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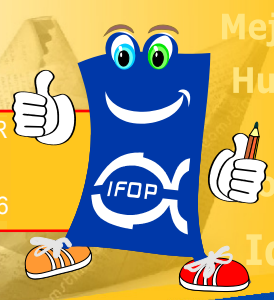

IFOP
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BULLETIN

El Ifopino



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CHILE IS AT A KEY TRANSITION POINT: The Blue Economy—The New Value of Marine-Based Production

This concept reinforces the commitment to achieving sustainability in the fishing sector—encompassing both capture fisheries and aquaculture—by promoting the responsible use of resources and the conservation of ecosystems.

The blue economy, which seeks to derive value from the seas while protecting ecosystem health, offers significant opportunities to boost our country's fisheries exports. Chile possesses the natural conditions, scientific capabilities, and extensive production and management expertise to sustainably capitalize on new avenues for sectoral development linked to marine conservation, blue carbon, and climate change adaptation.

The blue economy concept reinforces the commitment to sustainability in the capture fisheries



and aquaculture sectors, promoting responsible resource use and ecosystem conservation. "This enables the sector to realize its growth potential, shifting from volume-based production to a model that generates greater value through innovation, technology adoption, product diversification, and the development of both domestic and international markets," the statement notes.

Editorial commitee
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Luis Parot, Executive Director of the Fisheries Development Institute (IFOP), asserts that Chile is at the forefront of the region in terms of seizing blue economy opportunities. “The remaining challenge to fully capturing these opportunities is to coordinate sectoral efforts into a unified national strategy that addresses both short- and medium-term needs.”

Today, our country is at a pivotal transition point, moving from a fragmented ocean economy toward an integrated blue economy strategy; while it stands out for its international leadership, it also faces local regulatory and environmental challenges. “Chile has been making strides toward becoming a regional leader in the blue economy, thanks to a combination of marine conservation policies, the promotion of ocean innovation, and the coordination of sustainable community projects. While there is still work to be done, the progress made as a country is moving in the right direction,” explains Parot.

With a 62-year history, IFOP serves as the Chilean State’s scientific and research arm, responsible for providing the biological, fisheries, oceanographic, and socioeconomic evidence that underpins public management decisions.

Among other functions, it plays a central role in establishing safe biological catch limits, assessing the status of marine populations, and monitoring environmental variability to ensure that any marine economic development respects ecosystem resilience; it currently carries out more than 60 research projects across various fields.

In terms of foreign trade, fishery product exports grew at an average annual rate of 7% between 2021 and 2025. In 2025, two million tons were exported; 55% of this volume came from the extractive fishing sector—with jack mackerel standing out as the species with the highest export volume—while the remaining 45% originated from aquaculture, led by Atlantic salmon.

Overseas shipments generated US$9.18 billion in revenue in 2025, representing nearly 8% of the country’s total exports for that year. Additionally, Chile imported 216,000 tons of fishery products valued at US$639 million, with fish oil, canned tuna, and frozen Ecuadorian shrimp standing out in terms of volume. “Despite advances in aquaculture and fisheries management over recent decades, much remains to be done to diversify the production base, technically strengthen coastal communities, and improve the balance between economic development and environmental protection—thereby achieving greater sustainability as we transition toward what we call a ‘blue economy,’” says Luis Parot.

He adds: “Chile enjoys a privileged global geographic position, as its coastline lies within one of the world’s most productive zones. Its vast extent enables the development of diverse fisheries—driven by the variety of available resources (pelagic, benthic, demersal, crustaceans, etc.) and the range of operational scales (artisanal and industrial fishing, small-scale aquaculture, and medium- to large-scale aquaculture enterprises). This represents enormous potential that is growing in response to global demand for quality products.”

Therefore, it is crucial to take timely action to strike a balance between environmental capacity and the resource demands of sectoral stakeholders—a dynamic further complicated by the effects of climate change, which necessitate monitoring and the implementation of mitigation strategies.

