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AZTI REPORT
(40 YEARS)

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PROLOGUE
(40 YEARS)

The development of the future will be sustainable or there will be no development at all

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1.1. LETTER FROM THE PRESIDENT AND THE CEO OF AZTI

Bittor Oroz and Rogelio Pozo

A Japanese proverb says that vision without action is a dream, but action without vision is a nightmare.

AZTI was born more than 40 years ago with a vision that has been transformed throughout these four decades, but always keeping an unchangeable element: science as a means to improve people's lives.

From the sea to the entire food chain, AZTI has always been committed to guaranteeing our natural resources, promoting environmental, economic and social sustainability that is reflected in people's quality of life.

Today, more than ever, science and technology are necessary to advance in that direction. The future (whether in the short or long term) must be linked to sustainability, because we will never tire of saying it: the development of the future will be sustainable or there will be no development.

During our 40 years of life, we have generated knowledge that has allowed us to better understand what is happening around us, to understand the positive impact we generate and to seek solutions that help us to grow in the generation of value for society and people.



Bittor Oroz. President of AZTI.

1.1. LETTER FROM THE PRESIDENT AND THE CEO OF AZTI

In an environment characterized by high uncertainty and speed of change, organizations are putting the focus on short-term planning. However, trends and implications driven by major societal challenges such as global warming, population growth and the polarization of the economy between Asia and America, and more recently the war between Russia and Ukraine, will continue to shape the future, causing structural changes that will shape society and mark the competitiveness of countries and companies. All of this will force us to make significant changes in society, people, business and economic systems.

In this scenario, we have considered it appropriate

to make a long-term strategic thinking, to look to the future in order to guide short-term decisions that will help us stay on course and achieve our Vision and strategic goals.



Rogelio Pozo. CEO of AZTI.

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1.1. LETTER FROM THE PRESIDENT AND THE CEO OF AZTI

In this uncertain context, we have some certainties that should help us to chart the path to the future:



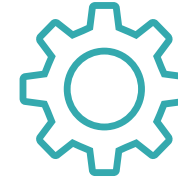
Food is already a strategic resource.

To feed the world's population in 2050, **70% more food will have to be produced with more expensive raw materials.**

In view of the depletion and pressure on resources, it is necessary to continue generating scientific knowledge that will help to manage them sustainably. The pressure on natural resources, especially fisheries, will increase, which makes science a necessary tool for their sustainable management, increasingly indispensable.

The demographic challenge requires the development of new quality protein sources (vegetables, insects, fungi, algae...) that allow a healthy, safe and pleasurable diet.

Food waste cannot be an option. If today one third of the food produced for human consumption is lost or wasted (representing 1.3 billion tons per year worldwide), transforming production systems by prioritizing circular economy solutions is essential to minimize food losses and waste as much as possible, while generating new businesses and sources of proteins and ingredients for the food chain.



Energy transition is more necessary than ever.

Approximately 15% of CO2 emissions come from land transport, maritime and other systems; around 7% originate from activities such as heating/cooling, cooking. Methane is the second most potent greenhouse gas, accounting for approximately 40 % of annual emissions and coming mainly from the oil, gas, coal, meat and dairy industries. All these industries need to **reduce methane emissions by 60% by 2030 and 90% by 2050.**

Technological innovation will be key to this process. Renewable energy, including maritime energy (and its impact on the environment) will be crucial in the attempt to reduce energy dependence. Energy saving systems, more non-fossil energies, new processes based on biotechnologies, systems to increase efficiency with the incorporation of new technologies and, once again, the establishment of circular economy models must be incorporated.

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1.1. LETTER FROM THE PRESIDENT AND THE CEO OF AZTI



It is essential to improve industrial efficiency.

40% of CO2 emissions come from industry. **It is necessary to promote improvements in production processes through digitalization, development of the circular economy, increase efficiency,** incorporate new technologies and optimize processes to reduce current emissions by 1/3.

Circular economy offers important opportunities to improve the life cycle of raw materials, save resources, reduce emissions and develop new technologies and jobs. The concept of reduce, recover and reuse is applicable to the entire food and fisheries value chain.



We must listen and get to know people better.

The structures and ways in which we live are changing very fast. There are more and more households, smaller and older. There are more elderly people living alone, more people with chronic diseases and also a higher percentage of healthy elderly. Couples are starting families at a later age and are having fewer children, and many are not having children at all. Food is another factor in the care and maintenance of health, even more so in a context in which access to information is widespread and people are taking an increasingly active role in their own care.

Nor can we forget that, increasingly aware, people can be drivers of change through their consumption decisions. The demand for transparent information on consumer products is increasing and this can lead to even more profound changes in production systems.

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1.1. LETTER FROM THE PRESIDENT AND THE CEO OF AZTI



In the last 40 years we have witnessed major changes, many of us have seen them coming, others have not. But our ability to react, our knowledge of the sector and the rigor and scientific excellence for which we work have allowed us not only to adapt, but also to continue contributing more and more value to society.

In the future we will continue to focus on talent and excellence as pillars to maintain and increase our international presence, collaborating with the best professionals to develop differential research and innovation based on technological and market specialization, with an ultimate goal: to lead projects

in cooperation with companies and institutions that transform production processes and increase the contribution of value to society and people.

We have a vision for the future: to make a better, more sustainable and healthier world. And with the help of knowledge, science and technology, we will continue to do everything in our power to achieve this.



AZTI
FOR SUSTAINABILITY

2.1. MORE SUSTAINABLE FISHERIES

Worldwide, fisheries and aquaculture are an essential part of the human diet, providing essential proteins and nutrients to a growing population while satisfying specific consumer demand preferences. At AZTI we work to ensure, today and in the future, socially, economically and ecologically sustainable fisheries.

GENERATING KNOWLEDGE FOR SUSTAINABLE SPECIES MANAGEMENT

Our innovation, development and technology transfer seek to ensure an efficient use of resources in order to guarantee the environmental, economic and social sustainability of the marine environment and its fishery resources.

- Our research work is carried out within the framework of international organizations such as ICCAT, IOTC, ICES/CIEM, NAFO, STEFC, etc., in which AZTI research personnel are present or lead the committees that establish the scientific management advice on which to base the sustainable exploitation of resources and fishing activity.
- We have developed **FLBEIA, a bio-economic simulation model** that describes the whole fishing system with which to evaluate

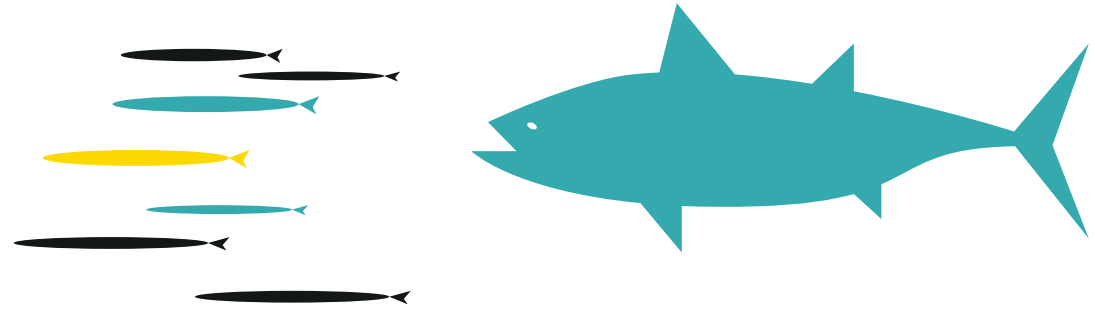
the consequences of the different fishing management strategies before they are implemented.

