

EMFF Operational Programme 2014-2020 Seafood Processing Development Measure

BIM Development & Innovation Services

Seafood Processing Innovation Scheme Work Programme Projects

Final Report 2021

BENEFICIARY: Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER: 21/SPIS/DIS-BG020-BR017
NAME OF PROJECT: Centre of Excellence
IMPLEMENTATION PERIOD: 1st January to 31st December 2021

Project Scope

The Centre of Excellence (COE) project was developed to explore industry good, research, development and innovation opportunities for the whitefish, pelagic and shellfish sectors. These sectors have been impacted negatively by Brexit, delays with transport and logistics and changes to international market dynamics.

The COE project explored the areas of:

- Added value opportunities for marine ingredients from blue whiting.
- Industry 4.0 Pelagic Opportunities.
- Automation.
- Value added technologies for mackerel and herring, and improved holding.
- Logistics technologies for Irish oysters.

Objectives

- To develop three R&D projects targeting R&D knowledge gaps for the pelagic, whitefish and shellfish processing sectors. BIM working with commercially relevant research performing operators (RPOs) and third-party providers will explore new commercial innovation opportunities for these sectors.
- To allow the Irish seafood sector to network with national and international expertise to best assess new innovative technology opportunities.
- To identify complimentary global expertise that provides further insights and knowledge to ongoing issues.

Budget	€91,250
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Achievements/Spend

Effect of blue whiting protein hydrolysate supplementation on markers of glycaemic control, metabolic syndrome and appetite in humans

This project, developed in conjunction with the University of Limerick, explored the potential for developing functional ingredients from a bulk commodity raw material species such as blue whiting. The research partners focused on establishing that methods for testing the beneficial effects of the functional ingredients could be validated. The results were compelling in relation to intake of blue whiting protein hydrolysate (BWPH) on post-prandial glucose response and appetite.

While similar positive effects were not apparent in a longer-term study, it was determined that the impact of consuming BWPH on weight merits further investigation. There is further potential in determining if these effects are reproducible using a treatment with a more favourable sensory acceptability.

Industry 4.0 Pelagic Opportunities

Conducted with Poseidon Aquatic Resource Management (Ireland) the aim of the industry 4.0 Pelagic Opportunities project is to benchmark Irish pelagic processing capabilities against international counterparts.

Global competitors continue to invest in automation and Internet of Things (IoT) enabled technologies. Highly automated technologies offer the potential for reduced production costs and improvement in processing speeds and efficiencies. IoT technologies create further opportunities for value add diversification and supply chain integration, enabling direct sales to new markets. A report on the findings of this benchmarking exercise for the Irish pelagic sector is currently in draft format.

Review of the technologies to transport live shellfish from Ireland to mainland Europe

BIM worked closely with Ocean Perfect Logistics to place a live holding system for Irish shellfish product in mainland Europe. Located in the port of Zeebrugge, Belgium the holding system allows us to explore the potential for these technologies to improve shelf-life and quality, and in mitigating the logistical constraints brought about by Brexit.

Irish oyster growers and processors worked closely with BIM in shipping product to this site, examining the effects of the holding system on live product quality and in determining how well the live product performs in onwards distribution to EU and Asian markets.

Placement of the container and the shipment of product was delayed due to Covid-19 restrictions however the holding system remains in place and this project is ongoing.

Summary of Spend	
Total Approved	€91,250.00
Total Eligible Expenditure	€90,981.48
Total Drawdown	€90,981.48
EU – 50%	€45,490.74
Exchequer – 50%	€45,490.74

Report by: John Fagan

Date: 22nd February 2022

BENEFICIARY: Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER: 21/SPIS/DIS-BG020-BR018
NAME OF PROJECT: **Global Knowledge Trawl**
IMPLEMENTATION PERIOD: 1st January to 31st December 2021

Project Scope

The Irish seafood sector has made significant investment year-on-year in new technologies, innovation, and R&D, in areas such as automated production systems, streamlined handling and maximising quality throughput in all parts of the value chain.

Notwithstanding, Irish seafood producers and processors face strong competition in the marketplace due to the continuous technological advances of global competitors. These technologies are aimed at:

- lower costs of production,
- increased raw material productivity,
- more sustainable catching and processing technologies, and
- the transfer of new and deeper levels of knowledge around intrinsic factors affecting product quality.

The implementation of improved commercial environmental mitigation measures also ultimately leads to increased commercial productivity and profitability.

Global competition is supported through multi-million R&D programmes, and networks, with innovative technologies systematically appraised along each part of the value and supply chain. In response, BIM undertook a *global trawl* of these innovative technologies by tapping into global Research, Development, and Innovation (RDI) networks to understand the latest insights and communicate the new opportunities to the Irish seafood sector.

Objectives

- To identify near-market and high Technology Readiness Level (TRL) opportunities for the Irish seafood sector.
- To appraise new opportunities and technologies for the pelagic, whitefish and shellfish catching and processing sectors.
- To define the potential effects of adopting relevant technologies in terms of the following:
 - lower costs of production,
 - increased raw material productivity,
 - transfer of new and deeper levels of knowledge around intrinsic factors affecting product quality, and
 - improved commercial environmental mitigation.
- To update the Irish seafood sector on new and emerging technology insights that add further value to the sector.

Budget

€50,000

Achievements/Spend

BIM, working closely with Erinn Innovation, conducted a systematic review of the knowledge gaps and opportunities for the Irish seafood sector. This project explored new knowledge around:

- Anisakis mitigation.