“Moreover, while we have historically operated under an extractivist paradigm, we have now made significant strides toward sustainability-oriented management of fishery resources and the protection of the aquatic environment,” notes the executive director.

In this context, provided a balance is struck between these factors and the country’s social and economic needs, the potential for industry expansion—as well as for the growth of the artisanal and small-scale fishing and aquaculture sectors—is immense.

The blue economy presents several challenges for Chile. Regarding governance, the national marine ecosystem is regulated by multiple institutions, including the Undersecretariat of Fisheries and Aquaculture, Directemar, and the Ministries of Economy, Environment, and Defense, among others.



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"This institutional diversity," explains Luis Parot, "slows down permitting and oversight processes to some extent. Furthermore, there is a lag in updating and implementing national guidelines for coastal zone usage—tools that are essential for resolving spatial conflicts between conservation efforts, local communities, and industry."

PENDING ISSUES

The blue economy presents several challenges for Chile. Regarding governance, the national marine ecosystem is regulated by multiple institutions, including the Undersecretariat of Fisheries and Aquaculture, Directemar, and the Ministries of Economy, Environment, and Defense, among others. "This institutional diversity," explains Luis Parot, "slows down permitting and oversight processes to some extent. Furthermore, there is a lag in updating and implementing national guidelines for coastal zone usage—tools that are essential for resolving spatial conflicts between conservation efforts, local communities, and industry."

Source: El Mercurio de Santiago

IFOP Presents an Update on the 2026 El Niño Event Assessment to the Chamber of Deputies' Fisheries Commission

ERVING AS THE CHILEAN STATE'S PRINCIPAL SCIENTIFIC ADVISOR ON FISHERIES AND AQUACULTURE

On Wednesday, September 23, a delegation from the Fisheries Development Institute (IFOP)—led by the Head of the Fisheries Research Division, Fisheries Engineer Jorge Castillo; the Head of the Economics Department, Dr. Camilo Torres; and the Head of the Oceanography and Environment Department, Dr. Jaime Letelier Pino—presented findings to the Chamber of Deputies' Commission on Fisheries, Aquaculture, and Maritime Interests. They detailed the Institute's ongoing monitoring of environmental conditions and extreme climate events—such as El Niño—that affect fisheries, as well as the associated economic impacts.

Additionally, they highlighted the importance of strengthening the ASIPA research program to ensure it encompasses sufficient studies to accurately assess the status of fishery resources and guarantee their long-term viability. They also emphasized the need to replace IFOP's primary research vessel, the *Abate Molina*—which has been in continuous operation for 36 years—with a modern fisheries and oceanographic research vessel. The IFOP presentation was very well received.

Dr. Letelier demonstrated the evolution of the 2026 El Niño event along the South American and Chilean coasts, its effects on resource availability and reproductive cycles, and forecasts for the coming months. This analysis was made possible by an advanced tool developed by IFOP: the Integrated Ocean Monitoring System (S.I.O.M., https://siom.ifop.cl/). Regarding the information provided by IFOP, Dr. Letelier explained how the "Coastal El Niño" event was detected by IFOP—in collaboration with IMARPE and IPIAP—off the coasts of Ecuador, Peru, and Chile. The event emerged and intensified starting in February 2026, whereas NOAA did not officially classify it until June.



Forecasts indicate that the event is becoming intense to strong and is projected to last at least until the autumn of 2027.

In this context, Dr. Camilo Torres outlined the potential consequences for artisanal fishing and the industrial sector, citing economic variables such as landing values, employment (both direct and indirect), and exports, among other relevant socioeconomic and production-related aspects in northern Chile.