- We have collaborated in the development of a **global atlas to monitor fishing activity using Automatic Identification Systems (AIS)**. This system can be a useful tool to improve the sustainable management of fisheries, since it allows us to identify the activity of the vessel at sea and, thus, to estimate the activity and fishing efforts almost in real time and even, a step further, we could have estimates of illegal fishing in certain situations.



2.1. MORE SUSTAINABLE FISHERIES

The knowledge generated by AZTI, together with the different models, is allowing a more responsible management and a better knowledge of key species for the region:



Anchovy:

Our scientific advice has been key to the fact that, with a precautionary approach, **anchovy today enjoys excellent health** (Juvena and Bioman campaigns). In addition to the opening of closed fisheries (anchovy in the Bay of Biscay), we have anticipated successes in recruitment, with the economic benefits this brings to the sector.

Tuna:

Our research has contributed to the fact that tuna has a stable management framework for the future, with **the highest TAC (Total Allowable Catch) in history for the next 3 years** (37,801 tons). This increase is the second consecutive increase since 2017, when the body approved a 20% increase from 28,000 tons to 33,600 tons. We are one of the driving partners of the **Bermeo World Tuna Capital Association** that seeks to respond to the global challenge of making tuna fisheries sustainable at a global level. And we have developed an **advanced tool that allows us to identify the origin of bluefin tuna** in the Atlantic and contribute to the sustainability of this species.

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2.1. MORE SUSTAINABLE FISHERIES

“We are international benchmarks and are present in important scientific and research committees.”

AZTI's scientific staff **tops the lists of scientific production worldwide in the thematic group of fisheries**. Thus, in the 2015-2020 period, AZTI is number 55 in the world in terms of academic production and 17 in terms of weighted citation impact. In terms of specific topics, AZTI is 11th in fisheries, fishing mortality and fish communities; 19th in stock assessment, fisheries management and fishing mortality; and 24th in the field of fisheries, sharks and fish.

The high scientific quality combined with the application of the research results is the basis on which our research team is an **international reference** and hence its presence and recognition in the main scientific fisheries committees.

- 10% of the Scientific, Technical and Economic Committee for Fisheries (STECF), a scientific committee of experts that advises the European Union on fisheries matters, is made up of AZTI research staff. We are the research centre with the largest representation on this committee at European level.
- AZTI scientific staff participate in or lead different scientific committees in areas related to our fields of research. Of particular note are the scientific vice-presidency of ICES and ICCAT, and the work as European scientific coordinators for the ICCAT, IOTC and IATTC fisheries management bodies.
- AZTI coordinates a team of European scientific institutions that provide advice to the Commission on fisheries management in distant water RFMOs.
- The NAFO Scientific Council rewards the scientific excellence of mathematician Agurtzane Urtizbera, AZTI's expert in Sustainable Fisheries Management, who is recognised for her "excellent modelling work on cod management, her involvement in it, her interest, hard work and success in defining management strategies and scenarios".

2.1. MORE SUSTAINABLE FISHERIES

WE USE TECHNOLOGY TO IMPROVE FISHING EFFICIENCY

Firstly, by optimising the probability of catching fish, which results in reduced working time, lower fuel costs and, therefore, more benefits for the sector.

- **Marine View**, developed in collaboration with Marine Instruments, is **a tool that makes fishing much more efficient** by providing recommendations to identify the best fishing grounds for tuna, longline and inshore fishing. It also offers an integrated solution for handling oceanographic information and buoy data, saving vessels time and fuel.
- **Bonicho** is the system developed by AZTI for **operational forecasting of both bonito in the Bay of Biscay and pelagic fishing resources** to predict the distribution of shoals and reduce fuel consumption and days at sea.

Also, through technological or operational alternatives that optimise the use of energy and reduce energy consumption, as well as gas emissions in the maritime-fishing field.

- **Gestoil is an on-board consumption**



measurement and management system which is enabling fishing vessels to measure fuel consumption and manage it to reduce it significantly

- In addition, we have achieved fuel savings of 5% on fishing vessels by **changing propellers or modifying diesel engines**.

We have also worked on the optimisation of on-board processes through **innovations in fishing gear** that result in improvements in occupational safety. Since manual work is reduced, exposure

to on-board equipment that may pose risks to fishermen is also reduced. Among other implementations of technologies and processes, the following stand out:

- Triplex seine manoeuvring replacing the traditional powerblock in the purse seine fleet
- Vacuum suction pumps replacing traditional brailing in the purse seine fleet automatic mackerel reels in the vertical line fleet

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2.1. MORE SUSTAINABLE FISHERIES

- Automatic mackerel reels in the vertical line fleet
- Deck conveyors in the baitboat fleet
- Fish transfer hatches between chilling tank and refrigerated hold in the baitboat fleet
- Pneumatic ice conveying system from ice store in the vessel's hold to the working deck
- Automatic rod for live bait tuna fishing
- System for placing plastic bags and quick stowage of tuna on board tuna vessels

We are also committed to finding **more efficient and sustainable alternatives for marine research** through new technologies.

- Itsasdrone is a **marine surface drone for long duration missions on the sea surface**. Developed by Branka Composites in collaboration with AZTI, this drone operates autonomously and is based 100% on renewable energies. Its applications range from oceanographic, meteorological or biological research to control by marine authorities, including target monitoring.
- An **underwater 3D camera** developed by an international consortium in which AZTI participates, provides divers, fish farmers and marine researchers with a new cost-effective

and compact tool to obtain high-resolution and long-range images, regardless of the water conditions. It enables, among other things, **monitoring fish populations in fish farms, mapping the seabed and detecting litter and pollution.**

INNOVATING WITH THE INDUSTRY TO REDUCE THE IMPACT OF FISHING

We have sought alternatives that improve the exploitation patterns of fishing gear (**selectivity**), minimising both the levels of unwanted associated catches (**discards**) and the **survival** of those species of special consideration due to the need for their protection. With this we seek to optimise fishing activity and also to adapt it to the regulatory requirements for the sustainable use of marine resources.