- Clean label shelf-life extension and drying technologies.
- Sustainable packaging and plastic reduction.
- Reduced carbon footprint and fuel efficiencies.
- Live onboard holding and tagging systems for fish and shellfish.
- Measuring survival rates of by-catch.
- State-of-the-art catching and handling systems.
- Future industry processing technologies.

In total 108 insights were gathered via 49 interviews with global experts, resulting in a deep dive into 36 commercially relevant opportunities for the Irish seafood sector. BIM intends to work with industry to further explore the commercial opportunities identified.

Summary of Spend	
Total Approved	€50,000.00
Total Eligible Expenditure	€49,200.00
Total Drawdown	€49,200.00
EU – 50%	€24,600.00
Exchequer – 50%	€24,600.00

Report by: John Fagan

Date: 22nd February 2022

BENEFICIARY: Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER: 21/SPIS/DIS-BG020-BR019
NAME OF PROJECT: Innovation Advisory Programme
IMPLEMENTATION PERIOD: 1st January to 31st December 2021

Project Scope

BIM worked with Irish third level institutions to appoint five advisors across the disciplines of food science, food marketing, finance, and project management. The advisors supported market driven innovations, that build competitiveness and capability within the Irish seafood sector.

The Commission for Research, Science and Innovation acknowledged that *'third level partnerships contribute directly to EU competitiveness and policy goals. The key strength of the partnerships is their ability to engage major industry partners and to overcome fragmentation in sectors'*.

Irish third level institutions provide a wealth of expertise and are informed of the latest thinking in all industry sectors. Utilising these institutions, for the application of innovative advisory services, will enhance development of the seafood sector through cross functional applications.

This project also helps BIM to meet Irish government and EU policy goals on competitiveness, and further strengthens the two-way relationship between research and industry, supporting innovation within the seafood sector and the development of high-quality jobs in the research and innovation platforms.

Objectives

Third level institutions provide a wealth of expertise that was applied by BIM in the areas of nutrition, food science, gastronomy, information technology, data analysis, financial applications, and market insights.

The advisory roles supported specific innovation projects, including:

- The application of food science methodologies to new product development.
- The application of financial planning to new product development, including, economics of innovation planning.
- The application of market insights to seafood products encompassing sustainability labelling.
- The application of project management and transition to drive best practice in project implementation.

Budget

€255,000

Achievements/Spend

- A report on the application of *Anisakis* prevalence in whitefish is under completion. The report includes the assessment of detection technologies and the development of standard operation procedures for its control in a processing environment.
- A report on the trend of frozen seafood as an opportunity to manage supply consistency to the European markets.
- A report on the macro factors of sustainability demands from European retailers that have a direct impact of seafood suppliers.
- An economic report including financial indices for the Irish seafood processors at a category level.

- A report on the utilisation of Material Requirement Planning (MRP) and Enterprise Resource Planning (ERP) systems in a seafood processing business to build efficiencies through digital processing metrics.

Summary of Spend	
Total Approved	€255,000.00
Total Eligible Expenditure	€238,079.46
Total Drawdown	€238,079.46
EU – 50%	€119,039.73
Exchequer – 50%	€119,039.73

Report by: Paul Ward

Date: 24th February 2022

BENEFICIARY: Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER: 21/SPIS/DIS-BG020-BR020
NAME OF PROJECT: Innovation Process
IMPLEMENTATION PERIOD: 1st January to 31st December 2021

Project Scope

The innovation process programme is a *design thinking application and expertise*, that enables seafood companies to make informed decisions on investments. The programme enables companies to deliver managed solutions that result in lower risk, and cost of change, and that help obtain organisation buy-in.

Innovation is the most important driver of growth, allowing companies to continually meet changing market demands. Today, 72% of innovations fail to meet their financial targets, or fail entirely, which is costly to seafood SMEs and presents as a barrier to innovation. BIM's innovation process helps mitigate these risks through the application of a design approach, in creating a business case, investment, and ultimately, the successful commercial launch of the innovative project.

BIM's Seafood Innovation Hub works in partnership with Bord Bia, Teagasc, industry groups and specific technology providers, to share the latest technology and market insights. This co-operation helps ensure that best international competitive position is derived from an innovation culture within the sector. Such a culture is achieved by embedding the widespread use of innovation methodologies in the quickest and most efficient way possible.

The innovation process is a cycle, or a continuous iterative process, and it implies several loops. Such loops mainly involve incorporating feedback from designers, engineers, retail customers and consumers. Incorporating feedback and exploring market opportunities from the start of the cycle is fundamental to effectively managing any barriers. Industry success stories greatly help build the sector's confidence in adopting innovative technologies and work practices.

Objectives

The Innovation Process is a specific innovation approach and methodology based on the *Stanford Innovation Model*. This model provides specific expertise from market information, third level research, and the latest technology developments. Application of the model produces highly informed data on which to build a full supply chain business model.

The key macro-objectives include:

- Embedding the widespread use of innovation methodologies to build towards an innovation culture to drive commercial growth across the sector in the quickest and most efficient way possible.
- Developing innovation business cases through research, prototyping and testing market opportunities, to support the seafood industry with commercial decisions on investment.
- Support a culture of innovation beyond new product development, aligned with the *Dublin Ten Innovation Types* to encourage innovation on partnerships, data systems and market integration, to drive innovation throughout the supply chain.

