmanna's technology are potentially much more significant than those outlined in this report.

ATTRIBUTION OF BENEFIT TO EIT FOOD

EIT Food was responsible for getting Ullmanna 'off the ground' with a small €3,000 initial grant. Since then, the company has participated in EIT Food startup programmes and currently it is part of a consortium in receipt of EIT scale-up innovation funding (€725,000 in 2023 and €616,000 in 2024). Aside from EIT Food, other grant funding has come mainly from the EU Horizon Research Programme (ca €500,000) and private investors and others (ca €400,000).

Ullmanna recognises the significant contribution that EIT Food funding has made to the development of the business. In quantitative terms, the company was asked what proportion of sales output to date could be attributed to the support it has received from EIT Food – and this was said to be in the region of 70-80%, because without EIT Food, the company could not have developed as rapidly as it has.

[16] *https://www.scottish-enterprise.com/media/wuafqpv5/sugar-beet-a-just-transition-for-the-chemicals-sector-and-a-net-zero-solution-for-manufacturing.pdf*
[17] *Cranfield University, Estimation of the greenhouse gas emissions from agricultural pesticide manufacture and use, 2009*

Annex 1: Ullmanna Image Database for Weeds

Currently supported crops:

- **Sugar Beet** - 336,513 photos
- **Pumpkin** - 226,104 photos
- **Chicory** - 149,795 photos
- **Celery** - 101,461 photos
- **Lettuce** - 69,532 photos
- **Corn (Maize)** - 49,066 photos
- **Rice** - 42,762 photos
- **Fennel** - 40,581 photos
- **Onion** - 37,668 photos
- **Marshmallow (Althaea officinalis)** - 36,033 photos
- **Cabbage** - 57,310 photos
- **Broccoli** - 14,901 photos
- **Tomato** - 14,885 photos
- **Grindelia** - 13,489 photos
- **Peanut** - 75,629 photos
- **Leek** - 23,053 photos
- **Passion Fruit** - 16,986 photos
- **Mint** - 16,654 photos
- **Dandelion (Taraxacum officinale)** - 24,494 photos
- **Red Beet** - 8,055 photos
- **Helichrysum italicum** - 8,129 photos
- **Tobacco** - 7,957 photos
- **Chinese Cabbage** - 6,445 photos
- **Kohlrabi** - 4,936 photos
- **Potato** - 4,623 photos
- **Bean** - 8,103 photos
- **Carrot** - 3,220 photos
- **Parsley** - 9,773 photos
- **Oregano** - 250 photos
- **Sunflower** - 1,304 photos
- **Thyme** - 8 photos
- **Sage** - 310 photos
- **Plantain** - 411 photos

Mimica:

Unlocking the true shelf life of food with Bump

LEAD ORGANISATION: Mimica (established in 20)

CONSULTEES: Solveiga Pakštaitė, Founder and Director of Mimica and Ieva Hofmane, Communications manager at Mimica.

COUNTRY OF IMPACT: Mimica is based in the UK and currently has project collaborations allowing access to a worldwide market.

WEBSITE LINK: https://www.mimicalab.com

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS: Contributes to UN Sustainable Development Goals 2 (improving nutrition), 12 (reducing food waste) and 13 (combat climate change).

IMPACT MEASURED BY: Predicted revenue combined with reductions in food and drink waste mitigating greenhouse gas (GHG) emissions.