- We have been present, since its inception, in the Discards state round table, an **advisory body to the Administration for compliance with the European Directive on fishing discards**. The research and innovation work in fishing technology carried out in close collaboration with the fishing sector has successfully contributed to the annual Discards Plans, allowing a framework of flexibility in the conditions of fishing operations and thus ensuring the sustainability of the activity.

- In recent years we have been studying and testing the effectiveness of different devices and selective elements in fishing nets **to avoid the unwanted fraction of the catch**.
- Some of these devices developed and tested by AZTI have already been **incorporated into fishing regulations by the Administration** (square mesh panel in trawl fishing by Spanish vessels in ICES division 6a).
- We are testing the effectiveness of active acoustic devices to **minimise or eliminate cetacean bycatch in trawl fishing**. Likewise, we are working to determine those operational factors in the fishery that can mediate it, so that they can be revised to reduce this bycatch.
- Together with the tuna freezer sector, **improvements have been incorporated into the code of good practice for responsible purse seine fishing**, helping in the selectivity of tuna purse seine fishing and minimising the impact on the marine ecosystem.
- Also with freezer tuna vessels, work has been done on the development of new sustainable materials to **mitigate the negative impacts of Fish Aggregating Devices (FADs)** on the ecosystem and work has been done on the **progressive replacement** by new non-meshing and biodegradable models.

2.1. MORE SUSTAINABLE FISHERIES

WE LEVERAGED THE INVOLVEMENT OF THE SECTOR

We have integrated fishing, scientific and administrative knowledge in marine governance for the design of new technologies and the search for solutions to reduce bycatch:

- **Anchovy catch rules** are defined by the fishing sector itself, as are the safeguards that ensure the sustainability of this species.
- **Measures to improve selectivity** on board trawlers defined and tested by the fishing sector to reduce discarding of unwanted species.
- We have developed a low-cost device that allows us to collect fishing data, moving towards **participatory management of the Basque artisanal fleet**.

Furthermore, in a bid to achieve standards for sustainable fishing and product traceability, we have accompanied the fleet in its commitment to the sustainability of the seas and their resources through the **achievement of certifications**.

- Collaboration with the sector has enabled the albacore tuna fishery of the Basque inshore fleet, which operates with trolling and live bait gear, to **obtain MSC Responsible Fishing certification**. This is a sector that has fished

around 8,000 tonnes of albacore tuna per year in recent years and which, in that period, has employed around 800 seamen.

- We have advised and monitored the entire process to achieve MSC certification for the Basque tuna fishing company Echebaster in the skipjack tuna fishery in the Indian Ocean.
- We have participated in successful fishery certification cases (participation in MSC assessments as independent experts or peer reviewers), for example for the Canadian Highly Migratory Species Foundation (CHMSF) or for the Swedish North Sea herring (SPFPO).



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2.2. CLEANER SEAS

Our challenge is to achieve sustainable development of our environment, so we seek solutions that promote the sustainability of marine and coastal ecosystems.

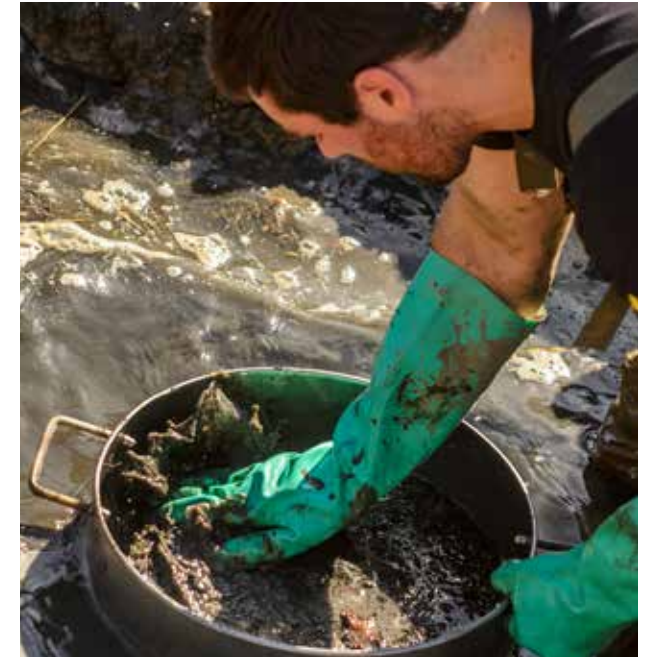
WE GENERATE KNOWLEDGE THAT IS TRANSLATED AND APPLIED IN PUBLIC POLICIES

Our work is aimed at determining the ecological and environmental status of estuarine and coastal areas. Such assessments are required by the main European directives on the protection and management of the marine environment, such as the Water Framework Directive (WFD) and the European Marine Strategy Directive (EMD). Some of our contributions to public policy have been:

- Framework Directive and European Marine Strategy: AZTI research staff have made a **relevant contribution to the generation of the scientific knowledge bases for the assessment** of the ecological and environmental status of estuarine and coastal areas, within the framework of the Water Framework Directive and the Marine Strategy Framework Directive

(MSFD). This knowledge base has been developed within the framework of the marine environment monitoring networks that we have been carrying out for more than 30 years for various entities in the CAPV

- The European Environment Agency has adopted the model and **"Marine Information Scheme" developed by AZTI** to manage the information that the Member States have to report for the implementation of the European Marine Strategy.
- **Network for assessing the ecological status of the estuaries and coasts of the CAPV, for the Basque Water Agency (URA)**, since 1994 tools have been developed to assess the physical-chemical status, the status of phytoplankton; the status of macroalgae; the ecological status of the benthos; or AZTI's Fish Index (AFI), and the status of fish. Some of these tools are used



worldwide.

WE ANALYSE THE ENVIRONMENTAL IMPACT AND MONITORING OF HUMAN ACTIVITIES

We study the environmental impact of human activities in the marine environment (marine energy, aquaculture, port expansions, dredging, dumping of dredging materials, wastewater treatment plants, etc.) by carrying out specific studies on their environmental impact.

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2.2. CLEANER SEAS

Some examples:

1. The characterisation and monitoring of dredging materials their relocation in waters of the maritime-terrestrial public domain (DPMT).

- **Eusko Jaurlaritzza-Basque Government (Directorate of Ports):** projects since 1994. Dredging plans and projects in the ports of the Basque Country.
- **Bilbao Port Authority:** monitoring plans for expansion works since 1992; Environmental Impact Study for aggregate extraction; studies for the characterisation and management of dredging materials.

2. Environmental monitoring of the receiving environment in relation to land-sea discharges (waste water, thermal discharges, etc.):

- Network for monitoring the state of the Nervión estuary (**Bilbao-Bizkaia Water Consortium**) since 1992.
- Environmental monitoring programmes of discharges from various wastewater treatment plants on the Basque coast (**Bilbao-Bizkaia Water Consortium, Busturialdea Water Consortium, Aguas del Añarbe, Provincial Council of Gipuzkoa, Txingudi Services**) since 1997.