Budget

€260,000

Achievements/Spend

The project resulted in innovative business cases on specific issues that BIM has made available for industry to commercialise. The systematic approach taken is informed by industry expertise. Removing any guess work supported the Irish seafood industry to monetise value add opportunities, thus improving its international competitive advantage.

Progress to date incorporates the following:

- A report titled *Innovation Capability within SMEs in the Food and Seafood Processing Industry Within in an EU Context* has identified key barriers to innovative practices and their application to the Irish seafood sector.
- Development of SOPs for new innovative technology for *Clean Smoke* and its presentation to Irish smoked seafood companies via webinars.
- Completion of trials on innovative technologies for freezing and tempering as it applies to seafood.
- The publication of a technical handbook on functional seafood (BIM's Seafood Handbook) including validation of its effectiveness in retail outlets as a means of meeting consumer demands for information on health and wellbeing, that drives seafood consumption.
- Presentation of market insights on the Irish seafood marketplace to several seafood processors and Co-ops on a bi-annual basis.
- Delivery of a report on the application of frozen seafood products into the European market including refresh products as an alternative market opportunity.
- Support provided to 35 seafood clients on varying innovation projects comprising 17 clients with technical innovation projects, 10 large value chain innovation projects, and eight projects in partnership with industry.

Summary of Spend	
Total Approved	€260,000.00
Total Eligible Expenditure	€204,765.95
Total Drawdown	€204,765.95
EU – 50%	€102,382.98
Exchequer – 50%	€102,382.98

Report by: Paul Ward

Date: 24th February 2022

BENEFICIARY: Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER: 21/SPIS/DIS-BG020-BR022
NAME OF PROJECT: **MSc Project “Marine Functional Ingredients Opportunities for the Irish Seafood Sector”**
IMPLEMENTATION PERIOD: 1st January to 31st December 2021

Project Scope

Opportunities exist for the Irish seafood sector in the global, health, wellness and functional ingredient markets that need to be explored.

Although a considerable amount of commodity raw material, by-product and underutilised species could potentially be converted into marine ingredients to supply this growing market, from an Irish context, it is important to identify the volume opportunities for which enough raw material is available.

For example, for products such as protein hydrolysates, oils and amino acids, percentage yield following processing can be as low as 5% to 15% thereby limiting the business case for smaller-scale fisheries and species.

BIM in collaboration with University College Cork (UCC) supported a masters degree project titled *Marine functional ingredients opportunities for the Irish seafood sector* to explore potential opportunities in this global area for the Irish seafood sector.

Objectives

- To conduct an MSc project in conjunction with UCC to identify marine ingredients opportunities for the Irish seafood sector.
- To develop a case study and business case for a target fish species. The study to focus on the size of Biomass availability, yield, underlying costs and market opportunities for developing Irish-origin marine ingredients.

Budget	€20,270
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Achievements/Spend

The MSc project reviewed and reported on the possible opportunity to develop functional ingredients from Irish mackerel through the three lenses of market size and opportunities, technological requirements, and the underlying costs.

- An in-depth study of competitor offerings, consumer profiles and preferences, aimed to identify consumer-oriented opportunities.
- Economic models were explored comparing, the entire quota, smallest grade fish, and by-product to determine the potential profitability of each model.
- Technical requirements were defined for the manufacture of protein hydrolysates and oil, including an estimate of the potential yield of functional ingredients from these models.

This work is documented in the format of a case study and a thesis.

Summary of Spend	
Total Approved	€20,270.00
Total Eligible Expenditure	€20,270.00
Total Drawdown	€20,270.00
EU – 50%	€10,135.00
Exchequer – 50%	€10,135.00

Report by: John Fagan

Date: 22nd February 2022



BENEFICIARY: Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER: 21/SPIS/DIS-BG020-BR024
NAME OF PROJECT: **Whitefish Innovations**
IMPLEMENTATION PERIOD: 1st January to 31st December 2021

Project Scope

The whitefish market was challenging in 2021 where values declined by about 15% to €40.6 million. However, the value of the main whitefish species including Monkfish (€14m) and Megrim (€8m) have held value year-on-year. This product is sold predominately on the commodity markets.

The Irish Governmental initiative *Foodwise 2025* sets a target to develop implementable actions to significantly increase the quantity of seafood added value that should, at a minimum, reduce the level of produce sold in commodity from 70% to below 50%.

The ensuing sectoral action is an investment in innovative processing technologies that create added value products in a competitive environment. These activities generate costs that need to be minimised if we are to compete with other non-EU countries. Bearing in mind that the outcome and the ensuing commercial success of innovation efforts remains to a large extent uncertain.

In response, BIM will apply a structured process to trial whitefish technologies to determine the commercial opportunities. The presentation of compelling, tested, business cases will reduce the barriers to innovation opportunities and enable the sector to compete globally.

Objectives

To help meet the significant challenges faced by the whitefish sector through determining how to manage innovative technology as an integrated system, within the overall sector, and harness the outputs to provide a reliable driver of growth.

BIM undertook the following key projects:

Technology implementation options for *Anisakis* detection

The presence of parasitic nematodes, of the genus *Anisakis*, in seafood poses a risk to human health through a food-borne disease known as anisakiasis. As such, whitefish processors in Ireland need advice on the management of this issue, at a processing level.