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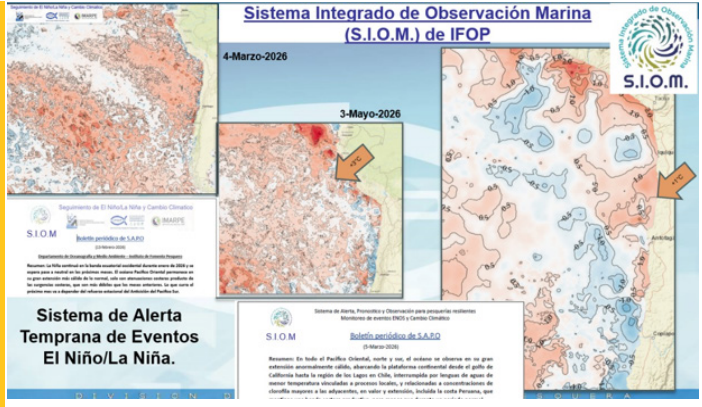

Finally, Jorge Castillo described IFOP's work on developing an Integrated Ocean Monitoring and Modeling System (SIMMO).

This system will integrate environmental information, fisheries and aquaculture data, and short-, medium-, and long-term models into a single digital platform. Simultaneously, the SIOM and CHONOS systems continue to be enhanced, alongside integration efforts with strategic partners such as the National Fisheries Service (SERNAPESCA), the Navy Meteorological Service (SERVIMET), and the Navy Hydrographic and Oceanographic Service (SHOA).

The event highlighted the importance of the monitoring and strategic information IFOP provides regarding events of this nature and the management of national fisheries. Furthermore, IFOP's key role in the Inter-institutional Committees for National and Regional Environmental Contingencies was underscored, as was its participation in the "El Niño and Climate Change" roundtable for northern Chile, coordinated by SUBPESCA's Zonal Director, Marcos Soto Díaz.

For IFOP TV and the link to the news story:

IFOP Strengthens Oceanographic Monitoring in Caleta Río Seco with New Chilean-Technological Buoy

In the Tarapacá Region, very close to the mouth of the Loa River, lies Caleta Río Seco, one of the most productive artisanal fishing areas in northern Chile. Its fishermen harvest important marine resources, mainly sea urchins and octopus, which are later sold and even reach supermarket chains.

It is precisely in this location that the Fisheries Development Institute (IFOP) is taking another step in strengthening ocean observation and generating environmental information for the coastal zone.

In addition to the meteorological station that IFOP already operates in Caleta Río Seco, a new MUSUX model oceanographic buoy has been added, expanding the area's environmental monitoring capabilities.

The buoy was acquired by IFOP from the Chilean company Wolke, and its installation was made possible through the collaborative work of specialized personnel from the Fisheries Development Institute (IFOP) and Southern Tech Solutions, incorporating top-quality Chilean technology.

Its installation required a significant technical and logistical effort, including the transport and preparation of the equipment, coordination with the fishermen of Caleta Río Seco, assembly of the buoy's various components, preparation of the mooring system, installation and configuration of sensors, and finally, its deployment and commissioning at sea.

This new platform will strengthen the continuous collection of oceanographic data and complement the records obtained from the meteorological station located in the area, moving towards integrated observation of ocean and atmospheric conditions.

One of the most important aspects of this initiative is that the data generated by the buoy is transmitted in real time and can be viewed directly through an IFOP web platform. In this way, the information is not restricted exclusively to the scientific community, but is available to the general public, faci-







litating its access for artisanal fishers, researchers, institutions, and the community at large.

Real-time data can be accessed at:

https://giscc.ifop.cl/boya_ifop/public/

With this installation, IFOP continues to strengthen its oceanographic and meteorological observation capabilities and, at the same time, advances its commitment to generating, integrating, and making environmental information publicly available, bringing scientific knowledge closer to coastal communities and contributing to a better understanding of ocean conditions.

Full House for Talk "Seabirds and Fishing: Progress and Challenges in Mitigating Bycatch"

On Friday, August 28, at the Fonck Museum in Viña del Mar, the talk "Seabirds and Fishing: Progress and Challenges in Mitigating Bycatch" was held. It was presented by IFOP researcher Luis Adasme.

The talk was a complete sell-out, as in addition to the general public who attend the weekly science sessions every Friday, an entire class and their teachers were also present. A very interactive session was held with the attendees, and the IFOP professional answered all their questions in a very engaging and educational way after the event. This is part of IFOP's commitment to sharing science with the community.