- **Bahía de Bizkaia Electricidad:** Environmental impact study of the regasification plant and combined cycle thermal power plant (Bahía de Bizkaia) in the port of Bilbao; Environmental monitoring programme for the BBE plant in Zierbena.

3. Environmental impact studies of various projects: marine energy, aquaculture, port extensions, dredging, dumping, etc.

- **Government of Panama:** at the request of the Canal Authority, we participated in the drafting of a protocol for carrying out Environmental Impact Studies in the marine environment, especially focused on public works and marine aquaculture.
- At AZTI's proposal, Jacumar (National Advisory Board for Marine Cultures) accepted a methodology for Environmental Impact Studies applicable to sea cage culture, which was adopted in 2000 and includes: **a protocol for the identification of suitable areas for the installation of sea cage culture, and a protocol for the environmental management of cage aquaculture installations.**
- Drafting of the Protocol for the Conduct of Environmental Impact Studies in the Marine Environment, which aims to be the basis on which to base possible developments of Environmental Impact Studies (EIA) in the marine environment and is the methodological reference guide for the technicians of the competent administrations in the declaration of environmental impact, as well as for people involved in carrying out EIAs, both in the Basque Country and in any part of Spain, or even in other countries.
- **Aquarium of San Sebastian:** Environmental impact assessment of its extension.
- **Ente Vasco de la Energía:** Environmental Impact Study and Monitoring Plan (pre-operational and during construction) of the Biscay Marine Energy Platform (BIMEP) which has enabled it to obtain the necessary environmental authorisations to operate as an infrastructure for the demonstration of wave and offshore wind energy collectors.



2.2. CLEANER SEAS

To facilitate the monitoring and assessment of the state of health of the marine environment, we have developed several tools that are benchmark instruments worldwide:

- **AMBI: AZTI's assessment tool for the ecological and environmental state of the marine environment used worldwide.** It allows us to assess or predict the environmental impact that different human activities have produced or may produce, proposing the appropriate measures to minimise the impacts.
- **NEAT (Nested Environmental status Assessment Tool):** a free software programme used to assess the environmental status of the marine environment, within the framework of the European Marine Strategy Directive (MSFD), but which can be used to assess impacts on the sea (whether the effects of human activities on marine biodiversity or variations due to climate change). It has also been used to assess the environmental status of the Exclusive Economic Zone in the Basque Country, in order to identify gaps in current information and propose actions for the future.

AMBI, the international reference tool for the assessment of the marine environment

AMBI includes 10,638 species from all continents. It is already in use in more than 70 countries, from the Arctic to the Antarctic and across all continents. Moreover, in many countries it has become the official system for assessing ecological status.

The researcher Ángel Borja, one of the creators of AMBI, has received the European environmental education award from Setac. The Society of Environmental Toxicology and Chemistry thus recognises his contribution in key fields of marine environmental management such as the prevention of marine pollution or the sustainable use of resources.

In addition, Angel Borja is on the list of **Highly Cited Researchers**, i.e. he is in the top 1% most cited in his field worldwide, and Xabier Irigoien, scientific director of AZTI, is in the top 2%. Both researchers are also on the list of the **most influential researchers** in the world: According to the Stanford University ranking, of the more than 7 million professionals analysed worldwide, in the field of Marine Biology, Angel Borja is in 89th position worldwide and is the leader in Spain, while Xabier Irigoien is in 348th position worldwide and 6th in Spain.

2.2. CLEANER SEAS



WE WORK FOR THE CONSERVATION OF MARINE ECOSYSTEMS

We have carried out projects aimed at conserving marine biodiversity (species, habitats, spaces, processes) in order to achieve sustainable management of natural resources. To this end, we carry out studies for the declaration of marine reserves and for the protection of threatened marine species, and we propose strategies for the recovery of sites subject to management and restoration measures. Some of our achievements

include:

- **Seagrass restoration:** more than 4 years of survival in our seagrass transplants in depopulated areas, maintaining and increasing the ecological benefits of the marine environment.
- Basic studies for the declaration of San Juan de Gaztelugatxe and Rasa Marea de Algorri in Zumaia as **protected marine biotopes**.
- Technical assistance for carrying out the study to determine the **ecological land-sea**

continuity in the territorial area of the west coast of Gipuzkoa between Ulia-Jaizkibel-Txingudi for its declaration as a marine protected area.

- Development of the scientific bases for the **ecological management of the ports** of the Basque Country.
- Preparation of the **diagnosis of the marine environment of the Basque Country** and identification of future lines of work for the Biodiversity Strategy of the ACBC 2030.
- **LIFE INTEMARES project**, the aim of which is to achieve an efficiently managed network of Natura 2000 marine areas. AZTI participates in the campaigns to acquire new information for the identification of vulnerable and priority benthic habitats for conservation and the declaration of new marine protected areas.

WE MONITOR THE OCEANS

The development of operational oceanography systems for real-time monitoring of marine processes, complemented by numerical applications that provide forecasts of the future behaviour of the sea, is helping to improve safety and efficiency in all sectors of activity in the maritime and coastal economy.

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2.2. CLEANER SEAS

- We have worked with Euskalmet to develop a **system for observing and predicting sea conditions on the Basque coast**, capable of providing key information in the management of environmental crises such as accidental spills of hydrocarbons or other pollutants.
- We have launched the first historical surface current data product for Copernicus based on data from the European High Frequency Radar network. These observations of water mass transport are **key to improving the management of human activities in the coastal zone** (maritime safety, environmental impacts, sustainability of resource exploitation).
- We have participated in the drafting of the **Special Emergency Plan for the Basque Country in the face of Pollution of the Seashore - Itsasertza by which the Basque Emergency Response System** is articulated to safeguard the safety of people and their property in the face of those episodes of marine pollution that may affect the Basque coast.

Furthermore, at AZTI we seek solutions to tackle one of the scourges affecting our seas: marine litter, especially plastics, a threat not only to the health of our seas and coasts, but also to our economy and our communities. In this sense we have developed:

- **Digital tools for the management of marine** litter on beaches and to optimise its collection in the open sea.
- A system of cameras and artificial vision to **measure the contributions in floating waste that rivers discharge into the coastal zone**,

with the capacity to quantify these discharges and monitor the effectiveness of management policies in river basins.



The sinking of the Prestige: a school for operational oceanography

2022 marks the 20th anniversary of one of the biggest marine ecological disasters in Europe: the sinking of the Prestige. The catastrophe stirred the minds of our research staff: in contact with other European research centres, they designed, in record time, monitoring systems, and applied various drift simulation models that made it possible to anticipate its arrival on shore and direct efforts to collection at sea. This allowed the collection of huge quantities of oil at sea never before achieved with non-specialised vessels: just in the Basque Country, about 1,000 km far from the spill site, some 21,000 tonnes of waste were collected at sea (3,200 tonnes were collected on the Basque coast) thanks to the work of the fishing fleet.