This project evaluated automated and scanning technologies as a method of detecting the presence of *Anisakis* in whitefish. This study was conducted on megrim and hake due to the demand for these products as value add, '*Anisakis* free products' on the Spanish market. Spain is the primary market for these products, as such, there is a strong impetus for the development of more advanced technologies to optimise *Anisakis* detection and manage and control this issue.

Project Baltic

Megrim: Optimising IQF standard operating procedures for utilising innovative technologies to produce a consumer ready megrim product.

To meet industries requirement for the development of optimised standard operating procedures for the production of individually quick-frozen (IQF) megrim. This will enable companies to commercialise a high quality added value product that meets buyer and consumer specifications.

This project supports previous efforts to understand the megrim supply chain valued at €8m and amounting to 2,900T in 2020, and to develop technologies to produce a value-added product in a format suitable for consumers.

Monkfish: Scoping added value concepts through innovative technologies

Monkfish is a prime seafood with an export value of €14m in 2020. The product is sold predominately in a frozen 15kg block format. However, market demand is growing for a more food service and consumer ready pack particularly in the main French and Spanish markets.

BIM undertook an initial scoping assessment to better understand the monkfish supply chain and existing market products and to determine possible added value options.

Budget	€90,000
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Achievements/Spend

- **Technology implementation options for *Anisakis* detection**
BIM published a report and optimised standard operating procedures on *Anisakis* management to utilise technology to reduce the prevalence of the parasite in consumer products. BIM is sharing these learnings with industry aided by an information sheet.
- **Project Baltic**
Megrim: Optimising IQF standard operating procedures for utilising innovative technologies to produce a consumer ready megrim product.
Publication of a BIM report on utilising innovative technologies to optimise production of individually quick-frozen (IQF) megrim as a consumer ready product. This product has been commercialised and is moving to full scale production in January 2022.
- **Monkfish: Scoping added value concepts through innovative technologies**
BIM published a report on the added value supply chain for monkfish and the findings from its retail audits of monkfish value-add products on French and Spanish markets. Samples of these products were return to Ireland where BIM undertook a technical assessment that informed processing options from an Irish perspective. The results of this work will be presented to industry in 2022 for commercial potential.

Summary of Spend	
Total Approved	€90,000.00
Total Eligible Expenditure	€90,000.00
Total Drawdown	€90,000.00
EU – 50%	€45,000.00
Exchequer – 50%	€45,000.00

Report by: Paul Ward

Date: 24th February 2022

BENEFICIARY: Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER: 21/SPIS/DIS-BG021-BR026
NAME OF PROJECT: **Project Atlantic**
IMPLEMENTATION PERIOD: 1st January to 31st December 2021

Project Scope

BIM commissioned Poseidon Ltd to undertake a review of raw material opportunities for the Irish Seafood sector and the development of a strategy to realise those opportunities. The resulting *Raw Materials Strategy* focuses on access to demersal fish and shellfish resources.

The aim of the strategy is to contribute to growth in the Irish seafood sector by increasing the use, sales and landings of demersal raw material supplies. It identifies where resource opportunities exist and prioritises opportunities to access and add value to raw material from non-Irish catches.

As a result of the strategy, Project Atlantic was set-up (2018) to enable the Irish seafood sector to add value to the ever-increasing landings into Irish fishery ports from international vessels.

At first stage a steering group was established comprising all sectoral interests including the Department of Agriculture, Food and the Marine. The steering group met four times over the course of 2018 and 2019 during which time the following outputs were realised:

- Irish landed Whitefish Supply Chain Study
- Study of European Online Seafood Sales Technologies
- Detailed Concept Design of Proposed Sales & Distribution Centre

Based on these outputs the steering group agreed to assess the opportunity for Irish companies to purchase fish from international vessels. The fish are currently transported whole, out of Ireland, to Spain and France. On completion, in early 2019, the group agreed to move to the next phase, namely, to test the commercial proof of concept (POC).

Due to the significant investment required BIM considered the POC phase beyond its remit and it approached the Irish Strategic Investment Fund (ISIF) to advance the project. The ISIF have the statutory mandate to invest on a commercial basis in projects which support economic activity and employment in Ireland.

With the backing of ISIF the objective was to establish a new company, with key industry stakeholders, to operate as a commercial entity and trade fish nationally and internationally.

Objectives

Four industry stakeholders formally expressed their interest in and their commitment to the project. BIM's role, as a facilitator, was to guide stakeholders through the relevant processes and enable an effective result. The successful realisation of Project Atlantic is in the strategic interest of the Irish seafood sector and accordingly the sector assisted the ISIF by providing technical support and guidance.

The primary objective of the project during 2021 was to facilitate and support industry stakeholders to test the commercial business concept.

Budget

€15,000

Achievements/Spend

The project secured the services of an independent facilitator to advise the industry stakeholder group. During this time several stakeholder meetings took place.

The outcome was the establishment of a new entity by industry stakeholders that will progress the opportunity. Given that the project has progressed to a commercial venture BIM's role will now be to support the entity through normal client services.

Summary of Spend	
Total Approved	€15,000.00
Total Eligible Expenditure	€14,145.00
Total Drawdown	€14,145.00
EU – 50%	€7,072.50
Exchequer – 50%	€7,072.50

Report by: Tomás Cooper

Date: 7th March 2022

BENEFICIARY: Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER: 21/SPIS/DIS-BG024-BR033
NAME OF PROJECT: **Assessing New Technologies for the Pelagic Sector**
IMPLEMENTATION PERIOD: 1st January to 31st December 2021

Project Scope

To date, the low margin high volume pelagic commodity business model has worked well for Irish pelagic processors. Pressures are nonetheless emerging as input costs are increasing and larger-scale international incumbents are out-competing Irish players on price in key markets.