Topic of the Talk

Globally, biodiversity is progressively declining due to unsustainable development that degrades natural habitats, drastically increasing the loss of species. Seabirds are no exception to this scenario, and in recent decades their populations have suffered a reduction, threatening several species with extinction.

Seabirds are considered important bioindicators of the health of our oceans (Sentinels of the Sea). They are key to maintaining the balance of the marine ecosystem, in addition to participating in all the biochemical processes of our oceans.



Chile is considered a center of seabird biodiversity. In this regard, approximately 109 species of seabirds have been reported. Furthermore, of the 22 albatross species protected by ACAP (Agreement on the Conservation of Albatrosses and Petrels), at least 12 regularly visit Chilean territorial waters during their migrations; only two species have established colonies on southern islands within the national territory. Various stages of the life cycle of these species overlap with fishing operations in various fisheries in national waters, resulting in mortalities.

The current General Law on Fisheries and Aquaculture incorporates new concepts and objectives in the area of marine resource sustainability, as well as conservation goals through an ecosystem approach to fisheries regulation. In Chile, significant efforts have been made to mitigate the interaction of fishing with seabirds, showing substantial decreases in the incidental catch of these species; however, major challenges remain.

Professional Profile: Luis Adasme

A marine science professional (PUC), with a diploma in fishing gear and equipment (PUCV) and a Master's degree

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in Aquatic Resource Management (PUCV). A researcher at the Fisheries Development Institute, with extensive experience in research and data analysis of demersal fisheries in the southern region. She is currently part of the research teams for the projects "Research on Discards and Incidental Catch in Demersal Fisheries" and "Research on the Status of Demersal Fisheries in the Southern Zone: Monitoring Program for the Status of the Main National Fisheries." Since 2010, her work has focused on research in fisheries biology and population dynamics of demersal fish, with an interest in issues related to the bycatch and incidental capture of seabirds within an ecosystem-based approach. In this context, she is a member of the Chilean Seabird Working Group (Biodiversity Scientific Committee) and is the official Chilean representative to the Seabird Bycatch Working Group of the Agreement on the Conservation of Albatrosses and Petrels (https://www.acap.aq/es/grupos-de-trabajo/seabird-bycatch-working-group).

Larval Monitoring Strengthens the Sustainability of Mussel Farming in Southern Chile

With 129 participants from the production sector, public agencies, academia, and research centers, the Fisheries Development Institute (IFOP) concluded the 13th phase (2025-2026) of the Monitoring and Surveillance Program on Mussel Larval Availability, an initiative that generates strategic information to support the sustainability of Chilean mussel farming and decision-making in one of the country's main aquaculture sectors.

Mussel production depends on a fundamental biological process: the natural availability of seeds collected from the environment. Unlike other aquaculture activities that may depend on controlled hatchery production, Chilean mussel farming relies primarily on the collection of wild seed. Therefore, knowing precisely when, where, and under what environmental conditions periods of peak larval abundance occur is essential for production planning and reducing uncertainty.

In this context, the program implemented by IFOP and funded by the Undersecretariat of Fisheries and Aquaculture has established one of the most extensive monitoring series in the country for mussel larvae. The work carried out allows for an understanding of spawning dynamics and the oceanographic and climatic factors linked to the variability in seed collection success in different areas of importance to mussel farming.

During the 2025-2026 season, researchers presented results from the main objectives of the Monitoring Program, demonstrating the importance of maintaining long-term, systematic observations to interpret the spatial and temporal variations in larval availability. The analyses conducted allowed



for the comparison of sectors with contrasting behaviors, the identification of environmental signals associated with larval abundance, and the evaluation of the production sector's own perception of the conditions observed during the last collection seasons.

The presentations given during the workshop are available for download below. We invite researchers, aquaculture professionals, students, authorities, and the general public to review the content shared by each presenter, which provides updated scientific background on larval monitoring, environmental conditions, and sectoral perceptions.