The techniques and methods developed at that time have continued improving and are used today to tackle and minimise the impact of another major problem in our seas: the presence of litter and plastics.

It was also the origin of EuskOOS, the operational oceanography system for the Basque coast operated by Euskalmet with the advice of AZTI. This tool provides an accurate description of the current state of the sea along the Basque coastline and provides continuous predictions of future sea conditions, which helps in the prevention of emergency situations due to coastal maritime risk.

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2.3.

A SUSTAINABLE FOOD INDUSTRY

We enhance the innovative power of business by designing socially, economically, and environmentally sustainable solutions that motivate and inspire society to live and consume more responsibly.

WE PROMOTE RESPONSIBLE CONSUMPTION AND PRODUCTION

We have developed tools and methodologies that enable companies to produce more sustainably and help consumers make better informed choices:

- **ENVIRO-SCORE®**: AZTI and the University of Leuven have developed the integrated environmental labelling system for food and beverages ENVIRO-SCORE®, an intuitive 5-scale labelling (A | B | C | D | E) that communicates the environmental impact of food and beverages based on the European Product Environmental Footprint measurement methodology and promoting sustainability. It provides consumers with understandable information to identify and compare the most sustainable alternative between different food and drink products. In addition, it enables agri-food companies to reduce the generation of environmental impacts along the supply chain.
- **Sustainability of local food**. We have validated a system to **assess the sustainability of local food products**. This environmental, social and economic assessment methodology validated by NEIKER and AZTI, with the collaboration of Auzo Lagun S. Coop., makes it possible to highlight the benefits of local raw materials for

the design of more sustainable menus in the community sector.

- More than 70 eco-efficiency plans carried out have been successful in terms such as:
 - **Up to 62% less water consumption by canneries, a 61% reduction in waste**, and a new boost has been given to waste recovery to return it to the value chain..
 - A 71% reduction in water consumption and a 70% reduction in waste for a craft beer production company.
 - A 23% reduction in water consumption and a 35% decrease in waste generated for a catering company.
- Around 20 environmental guides for the food sector indicating Best Available Techniques (BAT) and other options for cleaner production and minimisation of discharges in the food sector



Fighting food waste

From 2022 to 2026, AZTI researcher David San Martin will be part of the EU Platform on Food Losses and Waste (FLW), a committee for the prevention of food waste which is made up of 45 members from all over Europe, 7 of which are research centres and only one (AZTI) from Spain.

2.3. A SUSTAINABLE FOOD INDUSTRY



WE PROMOTE THE CIRCULAR ECONOMY

Circular economy is an essential strategy for sustainability. At AZTI, we understood many years ago that the challenge is to find sustainable economic systems that allow us to make responsible use of available resources.

Back in 2003, we were pioneers in making the first biodiesel production capacity plant in Spai: the **Bionor plant** in Berantevilla. This first project for circular economy and the use of by-products that we promoted facilitated the creation of two other companies: Ekogras and Rafrinor, which led to the extension of the orange container to collect used oil throughout the Basque Country. A good example of an impactful and transformative project, generating employment, wealth, and a commitment to sustainability throughout society.

Since then we have continued to generate solutions, products, technologies, tools and strategies based on circular economy, **aimed at guaranteeing competitiveness in the short term and economic, environmental and social**

sustainability in the long term throughout the food chain.

Some examples:

- We have **demonstrated the viability of whey**, a waste product generated in cheese making, as feed for feeding sheep, which is very useful for cheese dairies with their own livestock. We have managed to reuse more than 80% of the whey generated by cheese dairies in the Basque Country.
- We have **validated the use of by-products generated in beer production**, such as bagasse and yeast, for use as ingredients in the feed used in aquaculture. In addition, AZTI received the Euskalit Best Practices Award on Circular Economy for its 3 Barriers System used in this initiative.
- A solution has been developed for the **integral recovery of vegetable by-products as an ingredient for animal feed**. We have tested retro-logistic solutions that make the centralisation of those products in a more

efficient processing plant. We have tested **coffee grounds in the HORECA sector and vending machines** as ingredients for ruminant dairy cattle (sheep and cattle) with positive results. We are currently working on developing the whole value chain for the production of the ingredient in an efficient and safe way. Grape stems, the only by-product produced in the winery that is managed as a waste, have been tested thanks to our initiative in rabbits, with very positive results. We are currently working on extending its scope to ruminant dairy cattle.

- A circular business model for fishing nets: from harvesting in port to product manufacturing. To date, a pilot test has been carried out whereby 35 tonnes of fishing nets have been recycled and used to manufacture products for the fishing sector itself.

2.3. A SUSTAINABLE FOOD INDUSTRY

WE PROMOTE ENTREPRENEURSHIP AND INNOVATION

The revitalisation of the industrial and social fabric is a challenge for AZTI. **We transform knowledge into business opportunities**, and we are committed to projects with companies as the main way to transfer the results to the industrial fabric.

- We are **founding members of EIT Food, the strategic programme of the European Institute of Innovation and Technology**, where we have managed to consolidate the creation of its Southern hub headquarters in the Basque Country for the development of the axes of entrepreneurship and innovation in the food value chain.
- Within the framework of EIT FOOD, within the South hub, EIT FOOD BASQUE has been created for the development of the axes of entrepreneurship and innovation in the food value chain. This involves carrying out incubation and acceleration actions for start-ups in the Basque Country over the next few years, with the participation of up to 60 new companies. In 2020 alone, and through the EIT Food FAN programme, we have promoted the training of 414 startups from 51 countries.
- We launched AZTIInnova, an exclusive



community for collaborative and technological innovation and the development of value for the food value chain. As a result, we have managed to create a business innovation community, where more than a dozen collaborative sessions have been held with more than 60 companies and agents of the sector to develop joint solutions that promote innovative consortium projects.

We promote the creation of New Technology-Based Businesses

We have promoted the creation and development of 13 new technology-based companies (NTBCs) and facilitated the transfer of technology for the development of new lines of business that will involve an investment of around 25 million euros and the generation of around 90 new jobs in the coming years: Bionor, Agricomerce, NFS, Roboconcept, Aerovisión, Iparprest, Matxixako Moluskoak, Ondartxo, Arraiak, Be&Be, Wild Pilots Foods, Paturpat, Lipigenia...

2.4.

NEW PROTEIN SOURCES TO MEET THE DEMOGRAPHIC CHALLENGE

In the face of the great challenge of feeding the world's population, research into alternative sources of protein plays a key role in the food value chain.



WE PROMOTE AQUACULTURE

At AZTI we seek sustainable alternatives (economically, socially, and environmentally) through aquaculture to cover the growing demand for fish.