Higher margin opportunities are presenting as more B2B customers seek higher specification, better quality, and more convenient products, to maximise their value and drive costs out of supply chains. Currently, Irish pelagic processors (largely) blast freeze product in 20kg cartons and as such do not provide these higher value products.

Irish pelagic processors utilise their plants for less than five months of the year. This has a further negative impact on their competitiveness.

Tempering and IQF

In 2020 BIM commenced a project titled *Assessing New Technologies for the Pelagic Sector*. The project sought to enhance the sector's understanding of IQF and tempering technologies to support the progression of complementary higher margin opportunities that extract more value from the existing base of raw material resources. This will leverage the market demand for higher specification products and, importantly, is a potential use of the latent accessible processing capacity in processing plants by utilising frozen product stock.

During 2020 the project faced significant challenges as the opportunity to access third party expertise and equipment was significantly curtailed due to COVID-19 related travel restrictions. Nonetheless reasonable progress had been made.

A comprehensive desk study was carried out by a third party expert and BIM. The project engaged whitefish and pelagic stakeholders in defining IQF and tempering needs, based on current processing capabilities, and set out the suite of most appropriate best-fit technologies available internationally.

In addition, a third party sourced three different tempering technologies and arranged for the installation of this IQF equipment for in situ trials in processing plants in Killybegs during 2021. The continuation of this project (into 2021) enabled processors to assess, and use, best-in-class technologies. This should encourage commercial uptake.

BIM also identified a series of additional projects that could enhance value creation including Mackerel Pin-Boning Technology and Air Drying of Blue Whiting.

Mackerel Pin-Boning Technology

Atlantic mackerel was Ireland's most valuable fish species landed in 2019 with 53,300MT of fish landed worth €78 million according to the BIM's Business of Seafood. The quota increased by 40% in 2020, further increasing the landed value significantly.

A major stumbling block to opening opportunities for mackerel nationally and internationally is the inability to produce 'boneless' fillets. Farmed Atlantic salmon has become one of the most widely accepted proteins of choice within global seafood markets, and the development of automated pin-boning technologies for salmon has been a major contributor to this.

China represents one of the major global re-processors of pelagic product and can produce high-spec skinless and boneless mackerel fillets for the high value Japanese markets. This is achieved through manual processing and is reliant on cheap labour. Given the higher labour costs in western countries manual pin boning for a high-volume resource like mackerel is simply not possible. However, China is currently facing competitive challenges as its labour costs have been spiralling in recent years.

During 2021 BIM sought third party expertise to provide an automated mackerel pin-boning solution.

Air Drying of Blue Whiting

In volume terms, blue whiting (*Micromesistius poutassou*) represents Ireland's largest accessible whitefish species resource. This is despite Ireland only having 3.4% of the 929,292MT Total Allowable Catch (TAC) for 2021.

The proximity of Irish ports to the fishing grounds, particularly Killybegs means that the main fishing nations, including Norway, Faroe Islands, and the UK often favour landing in Ireland when targeting blue whiting off the west coast. This minimises fuel and time costs from steaming home.

Currently blue whiting landed in Killybegs is either destined for animal feed production or lower value commodity production, principally for African markets. Over recent years BIM has demonstrated that it is possible to process blue whiting into fillets, Headed & Gutted, mince and surimi with feedback from key markets indicating a robust interest in these products. Pelagic processors have been reviewing options to commercialise.

A market opportunity that has more recently emerged is the air-drying of blue whiting for human consumption or as a dried 'treat' product for the petfood sector. Initial trials during 2019 and early 2020, in the UK, revealed that blue whiting processed in Killybegs as fillets and H&G produced good quality air-dried products. Trials were further progressed during 2021 to define commercial drying processes and determine the most cost-effective means of doing so in energy terms (e.g., using latent heat from existing refrigeration processes).

Objectives

This project will deliver on the following objectives:

- Progress assessment of three tempering technologies and IQF trials conducted through third party experts in Killybegs.
- Determine best-fit business cases for progressing tempering and IQF for the pelagic sector.
- Assess the most effective automated mackerel pin-boning solution and gauge market interest in product.
- Progress air drying trials of blue whiting and determine the commercial potential.

Budget

€467,084

Achievements/Spend

Tempering/IQF

KER Group, an engineering firm based in Killybegs, coordinated the selection of equipment and the setting up of trials at various fish processing plant locations. The selection of the tempering (defrosting) equipment, for trials was based on feedback from pelagic and whitefish processors regarding the species mix to be processed and their volume/capacity requirements.

Three different tempering units were sourced; forced-air, immersion and radio frequency. Most of the trials on the pelagic species were conducted at Island Seafoods Ltd, due to the extent of their experience at tempering product and their willingness to allow pelagic processors to attend relevant trials.

Initial trials on the **forced-air drying unit** focused on mackerel. Batches of fish (400-800kg) were placed in the unit and despite several trials and a range of modifications the tempering effectiveness was found to be highly variable with fish on the outside of the batch being overly dry and fish at the core of the batch remaining frozen.