The information generated by the program constitutes a practical tool for producers and seed collectors, contributing to better planning of operations and production strategies. At the same time, it provides relevant scien-

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tific background for sector stakeholders and public agencies responsible for aquaculture management, strengthening evidence-based decision-making processes.

One of the highlights of this stage was the integration of biological, environmental, and climatic data, allowing for a broader understanding of the factors that influence seed availability in the coastal systems of southern Chile. This approach is particularly relevant in the face of climate variability and oceanographic events that can alter productivity patterns and affect the sustainability of aquaculture activities.

Those wishing to learn more about the results of this monitoring and access updated information on the availability of mussel seed can visit the Endemic Seed platform, developed by IFOP, available at: www.ifop.cl/monitoreo-larvas-de-mitilidos

The dissemination workshop held on August 24th allowed for sharing this information with a maximum audience of 129 remote participants, reflecting the growing interest in accessing applied scientific information and strengthening the links between research, public administration, and the productive sector. The event brought together mussel farmers, representatives of public services, researchers, academics, and professionals involved in the development of Chilean aquaculture.

The day's program included presentations that reflected the diverse perspectives surrounding the sustainability of mussel farming. Along with a presentation by Paulina Vera from the Undersecretariat of Fisheries and Aquaculture, members of the program team—Cristian Segura, Cristina Stuardo, José Videla, Macarena Herrera, and Oscar Ramírez—presented on the various components of larval, environmental, and sectoral perception monitoring developed during this phase. (For more details, see the content of each presentation above.) Both the Mussel Larval Availability Monitoring and Surveillance Program and the Red Tide Program are initiatives developed by IFOP's Aquaculture Research Division, through its Environmental Department, aimed at generating scientific knowledge to support the management and sustainability of national aquaculture. A particularly noteworthy moment was the presentation by Oscar Espinoza, from IFOP's Red Tide Program, on the El Niño event and its relationship with the Antarctic Oscillation for the 2026-2027 season. His presentation exemplified the connection between different lines of institutional research serving the sustainability of national aquaculture.

Beyond the dissemination of information, the event represented an opportunity to strengthen collaborative networks with academia, research centers, and government bodies that support this ongoing research program. The exchange of experiences and needs between users of scientific information and research teams allows for the formulation of new research questions and progress toward increasingly useful monitoring tools for coastal areas.

After the execution of thirteen consecutive stages, the Monitoring and Surveillance Program on the Larval Availability of Mussels continues to consolidate itself as a strategic source of information for Chilean mussel farming, providing publicly accessible scientific knowledge that helps reduce uncertainties, generates relevant information to address adaptation to environmental changes and supports the sustainable development of a key activity for the coastal communities of the south of the country.

IFOP brings scientific research and knowledge of aquatic systems closer to the new generations at the XXII Regional School Research and Innovation Congress

Professionals from the Aquaculture and Fisheries Research Divisions participated in a scientific dissemination day organized by PAR Explora Los Lagos, bringing students and teachers closer to the work carried out by the Institute in hydrobiological health, environment, fluvial, estuarine, and marine ecosystems, aquaculture, and fisheries.

With the purpose of bringing scientific research closer to the new generations and strengthening the bond between public research and educational communities, professionals from the Fisheries Develop-

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ment Institute (IFOP) participated on August 26 and 27 in the XXII Regional School Research and Innovation Congress, organized by the Regional Associative Project (PAR) Explora Los Lagos, at the Arena Puerto Montt facilities. The activity gathered more than 800 attendees, including students, teachers, academics, researchers, and representatives from various institutions linked to science, education, and innovation in the region, consolidating itself as one of the main meeting spaces for school scientific dissemination.

IFOP's participation allowed students, teachers, and educational communities to learn, through demonstrative and interactive experiences, about part of the research and tools used to generate scientific information on marine, fluvial, and estuarine aquatic ecosystems, fishery resources, and processes associated with aquaculture.