- Collaboration with the Basque Government in the implementation of the **'Strategic Plan for Fisheries and Aquaculture. Euskadi 2020'** with the aim of promoting employment in the fishing sector, which has a long tradition in the Basque Country, and with the aim of generating new seafood in high demand, of local origin and with great brand potential.
- Development, together with the Basque Government, of an **experimental offshore marine farming area** and the creation of a marine area of special protection for marine aquaculture.
- Technical support in the creation of aquaculture **infrastructures in the open sea** (Medexa, Bizkaia). The research carried out by AZTI into mussel breeding and marketing has resulted in the creation of **Matxitxako**

Moluscos S.L., a new business project for industrial implementation in the open sea. We have carried out the development and analysis of biological, economic, environmental, and social feasibility studies to produce mussels from the open sea in the Bay of Biscay. Today it is already a reality and is marketed under the Amarra brand.

- Promotion of the **Balura aquaculture production and research centre** through a study in which it was found that the former Lemoiz nuclear power station, an industrial coastal area that has been unused for several decades, has exceptional conditions for aquaculture.
- **Long-lines to research and develop** bivalve culture on 50 m deep seabeds between Ondarroa and Lekeitio since 2011.
- Development of new, **more economically and environmentally sustainable feeds for sole fattening**, using vegetable by-products, potato and brewer's yeast as protein sources.

2.4.

NEW PROTEIN SOURCES TO MEET THE DEMOGRAPHIC CHALLENGE

WE ARE LOOKING FOR NEW ALTERNATIVE PROTEIN SOURCES

The protein transition, or the search for alternative protein sources, may be the answer to various challenges facing the food industry: the need for quality proteins for a good diet for society, reduction of the environmental footprint, reduction of dependence on raw materials from abroad... And its development may have considerable collateral benefits, such as increasing the production efficiency of certain industrial sectors. Some achievements in this area:

- We work to ensure that the production of alternative proteins is efficient and has a truly positive impact, by committing to the circular economy, reducing the generation of waste and promoting local production.
- We have developed different **novel fermentation processes from food by-products** (both liquid and solid) for the sustainable production of protein-rich microalgae and fungi. In the case of microalgae, we have achieved densities well above the usual ones (40 g/L compared to the usual 2-3 g/L) and with much more successful



colours (cream, instead of green); while in the case of mushrooms we have managed to increase the protein content in fermented fruit and vegetables from 10% to 20% in dry weight. This allows us to improve the added value and potential applications of these by-products as an ingredient in ruminant feed.

- We have developed several prototypes of products derived from these biomasses as protein extracts, with antioxidant and antimicrobial activity and with food functionality.

2.5. BECOMING MORE RESILIENT TO CLIMATE CHANGE

We are committed to one of the greatest challenges of the future: understanding the effects of climate change on the ocean, the coast and marine resources, defining strategies to adapt to these effects, and establishing mitigation measures.

GENERATING KNOWLEDGE THAT HELPS DEVELOP MITIGATION STRATEGIES

Thanks to the research and data collected over the last few decades, AZTI's studies have led to important discoveries:

- **The sea in the Bay of Biscay is warming** by about 0.2°C per decade since 1980 (by the end of the century from 1.5°C to 2.5°C) and there is a thermal expansion and an increase in sea volume of 3.2 mm per year (50 and 80 cm on the Basque coast).
- The drop in marine salinity and the stratification of the water column can **affect the productivity of the ocean**. There is also an acidification of the ocean that can affect the growth of marine organisms with calcium carbonate skeletons or shells, such as coralline algae, molluscs, crustaceans and many corals.
- Ocean warming will lead to an **estimated**



reduction in phytoplankton and zooplankton biomasses of 6% and 11% respectively by the end of the century. Reduced quantities of these two main components of the marine food web could reduce fish biomass in certain regions.

- We have identified a **northward shift of fish species populations**, the advancement of their cycle, trophic amplification and the expansion of certain invasive species.
- The distribution is shifting hundreds of kilometres towards the poles, there are changes in their seasonal cycle and the size of

the fish is decreasing. Species have less food and move away.

- **Southern species** such as anchovies, horse mackerel and sole **have taken over the North Sea, the Baltic Sea and the west of Scotland**, because the waters are now warmer. In addition, over the last decade, some species have expanded the space they occupy due to successful management under the European Common Fisheries Policy, which has led to the recovery of many stocks.
- In particular, mackerel stocks have doubled

2.5. BECOMING MORE RESILIENT TO CLIMATE CHANGE



in the last 15 years and the quantity of hake has increased fivefold in the same period. This study confirms what climate change research has predicted over the last decade in terms of northward shifts of species and the more pronounced impact on high-value species. This information is key to reviewing how some quotas are allocated in order to **manage stocks sustainably**.

- Rising seas can lead to **flooding in certain areas** of the coastline under neap tide conditions and damage to harbours, dykes and passes during storms. It is estimated that much of the beaches will be lost. In fact, between 21% and 29% of the supra-littoral part of the beaches (i.e. the higher part of the beaches that is not usually submerged at high tide) could be affected by the rising sea. We have developed a technological solution adapted to the detailed monitoring of sandy beaches. We have also worked on the development of recommendations for protection against adverse meteorological phenomena.
- Likewise, within the framework of the KOSTAEGOKI project developed for IHOBE, we have provided **information and tools to the competent bodies to deal with the effects of the rise in the average sea level** on the Basque

coast.

WE PROMOTE THE USE OF ALTERNATIVE ENERGIES

At AZTI we work to increase the diversity of energy sources, reduce greenhouse gas emissions, and diversify the economies of coastal communities.

- **Promoting biodiesel:** AZTI was, together with EVE, one of the driving forces behind Bionor, a plant for the production of fuel from used vegetable oil and other renewable materials that became the main generator of biodiesel in Spain.
- **Marine renewable energies:** Accompanying the Basque Energy Agency (EVE) in the creation of the **experimental marine energy park Biscay Marine Energy Platform (BIMEP):** we carried out the environmental impact study that allowed environmental approval of the project as a test and trial area for wave and offshore wind energy collectors. We have led two European projects, projects for the **Gipuzkoa Science and Technology Network, Ministry of Science and Innovation, Department of Economic Development and Competitiveness, Vice-Ministry of Technology, Innovation and Competitiveness, Technology Directorate of the Basque Government** to

2.5. BECOMING MORE RESILIENT TO CLIMATE CHANGE



overcome the non-technological barriers that may impede the future development of marine renewable energies:

- environmental risk and uncertainty about the possible environmental impacts of marine renewable energy developments;
- the need for Maritime Spatial Planning to overcome potential competition and conflicts between the marine renewable energy sector and other users of the sea;
- the complex and lengthy approval

processes for marine renewable energy projects.