An **immersion unit** was also trialled. The unit used aerated water and waste heat as an energy source from the processing plant's refrigeration system to temper fish.

Preliminary trials showed variability in tempering with 'hot spots' evident, where fish were heated excessively in certain parts of the unit and in contrast fish remained frozen in other areas of the unit. Re-configuration of air-jet bars within the unit significantly improved aerated water circulation and thus the consistency of tempering throughout the batches of fish. Subsequent trials revealed that the unit worked well and had the capacity to temper up to 800kg of fish in c. three hours, as opposed to 24 hours when using Island Seafoods' conventional ambient water spraying system.

Several pelagic processors attended the various trials at Island Seafoods. An ancillary sub-chilling unit was also trialled. This allowed for temperature equilibration of batches of post tempered fish in chilled water. The unit proved highly effective.

The immersion unit was trialled in BIM's Seafood Innovation Hub on a range of whitefish species and formats. Follow-up sensory assessments and drip loss (yield loss) tests were conducted. The unit proved effective at tempering whole and Headed & Gutted product however it was deemed ineffective at tempering fillets as the flesh became overly soft/mushy due to extended immersion in warm water.

Further commercial trials of the unit were conducted at Castletownbere Fishermen's Co-op using both the immersion and sub-chilling units with several whitefish and pelagic processors in attendance.

A **radio frequency (RF)** tempering unit was also trialled in Killybegs. This emerging technology uses dissipation of electromagnetic energy within the tissue to temper. The unit proved somewhat effective particularly the capacity to temper small batches within 15 minutes. However, there was evidence of 'over-heating' at the edge of batches, particularly in poorly graded fish, and it was deemed too costly a system for the scale requirements for pelagic processors.

Further trials were conducted at another production site where it was deemed that the unit is effective for a range of whitefish and shellfish product formats and the client is considering investing in the technology.

Trials were also conducted at BIM's Seafood Innovation Hub and several whitefish and shellfish processors had the opportunity to view trials and test their own products. The benefits of RF technology were evident particularly for processors seeking to optimise delivery of tempered product in time sensitive supply chains. Although a detailed desk-study was conducted to assess the best available IQF technologies in the market, to suit Irish processors' needs it was not possible to source and set up a specific IQF unit for trials. Several options were considered, however, the costs of setting up the unit for shorter term trials and the associated support infrastructure (nitrogen, CO2) required, meant this was not possible.

Preliminary IQF trials were conducted on mackerel fillets in a IQF system at Castletownbere Fishermen's Co-op and speed/capacity of the system was established. It was noted by many of the IQF system suppliers that processor's requirements (space/footprint, species mix, formats, financial capacity) are so varied that setting up and trialling one system provided limited information and progress would be more fruitful if each processor engaged with suppliers to establish best-fit bespoke systems. Overall, the processors' knowledge base has improved regarding the IQF options available and what to consider. This will inform their investment decisions.

Mackerel pin-boning

Eddie Carr & Co Ltd was selected to develop an automated mackerel-pin boning solution. The development project was conducted at Eddie Carr & Co's engineering plant and trials/demonstrations were carried out at Island Seafoods Ltd as there was access to a Baader 221 automated filleting machine.

A range of pin-boning systems were trialled. The most effective filleting 'holding' system proved to be a rotating frozen drum that allowed fillets to stick to the drum skin-side down to enable pin-bone removal.

The most effective pin-bone removal system proved to be a U shaped blade cut system. This resulted in removal of all discernible bones, with a c. 11% yield loss. Although a V-shaped system resulted in lower yield loss (<10%), fine bone remnants were detectable on some fillets, particularly if there was variability in the size of the fillets used.

To ensure the machine could commercially perform it was essential that fish were conveyed and singulated consistently towards the drum. A laser guided system helped operatives align each fillet at speed for pin-boning. Two lanes conveying allowed for c. 40 fish to be pin-boned per minute. For higher capacity needs, design drawings for a four-lane system were produced.

Pin-boned products were distributed to a range of larger domestic retail customers via Island Seafoods Ltd. Feedback was very positive and certain retailers have expressed an interest in purchasing this product in the future. Likewise, customers in France also expressed interest in pin-boned product.

Several Irish processors attended the trials in Killybegs as did several larger scale pelagic international processors, expressing an interest in the technology. The unit was transported to Castletownbere Fishermen's Co-op for further trials/demos.

Eddie Carr & Co Ltd is currently *CE marking* the system to ensure it meets all safety requirements.

Air-drying

Blue whiting was processed into a variety of formats (whole-gutted, Headed & Gutted, fillets) and air-drying trials were initially conducted at 'kitchen scale' (c. 10kg) level to determine optimum drying/humidity times and resultant yield loss, quality and shelf life.

Parameters were developed that allowed for air-drying trials to be conducted on larger scale (c. 100kg) batches. Time/temperature/humidity parameters were determined, and packaging considerations were also appraised. Dried products were distributed to potential customers (human and petfood) for appraisal. Results indicate good demand for air-dried products particularly for dried pet-treats. Air dried butterfly fillets also proved popular.

Set up and running costs for a commercial unit was appraised and product market prices determined. Yield loss (up to 70%) during drying significantly reduces the saleable volume and the ever increasing energy costs for drying processes presents real challenges. However, the potential to access waste heat (from refrigeration systems or renewables (wind or hydro-accessible at Island Seafoods) coupled with capital funding supports makes air-drying of blue whiting an interesting commercial proposition.