More than presenting scientific results in an expository manner, the initiative sought to show how knowledge is built that subsequently contributes to understanding, monitoring, and supporting the management of the country's aquatic resources and ecosystems. In this context, scientific dissemination constitutes a relevant tool to bring research closer to society and encourage new generations to understand the existing link between science, territory, and productive activities.

Applied research that reaches the classrooms

During both days, IFOP set up an interactive space organized into thematic stations, where professionals from its different areas shared knowledge and experiences linked to hydrobiological health, the environment, fisheries, and aquaculture.

From the Department of Hydrobiological Health, Dennis Cisternas, María Paz Navarrete, and Katherine Subiabre developed demonstrations related to procedures used in research and diagnosis, including molecular analysis, PCR techniques, bacterial cultures, and macroparasite studies. These activities allowed students to get closer to methodologies that are part of the processes through which information is obtained to evaluate the health status of aquatic organisms and systems.

Meanwhile, from the Department of Environment, Mario Ortiz and Macarena Herrera addressed content related to fluvial, estuarine, and coastal ecosystems, highlighting the importance of understanding the connection between these environments and the productive activities that depend on them. Mario Ortiz explained the case of Didymo (*Didymosphenia geminata*), an exotic microalga considered a pest that spreads in fresh watercourses, whose dispersion is limited upon reaching the physicochemical conditions of estuarine waters at river mouths. Likewise, he explained prevention measures to avoid its dispersion, raising awareness among the audience regarding the associated environmental risks and the importance of monitoring invasive species and pests of ecological relevance for the conservation of aquatic ecosystems. All of this was presented through an aquarium with a live Didymo bloom, a microscope to observe the cellular appearance of this pest species, and an educational model designed to teach about the various tourism activities carried out in rivers and how these activities can contribute to the dispersion and propagation of this microalga in fluvial ecosystems.

On her part, Macarena Herrera presented the existing link between estuarine systems and mussel farming, using the empirical model of the mouth of the Puelo River, an aquarium with organisms native to the marine benthos to discover part of the epiphytic community of mussel seed collectors as settlement units in mytilid seed collection areas, and other games that allow content integration in a playful way. The researcher explained how these environments provide favorable conditions for seed settlement that later support regional aquaculture production, also highlighting the contribution of public science through dissemination tools such as the interactive platform Semilla Endémica, which allows bringing this knowledge closer to the educational community and the general public.

Meanwhile, the Fisheries Division, represented by José Pérez with the support of Katherine Subiabre, carried out practical demonstrations using instruments employed in fisheries research, such as ichthyometers and scales, in addition to a real-time dissection of a golden kingclip. The activity allowed explai-

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ning directly how biological information on fishery resources is obtained and its usefulness for the knowledge and monitoring of fisheries.

The importance of integrating research and scientific dissemination

One of the main contributions of this initiative was the coordinated participation of professionals from the Aquaculture and Fisheries Research Divisions, allowing them to present a broad view of IFOP's scientific work to the school community.

This integration is particularly relevant in a territory like the Los Lagos Region, where fishing and aquaculture activities maintain a close relationship with environmental conditions and coastal ecosystems. Understanding these interactions requires generating knowledge from different disciplines and, at the same time, communicating it in an accessible way to those who inhabit and carry out their activities in these territories.

For IFOP, bringing this knowledge closer to students and teachers also represents an opportunity to make the role of applied public research visible, showing that behind the information used to understand hydrobiological resources and support decision-making, there is scientific work that involves observation, sampling, analysis, experimentation, and systematic data generation.

In this way, dissemination activities not only spark interest in marine sciences, but also help educational communities recognize the value of scientific research in addressing environmental, productive, and social challenges present in their own territories.

A perspective from PAR Explora Los Lagos

"From the Regional Associative Project Explora Los Lagos, we are tremendously grateful for the participation of around twenty institutions from our region's science ecosystem, as in the case of the Fisheries Development Institute, because with creativity, patience, and much dedication, they accompanied us and helped bring relevant knowledge and information about the work IFOP does to many children, young people, and also teachers who were the protagonists of the two days of socialisation of science, knowledge, technology, and innovation at the twenty-second School Research and Innovation Congress, held at the Arena Puerto Montt events center."