- Within the framework of these projects, we have created the **WEC-ERA Tool** (Wave Energy Converters Ecological Risk Assessment), a tool to maximise efficiency in the use of marine energy and to assess the environmental risks associated with new wave energy capture projects, taking into account the potential impacts that these systems may have on natural ecosystems
- Furthermore, research samples have identified

that **4% of the Basque Country's coastal strip is viable for producing offshore wind energy. Thanks to this renewable energy source, 350,000 homes in the Basque Country could be supplied with marine energy in 2030, which would mean a reduction in emissions equivalent to 505,417 tonnes of CO₂.** ikerketen arabera, **Euskal Autonomia Erkidegoko kostaldearen %4 bideragarria da itsasoan energia eolikoa ekoizteko.** Energia-iturri berriztagarri horri esker, Euskadiko 350,000 etxe itsas energiaz hornitu daitezke 2030ean, eta horrek 505.417 tona CO₂ gutxiago isurtzea ekarriko luke

4th

Benchmarks in environmental management of seas and coasts

In the field of scientific production worldwide, in the 2015-2020 period, we are ranked 4th in terms of academic production in the field of Marine Spatial Planning; Ecosystem-based Management; Marine Strategy Framework Directive.

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AZTI for sustainability

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AZTI for health



AZTI
FOR HEALTH

3.1. SAFER AND HEALTHIER FOOD

We research and develop solutions to guarantee a healthy life, thus achieving the maximum wellbeing of the entire population.

WE PARTICIPATE IN THE DEVELOPMENT OF PUBLIC POLICIES

RRIS3 Strategy: AZTI has been one of the main promoters, in coordination with the Basque Government, of the Basque Government's RIS3 Smart Specialisation Strategy, identifying food, which generates 10% of Basque GDP, as a niche of opportunities with great potential for future development in the Basque Country.

We have worked on the drafting of the **Basque Country 2020 Strategic Plan for Gastronomy and Food** and we have acted as **technical secretary of the steering group "Food, Territory of Opportunity for the Basque Autonomous Community"**.

We have also contributed to **the scientific recognition of gastronomy:** we have participated as **promoters of the Basque Culinary Center (BCC)** and we launched, together with Mugaritz and, subsequently, the BCC, the **International Journal of Gastronomy and Food Science**. Published by Elsevier, the largest publisher of scientific literature in the world, this journal is an international communication space of reference for chefs and scientists.



3.1. SAFER AND HEALTHIER FOOD



WE RESEARCH ON FOOD AGAINST DISEASE

Health and nutrition form an inseparable binomial when it comes to preventing diseases and improving quality of life. The ability to provide dietary recommendations based on individual needs and preferences can help to address the nutrition and health situation in modern society. And, of course, they represent a great opportunity for the food industry. Some of our contributions are:

- **Research on food and cancer:**

- AZTI and ONKOLOGIKOA are collaborating on research projects on nutrition aimed at the prevention and reduction of cancer risk factors, as well as on specific nutrition once the patient has been diagnosed.
- To improve the nutritional status, eating pleasure and quality of life of oncology patients and avoid malnutrition, we have developed a range of food solutions (soups, seasonings and drinks).

- We have shown that women with breast cancer undergoing chemotherapy who receive a personalised nutritional recommendation according to their lipidomic profile have a better quality of life and improved metabolic and nutritional profiles than those who receive a general recommendation.

- **Prevention and treatment of obesity:** In order to be able to **make recommendations for the obese and overweight population, especially children**, we have developed an algorithm of

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nutritional recommendations according to lipidomic profile for the general population that allows us to personalise diet and supplementation recommendations to achieve a better nutritional status and weight control.

WE IMPROVE FOOD SAFETY

Globalisation, environmental contamination, allergens, etc. are elements of risk for consumers' health, which require scientific and technological advances and legal developments in the field of Food Safety. At AZTI, we believe that the early adoption of new technologies and systems for food safety and traceability management can provide a competitive advantage for the company. Below some of our research results:

- **Genetic identification systems:** We have developed a new line of kits that allow rapid genetic identification by PCR-Sequencing and Real Time PCR of anisakis in fish products; of different fish species, meats, cheeses... in fresh, frozen and even processed products; or the presence of mandarin in orange juice. We also have **ENAC accreditation for genetic methods** that allows us to authenticate any canned tuna

in just 24 hours, detecting, for the first time, whether the same product contains a mixture of yellowfin and bigeye tuna.

- **Bacteriophages:** We have made significant progress in the identification of bacteriophages as a tool for the replacement of antibiotics in fish farms, which offers a competitive advantage by offering safer products for people to eat.
- **Sensors:** An optical sensor system has been developed, based on the QIM (Quality Index Method), which makes it possible to determine the **quality of fresh hake** at first sale in an objective and automatic way.
- **Studies of the freezing process:** We have carried out a study of the freezing process in the tanks of tuna vessels of the fleets associated with both organisations ANABAC and OPAGAC and we have presented the results to the AESAN (Spanish Agency for Food Safety and Nutrition) on the capacity for "rapid" freezing at temperatures equal to or lower than -18°C, in order to be able to **market the product on an ad hoc basis.**

- **Technologies for food preservation:** AZTI researchers, in collaboration with other research centres and capital goods manufacturing companies, have developed and validated a **new ultra-high pressure homogenisation technology**. This technology represents a **new generation of equipment for processing and preserving liquid foods**. We have also collaborated in the creation of the company **Accua HPP Solutions**, a processing centre that offers food SMEs manufacturing services based on high-pressure technology that increases the shelf life of food and, consequently, facilitates export and reduces the turnover rate.

WE DO FOOD INNOVATION

We have developed, always with the consumer at the centre, hundreds of products based on specific nutritional requirements, convenience, comfort, quality, ethical and environmental concerns, and market competitiveness. **Here are some of our award-winning and featured products:**

- **Ecolumber** received the Carrefour award

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for the most innovative SME in the Basque Country with **Airnuts**, dried fruit snacks developed by AZTI.

- **Saroi Unaiak** cheese from the TGT cheese factory in Karrantza won the "Super Gold" award at the World Cheese Awards, the most important international gastronomic event of the year. AZTI has collaborated in the design

of this product within the framework of the Karlab project.

- **Paturpat**, the company created as a result of the R&D collaboration between the agricultural cooperative UDAPA and AZTI, has been recognised with the Lanzadera Award at the Fruit Attraction Fair for the best innovation and entrepreneurship project in recent years in

the fruit and vegetable sector.

- **Café Fortaleza** received the award for the most innovative Basque company of 2011 from the French multinational Carrefour for the decaffeinated coffee product with lime blossom and lemon balm developed together with AZTI.
- With **Zappore Froth & Foods**, dedicated to the production of aerosol food products, we have developed an orange foam with a high fruit content, for which a distribution agreement has been reached with Makro.
- We have collaborated with the company specialising in croquettes and typical Basque dishes, **Lautxo**, to improve the stability of croquettes, improving the frying process through research and innovation in breading coatings.
- For the company **Delicass**, we have produced a duck sirloin burger that stands out for its high duck sirloin content and its high sensory quality. To make this product, we have worked with different preservation and packaging technologies in order to guarantee the microbiological and sensory stability of the product during the desired shelf life. Important work has also been carried out in terms of formulation with different ingredients to achieve the required sensory characteristics (taste, smell, texture, appearance, etc.).