Furthermore, the recent spiralling logistics costs will also be a growing driver for processors to opt for exporting higher value lower weight products.

Summary of Spend	
Total Approved	€467,084.00
Total Eligible Expenditure	€467,034.45
Total Drawdown	€467,034.45
EU – 50%	€233,517.23
Exchequer – 50%	€233,517.23

Report by: Michael Gallagher

Date: 7th March 2022

BENEFICIARY: Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER: 21/SPIS/DIS-BG025-BR091
NAME OF PROJECT: **Brexit Seafood Industry Supports**
IMPLEMENTATION PERIOD: 1st January to 31st December 2021

Project Scope

The disruption to processing activity from the Trade and Co-operation Agreement (TCA) has been immense which is evident in the reduced supply of raw material as well as the commercial and logistical impacts on trading relationships.

There are now significant differences in the arrangements for trade between the UK and EU member states that affect businesses operating to and through Great Britain (using the landbridge). Although a deal has been agreed, a range of new rules in the form of customs paperwork, origin statements and health restrictions have been introduced.

With unique requirements for fish and fishery products this sector must now adapt to the changes, brought about by Brexit, and seek out opportunities so that greater value can be derived from the market and shared throughout the supply chain.

Notwithstanding the many adverse effects of Brexit, the sector is now at an inflection point by which those adverse effects must be mitigated while the opportunities presented by Brexit must be maximised.

Objectives

BIM sought to provide a suite of support services to assist Irish seafood processors to navigate the challenges of Brexit through this project.

This encompassed support and guidance to understand new rules, documentation and studies to support the understanding of the longer-term impacts and opportunities of Brexit. The key goals were to assist industry to adapt, restructure and reposition post-Brexit.

The Seafood Industry Brexit Support consisted of individual processing companies working with an approved BIM customs mentor to:

- Analyse the company's trading situation.
- Interpret and explain how the new custom requirements will impact the company's trading situation.
- Develop a tailored plan and support the company to implement actions to satisfy the new trade requirements.

Budget

€200,000

Achievements/Spend

Under the EMFF, BIM has supported 35 processing companies through the Brexit Seafood Industry Supports project. This support has consisted of individual processing companies working with an approved BIM mentor, analysing the company's trading situation, interpreting and explaining how the new custom requirements will impact the company's trading situation and supporting the company to implement actions to satisfy the new requirements and allow for trade to continue to and through the UK.

Industry feedback on the support has been very positive. 88% of companies that engaged with the support were satisfied with the service and felt their business was better prepared for Brexit changes as a result.

BIM has hosted/co-hosted 10 industry webinars to create awareness and explain the new customs requirements for Irish seafood companies trading to or through the UK. This informative material, along with an FAQ section, was also made available through the BIM Brexit Hub website.

Summary of Spend	
Total Approved	€200,000.00
Total Eligible Expenditure	€179,852.51
Total Drawdown	€179,852.51
EU – 50%	€89,926.25
Exchequer – 50%	€89,926.25

Report by: Gavin McGrath

Date: 14th February 2022

BENEFICIARY: Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER: 21/SPIS/SDS-BG035-BR054
NAME OF PROJECT: **Process Efficiency Programme**
IMPLEMENTATION PERIOD: 1st January to 31st December 2021

Project Scope

BIM's Process Efficiency Programme enables a range of seafood companies to maximise the use of information, garnered through their day-to-day operations, to increase internal efficiencies and build competitiveness. At present many seafood SMEs are collecting data through various production, stock management and administration processes. However, the analysis of this data will need to be improved if companies are to realise the full potential of the data available. BIM, working with industry experts, provides an enhanced oversight of key performance indicators (KPIs) to enable SMEs to analyse data in real-time and make proactive business decisions.

Objectives

Companies in the seafood industry have invested and developed systems to record data, critical to analysing key elements of their business. However, the data is often collected on different systems and is analysed independently and inconsistently. As such, identifying trends or issues can be problematic.

BIM's Data Visualisation Programme seeks to develop a user-friendly reporting tool to enable Irish seafood companies to easily interpret the data on KPIs and make data driven decisions based on the outputs.

The reporting process involves the identification of KPIs pertinent to seafood companies, as informed by consultation with key stakeholders. The further development of a centralised system enables the analysis of all the data simultaneously. Chosen industry experts manage the relationship with the client company, set the parameters of the project, deliver the reporting tool, implement the solution, and provide support to the client company in its use.

Following implementation companies have access to real time data that will enable them to make better informed decisions and identify enhanced efficiencies that can be achieved thereby enabling Irish seafood companies to be more competitive in the marketplace.

Budget	€53,000
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Achievements/Spend

The programme was launched in quarter two, 2021. Following a tender process Grant Thornton was chosen as the third-party provider. Power BI was chosen as the preferred reporting platform provider, offering a dashboard feature that provided the data visualisation element.

Due to Covid-19 restrictions the consultation and implementation processes were facilitated online through MS Teams. The programme process included the following:

Consultation

A consultation process took place with four seafood companies of which two companies committed and completed the programme. Participating companies were invited to engage in a consultation process to identify the most pertinent KPIs for their business. This included a review of the IT systems used to collect the data.

Data Collection and Template Design

Grant Thornton, in consultation with the participating company, sought agreement on the KPIs, defined the data required and reviewed the process for collecting and validating the data. Following this, the design of the dashboard was agreed with the client company. BIM provided input throughout the process.