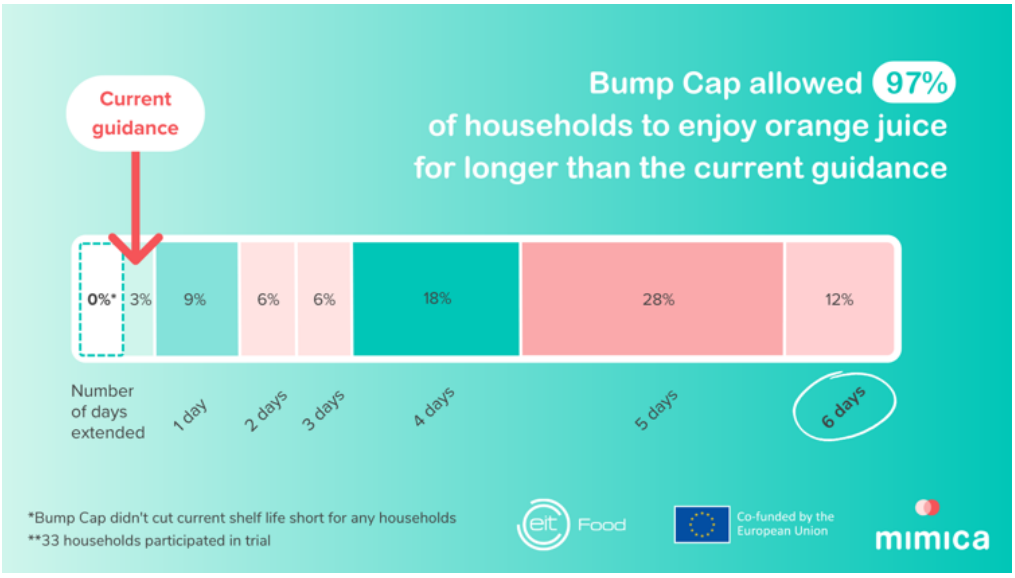
PROJECT BACKGROUND

Solveiga Pakštaitė, Founder and Director of Mimica, originally developed the Bump concept at Brunel University London to help people with visual impairments access food expiration information using a tactile design.

After filing the core patent, Bump won the prestigious James Dyson Award, attracting significant attention from major UK supermarkets. It quickly became evident that Bump not only improves inclusivity but also helps reduce food waste from overcautious expiry dates, delivering significant commercial benefits. Mimica was established in 2017, with Laurence Kayson appointed as CEO and Lawrie Matthews as CTO.

The company began its journey with juice as its proof-of-concept product, supported by EIT Food under the RisingFoodStars programme. This culminated in the project moving on to EIT Food's Fast Track to Market programme, which delivered outstanding results. A consumer trial on orange juice revealed that Bump enabled 97% of households to enjoy the product for up to six days beyond current expiry date guidance.

Building on this success, Mimica is now expanding into high-value, high-carbon-footprint products such as meat and fish, where overcaution in expiry dates is even more significant. The work is currently being supported by the EIT Food Impact Funding Framework. This is a commercial pilot project with partner ABP Food Group, a €5bn food processing business providing beef and other meat products to customers around the world. The project is due to run until November 2025 with the intention that Mimica and ABP will then work with supermarkets across the UK and Europe to introduce Bump Tags on their own-brand packaged meat products.



Mimica is based in the UK and currently has a core team of 12 staff, and additionally regularly benefits from the support of PhD and Master's students through the EIT Food Fellowship programme. Recently, 4 students from the programme contributed their expertise to assist the team. The business has plans to expand the team significantly over coming years.

PROJECT NEED *(benefit and why it matters)*

In the EU, over 59 million tonnes of food waste (132 kg/inhabitant) are generated annually[18] with an associated market value estimated at 132 billion euros[19]. Households generate more than half of the total food waste (54%) in the EU. The remaining 46% of waste is generated upwards in the food supply chain.

It is estimated that 60% of food wasted by EU households is still perfectly edible[20]. This unnecessary waste of good food is driven by expiry dates based on near-worst-case temperature scenarios.

Short expiry dates also lead consumers to choose less nutritious, processed foods over fresh foods, where the CO_2 footprint is around 7x that of fresh equivalents[21] and which now make up half of EU consumed calories[22].

The EU is committed to meeting the Sustainable Development Goal Target of halving per capita global food waste at the retail and consumer level by 2030. New technologies such as Bump give consumers the confidence to use the fresh food they buy safely beyond current overly cautious expiry dates.