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3.1. SAFER AND HEALTHIER FOOD

- With **VENSY**, two SKANDIA ready-to-eat smoked salmon and cod tartares have been developed. They are presented as a solution adapted to today's consumers, offering them a product of high sensory quality and ready to eat.
- **VENSY** enpresarekin, kontsumitzeko prest dauden izokin eta bakailao ketuen SKANDIA tartarren bi erreferentzia garatu dira. Egungo kontsumitzaileari egokitutako soluzio gisa aurkezten dira, kalitate sensorial handiko eta kontsumitzeko prest dagoen produktu bat eskainiz.

We also work to respond to health needs in food through research and development of new nutritionally balanced formulations, adapted textures and the use of new technologies that have less impact on the nutritional properties and molecules of interest to health that are naturally present in food. Some recent examples:

- Together with the Spanish multinational **NATRA**, dedicated to the production and processing of chocolate and cocoa products, we have developed 5 multi-layer bars with a reduction of more than 30% of sugar, without

the use of artificial sweeteners or polyalcohols. The bars are marketed in the US market.

- With AZTI's technological advice, **Be&BeJuice** has used cold pressing as an extraction method to develop juices with a longer shelf life and high organoleptic quality.
- Through a patented process, we have managed to make dehydrated fruit and vegetable snacks with a crunchy texture. They are products with

no added sugars, no gluten, no preservatives, colourings or artificial flavourings, made without frying.



3.2. A SAFER FOOD VALUE CHAIN

IMPLEMENTING IMPROVEMENTS IN OCCUPATIONAL RISK PREVENTION SYSTEMS

The COVID crisis has highlighted the importance of the primary sector, which has emerged as key and essential, as well as an important generator of employment. At AZTI, we continue to contribute to improving safety and efficiency in all sectors of activity in the food value chain.

- We have developed a **Risk Prevention Management System by Models**, which allows us to assess and identify risks and make improvement plans appropriate to each vessel and type of fishing.
- We have improved the lighting conditions during net setting in purse seine fishing, so as to reduce the **occupational risks affecting fishermen during net setting**.
- We have implemented an intelligent real-time monitoring, warning and alarm system to **prevent accidents and incidents due to the improper presence of personnel in high-risk areas** during maintenance operations and critical activities in maritime-fishing facilities.
- We have developed two mechanical prototypes to achieve **more ergonomic working conditions during the production of artisan cheese** and thus promote the sustainability of the artisan cheese sector in the Basque Country.



Awards for R&D&I in Occupational Risk Prevention

AZTI has been awarded and recognised in different editions of the **Mutualia Award**, which aims to recognise the work of entities that develop a research, technological development or innovation projects in the field of Occupational Risk Prevention.

3.2.

A SAFER FOOD VALUE CHAIN

WE WORK TO INCREASE SAFETY AT SEA

AZTI's research staff work to improve coastal maritime risk predictions, optimise actions related to rescue and maritime safety. We also seek to have an impact on the tourism and leisure sector thanks to our video-monitoring systems for currents on beaches, which contributes to improving the signalling of risk areas, with special emphasis on the safety of coastal activities.

- The Ocean-Meteorological Network of the Basque Country, operated by AZTI for Euskalmet, is a fundamental tool both for dealing with adverse weather situations and for offering information of general interest to all types of users.
- The EuskOOS portal for the dissemination of information from the CAE ocean-meteorological network has become one of the most important assets of the territory and a reference for sectors such as fishing, maritime transport, marine leisure and tourism, as the coast and its resources -beaches, cliffs, tidal flats, ports, etc.-.
- The videometry tool applied to intelligent beach management, KOSTASystem, has made

it possible to improve the safety of beach users by providing the rescue services with real-time information on the state of the beach and support in locating currents that are dangerous for bathing. In addition, with innovative image processing tools, it provides real-time information on the impact of extreme maritime events such as overtopping and wave flooding, allowing for improved management of associated emergencies.

In the European elite of operational oceanographic research

AZTI is a full member of the European ocean observation organisation EuroGOOS, which highlights the quality of our research in the field of operational oceanography and marine research. EuroGOOS is an international non-profit organisation, made up of 44 members from 18 countries, which focuses on identifying priorities, developing strategies, improving cooperation and promoting the benefits of operational oceanography in Europe, as well as establishing an integrated, sustainable and accessible European Ocean Observing System (EOOS).

We close this report dedicated to AZTI's 40 years of history with the words of those who know us best, our collaborators and members of the AZTI Board of Trustees. We would also like to take this opportunity to thank them for their work and dedication.



Bittor Oroz

Vice-minister of Agriculture, Fisheries and Food Policy of the Basque Government. President of AZTI.



Miren Garmendia

Director of the Organisation of Inshore Fishing Producers of Gipuzkoa (OPEGUI)

"AZTI has developed its competence in the Basque Country, promoting research excellence, international presence in decision-making forums and proximity to the sector to understand its needs and transfer knowledge and technology so that it can advance and be sustainable in a highly competitive scenario."

"AZTI has contributed in a very important way, working hand in hand with us to develop exploitation rules and management plans for fisheries of great interest to our fleet, such as anchovy and albacore tuna. Without AZTI it would have been very difficult to develop these management plans."



Alfonso Saenz
General Manager of UDAPA.
Trustee of AZTI.

"AZTI has helped the food industry a lot in terms of sustainability and new products. I would highlight, fundamentally, the system for measuring environmental impacts, ENVIROSCORE, as well as the measurement of the environmental impact of local products. It has also taught us to listen to consumers and to collaborate in the agri-food industry so that we take on the challenges that we have in all markets."



Ignacio Muñoz
CEO of Angulas Aguinaga.
Trustee of AZTI.

"AZTI has become a benchmark in the world of food and, above all, in sustainability, in the reduction of inputs, both water and energy, in order to have more efficient production. Also, in the consumer and, fundamentally, in consumers with special needs: those looking for precision food, specific solutions for specific groups, from children, seniors, sportsmen and women..."



Arantxa Tapia

Minster for Economic Development, Sustainability and the Environment and President of BRTAko (Basque Research & Technology Alliance)

"AZTI has opened up a different path towards diversification, towards the creation of new products, towards the generation of new companies, and all of this associated with the international sphere. As a small country if we need to work in international networks, with the knowledge that exists in other places, and trying to adapt it to the Basque Country as well. I believe that we still have a long way to go and that AZTI's international position can also allow us to open the way for the internationalisation of our companies."

To many more years of putting science and technology at the service of a healthier and more sustainable society.





MEMBER OF
BASQUE RESEARCH
& TECHNOLOGY ALLIANCE