Data Input in Power BI Dashboard and Assessment

Each company was required to clean and upload their data as part of their engagement in the project. A sample of this data was used to test and resolve any issues that arose during the design and build phase. The outcome of the work was the delivery of a comprehensive bespoke dashboard that was thoroughly reviewed against the success criteria of the participating company.

Implementation and Support

The seafood companies were supported as they commenced use of the dashboard. Standard Operation Procedures, including troubleshooting guidelines, were developed to assist with the administration of the dashboard and to help measure and monitor the KPIs.

Initial indications are that the dashboard is contributing to real time decision making. This was evident in companies' ability to respond effectively to the recent increase in energy costs and make informed decisions to reduce their energy consumption.

Summary of Spend	
Total Approved	€53,000.00
Total Eligible Expenditure	€52,644.00
Total Drawdown	€52,644.00
EU – 50%	€26,322.00
Exchequer – 50%	€26,322.00

Report by: Pat O'Leary

Date: 17th February 2022

BENEFICIARY: Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER: 21/SPIS/STS-BG043-BR087
NAME OF PROJECT: Green Seafood
IMPLEMENTATION PERIOD: 1st January to 31st December 2021

Project Scope

Addressing climate change and the challenges of sustainable development are critical issues for the seafood sector. By 2050 the world's population will have increased to 9.7 billion, with food production a key area of growth. Seafood processors will play a key role in providing protein rich seafood products to domestic and global populations. The growth and survivability of the sector is however presented with a range of challenges. Climate change is having significant impacts on our ecosystems and the biodiversity that they support, including the fish stocks upon which the sustainability of our industry depends. The seafood sector must act on climate change to reduce energy use, improve water management, limit waste creation, and reduce emissions wherever possible. Making the right choices now will ensure that Ireland is well positioned to deliver sustainable growth in the seafood sector far into the future.

BIM's Green Seafood Business Programme works alongside the seafood processing sector to provide resource efficiency support to reduce operations environmental impacts and to improve overall sustainability. The aim of the programme is to embed and promote the widespread use of sustainability innovations, processes, and methodologies to drive growth and improvement across the sector.

Through this programme, BIM is simultaneously addressing climate change and sustainable development challenges whilst also implementing the recommendations of Food Wise 2025 and championing the UN sustainability development goals.

Objectives

- To provide and disseminate resource efficiency information, relevant case studies, best practice guides, emerging and innovative sustainability technologies and novel resource management solutions through a range of different platforms and communications methods/channels.
- To provide direct support to companies looking to engage in the Green Programme.
- Continue to build on body of knowledge, new tools and sector-specific examples and case studies relevant to long term sustainability of the seafood processing sector.
- Provide opportunities for peer-to-peer learning and collaboration on overarching sustainability challenges faced by the sector.
- Continue to develop awareness and improve engagement in resource efficiency/sustainability programmes and other Green Seafood Business Programme service offerings.

Budget

€90,000

Achievements/Spend

In total, eight business were supported across 2021 in resource efficiency guidance with one-to-one mentoring. Five of these successfully completed the Green Seafood Business Programme with a further three completing the Water Stewardship Programme. These businesses received one to one site visits, meetings and personalised reports and maps detailing areas where energy, waste or water reductions and savings could be made. This work was done in partnership with energy and waste consultants at the Clean Technology Centre in Munster Technological University and involved water consultants.

As part of BIM's work on water stewardship, a workshop titled *Five Steps to Better Water Stewardship* was developed and delivered in December 2021 to eight participants, in partnership with water consultants and Water Stewardship Ireland. This workshop enabled participants to understand their own water usage and identify areas to create water usage and financial savings.

Two sector-wide online webinars were facilitated and hosted in partnership with consultants in the Clean Technology Centre. In June 2021 a *Refrigeration Systems Management* webinar covered the importance and improvement of energy efficiency in refrigeration systems. In September 2021 a *Waste Management* webinar was held to discuss seafood waste and by-products disposal, the environmental and financial impacts of these and opportunities for business in terms of value-added production of products.

The Sustainability Toolkit continued to be developed with the addition of energy and tariff (MIC, Led) calculation tools. These tools allow seafood processors to calculate if they are on the correct energy tariff based on current usage and if they were to replace lighting with led what energy and financial savings could be made. These tools are complimentary to the services offered in Green Seafood mentoring programmes and available on the BIM website <https://bim.ie/seafood-processing/sustainability-and-certification/toolkit/>

The Enhancing Engagement project was concluded with a report on the feasibility of establishing a sustainable seafood processor group where processors can come together to share ideas and tackle shared sustainability issues (e.g., climate change, resource management etc). The report identifies the key opportunities and barriers for seafood processing companies in becoming meaningfully engaged in environmental and sustainability issues.

BIM's Sustainability Series newsletter was developed and first two issues sent in September and December 2021 to approximately 300 members of the seafood processing sector. The newsletter provides relevant up to date information on energy, waste, water and transport and highlights the recent work of BIM's Green Seafood Business Programme while including links to relevant resources online on the BIM website.

Summary of Spend	
Total Approved	€90,000.00
Total Eligible Expenditure	€84,308.42
Total Drawdown	€84,308.42
EU – 50%	€42,154.21
Exchequer – 50%	€42,154.21

Report by: Jeanne Gallagher

Date: 22nd February 2022