Bump is a temperature-sensitive indicator that provides accurate freshness information. Designed as a Cap or Tag, it shows the true longevity of food and drinks by responding to temperature changes, becoming bumpy when the food or drinks actually are past their best. Bump helps brands and producers safely print longer expiry dates based on reasonable storage, while also warning if poor storage has shortened that time.

Bump works on packaged perishable foods like meat and fish for example, and the cap version fits onto bottles of juice, smoothies and other drinks. Any perishable product with an expiry date can potentially make use of the technology, so Mimica is working to expand to more products and services, from vaccines to catering.

Most currently available expiry indicator technologies are complex, difficult to use, expensive or deliver information only on when threshold temperatures have been compromised, instead of linking this to resulting changes in food quality.

Bump Tag stands out by being more affordable than competing products, offering superior performance and delivering real financial gains. Retailers, brands and food & drink producers benefit from reduced waste with fewer mark-downs and increased sales driven by consumer demand for longer shelf life.

[18] Eurostat, 2024
[19] SWD (2023)421
[20] FUSIONS 2016
[21] da Silva 2021
[22] Mertens 2022

PROJECT OUTCOMES & IMPACT *(reach and significance)*

1. **Business sales Bump Cap**

In November 2023 Bump Cap was launched on a range of EXALT nutrition drinks (EXALT has contracts with top sports teams to supply personalised nutrition to their athletes). Mimica is in discussion with several more traditional juice/smoothie brands with a view to piloting and rollouts.

2. **Business sales Bump Tag**

Bump Tag opens up expansion into the much larger market of packaged meat and fish products. Mimica's market research shows that potential annual sales up to €2.6bn are achievable (see Annex 1). There is a firm foundation for projecting future forecast sales because Mimica already has a formal collaboration with ABP Food Group as mentioned previously.

Three further major businesses in the UK & Italy are also tracking progress and offering product development advice. These four are the first planned customers for Bump Tag. Together they represent maximum sales potential of more than €100m of Bump Tags. Mimica believes a reasonable aspirational target for the next ten years would be to capture 33% of this potential, as well as making significant inroads into the vast wider £2.6bn market referenced above.

In the short-term, the target is to achieve annual sales of €13.25m by 2029.

3. **Carbon savings - Bump Cap**

A Net Environmental Impact Study of Bump Cap was undertaken by Mimica in 2021, focussing on the UK market for juice. Each 1 kg of orange juice sold in the UK has an environmental impact of 2 kg of CO_2-eq/kg juice, and the study cited yearly juice purchases and waste levels of 1,010 and 121 million kg juice respectively. Data sources show that up to 44% of juice waste in the UK comes from consumers throwing juice away based on the belief that it has spoiled - 53.24 million kg of juice per annum. With the Bump Cap system, consumers would be given a tool that would allow them to tell exactly when the juice is no longer good to be consumed. If this eliminated all the 44% of current juice waste due to misbelief that it has spoiled, the emission savings would equal 106.48 million kg of CO_2-eq (94.55 million kg of CO_2-eq after allowing for the carbon footprint of producing the Bump Cap itself).

However, not all juice producers will use Bump Cap and in time other products will be developed which compete with Bump Cap for market share. Therefore, the Environmental Impact Study looked at a range of plausible scenarios for juice waste reduction from Bump Cap. This showed that even if the current level of juice waste was reduced by only 20%, there would still be annual emission savings equal to 36.5 million kg of CO_2-eq.

4. **Carbon savings - Bump Tag**

An Interim Net Environmental Impact Report on Bump Tag has recently been shared by Mimica (2024), focusing on the UK market for beef. It reports that average emissions from beef production worldwide are 46.2 kg of CO_2 / kg carcass weight, and yearly beef purchases and avoidable waste levels are 449 and 34 million kg of beef respectively. There is evidence that up to 29% of avoidable beef waste in the UK comes from consumers throwing it away because it has gone past the expiry date – which equates to 9.86 million kg of beef per annum. The Bump Tag system would tell consumers exactly when the beef was no longer good to be consumed. However, it doesn't replace the use-by date, which is there to help consumers plan and a legal requirement. Bump helps brands and producers print longer expiry dates based on reasonable storage, while also warning if poor storage has shortened that time. If this eliminated the 29% of current beef waste which is discarded due

to the misbelief that it has spoiled, the annual emission savings would equal 455.53 million kg of CO_2-eq (451.13 million kg of CO_2-eq after allowing for the carbon footprint of producing the Bump Tag itself).

The Environmental Impact Study tested a range of plausible scenarios for beef waste reduction, considering that not all beef processors / retailers will use Bump Tag and the emergence of other competing products over time. This showed that even if the current level of beef waste in the UK was reduced by only 15%, there would still be annual emission savings equal to 231.2 million kg of CO_2-eq.

ATTRIBUTION OF BENEFIT TO EIT FOOD

EIT Food has played a pivotal role in the development of Bump. First, in the significant funding it has provided to support the commercialisation process. Second, in providing access to talent and skills from EIT Food's education programmes. Mimica has recently had 4 EIT Food Fellows making a valuable contribution to the business.

Laurence Kayson, CEO of Mimica:

"Funding and general support from EIT Food in Mimica's time, initially as a RisingFoodStar, and now as a Delivery Partner, has had a profound and significant effect on Mimica's potential to make an impact in line with its mission to radically reduce unnecessary waste for industry, consumers and communities around the world. Public funding and support for R&D is vital to help impact-driven businesses like Mimica to get off the ground and make a real difference."

Mimica is clear that most of its impact will be achieved through the benefit of having had such public support and estimate that more than half of projects' benefits achieved to date could be attributed to EIT funding, perhaps up to 60%.

Funding from EIT Food for projects from an early stage, and as an equity investor itself, has encouraged other equity investors to invest. EIT Food's rigorous application processes and due diligence ahead of investment has helped support Mimica's credibility to other investors."

Mimica currently has minimal pilot production capacity sufficient to supply very small volumes and will be raising around £500k in equity funding in 2025 to build further production capacity.

Annex 1: Mimica Bump Tag Market Research

Assumptions

- All meat, fish, and seafood production volumes and growth rates are taken from the OECD-FAO Agricultural Outlook 2021-2030
- All base figures are for 2023
- Where assumptions are made, these are based on the team's >50 years combined experience in the food and packaging industry.

Total Addressable Market (TAM): The global market for meat, fish and seafood was valued at €1,497bn in 2023 and was predicted to reach €1,917bn by 2027 (CAGR=6.7%). The industry for sustainable packaging is currently worth €93.5bn and is seeing strong growth- CAGR 7.6% predicted 2023-2032. Global production of meat, fish, and seafood is 507bn kg/year. A conservative assumption from research is that 49% is pre-packed (so tag-suitable) and assuming an average pack size of 300g and a tag price of 5c, this translates to a TAM of €47.2bn.

Serviceable Addressable Market (SAM) – the proportion of the total market you can realistically market to. It is expected that the first five years of product exploitation will focus on the geographical markets of UK, EU, and North America. Meat/fish/seafood production in this area = 112bn kg/yr. Supermarkets' share is around 80% of this, with 85% of the commodity in Tag suitable packaging. Making deductions for ready meals (30%) and food service (10%) where tags are not applicable gives a SAM of €7.6bn.

Serviceable Obtainable Market (SOM) – the market (SAM) share which can be captured. This has been derived from the following, accrued cumulatively:

- 33% for growing competition once Mimica proves concept success to the market
- 20% for market inertia (not everyone will adopt tags irrespective of their availability)
- 20% for low-cost products (where RRP less than €1.75/pack for meat/fish it may be harder to establish a business case for the use of tags)
- 20% margin for unknown factors.

This gives a SOM (UK, EU, N. America) of €2.6bn.

Mimica is forecasting cumulative sales & net profit of €22.5m & €8.792m respectively from 450m Bump Tags by 2029.