— Daniela Pradenas Field, Communications Manager, Regional Associative Project (PAR) Explora Los Lagos

New opportunities to bring science to the territory

The experience developed in the XXII Regional School Research and Innovation Congress constitutes an instance that can project towards new collaboration and scientific dissemination actions, especially considering the diversity of research lines developed by IFOP and the need to strengthen meeting spaces between researchers, educational communities, and territories.

In this sense, participation in initiatives of this type allows identifying new opportunities to generate educational activities, scientific demonstrations, and knowledge-sharing spaces, helping students learn firsthand about the work of those who research the ecosystems and resources that form part of their environment.

The connection with educational communities thus constitutes a complementary component of applied research: while scientific programs generate information to understand and support the



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management of hydrobiological resources, dissemination actions allow sharing that knowledge with society and strengthening a scientific culture linked to the territory.

The joint participation of the Aquaculture and Fisheries Research Divisions in this activity also reaffirms the importance of integrating capabilities and disciplines to communicate IFOP's scientific work, bringing research closer to new generations and contributing to forming a more informed citizenry regarding the challenges facing the fisheries, aquaculture, and environmental sectors.

Executive Secretary of the Agreement on the Conservation of Albatrosses and Petrels (ACAP) meets with IFOP professionals

JONATHON BARRINGTON, EXECUTIVE SECRETARY OF THE AGREEMENT ON THE CONSERVATION OF ALBATROSSES AND PETRELS (ACAP), MEETS WITH PROFESSIONALS FROM THE FISHERIES DEVELOPMENT INSTITUTE (IFOP).

During the meeting, held at IFOP's facilities in Valparaíso, various aspects of Chile's commitment to the conservation of albatrosses and petrels were discussed, with a particular focus on measures to prevent and reduce seabird bycatch in national fisheries.

Mr. Barrington's visit to IFOP was part of a broader trip to Chile that included a visit to the city of Punta Arenas, where he toured potential venues for the Agreement's upcoming Advisory Committee meeting, scheduled to take place in Chile in August 2027.

Luis Adasme—an IFOP researcher, member of the Chilean Seabird Working Group (Biodiversity Scientific Committee), and Chile's official representative to the ACAP Seabird Bycatch Working Group—commented on the importance of the



visit and the topics addressed: "The visit to IFOP by ACAP Executive Secretary Jonathon Barrington provided an opportunity to learn more about ACAP and discuss the work being done regarding seabird bycatch and the progress of Ecological Risk Assessments (ERAs) in the region, as well as to explore potential future collaboration between ACAP and IFOP in this area. Chile contributes to international efforts aimed at conserving albatrosses and petrels—species facing various threats in the ocean, including bycatch associated with certain fishing activities."

Chile Moves Toward New Governance for Benthic Fisheries

REPRESENTATIVES FROM PUBLIC INSTITUTIONS, ACADEMIA, AND CIVIL SOCIETY PARTICIPATED IN A NEW FORUM FOR DIALOGUE AND COLLABORATIVE WORK UNDER THE AUSPICES OF THE CHILE-MEXICO FUND.

Valparaíso, September 2026. Strengthening the participatory management of benthic fisheries and moving toward more effective co-management were the primary objectives of the third workshop titled "Small-Scale Fisheries Co-management: An Institutional Perspective," held on August 25 and 26 in Valparaíso.

The event took place within the framework of an international coope-

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ration project funded by the Chile-Mexico Fund—managed by the cooperation agencies of both countries, AGCID and AMEXCID—and brought together 30 representatives from the Undersecretariat of Fisheries and Aquaculture (SUBPESCA), the National Fisheries and Aquaculture Service (SERNAPESCA), the Fisheries Development Institute (IFOP), the Austral University of Chile (UACh), and the NGO Conectar para Conservar.



Over the course of two days, participants analyzed the main challenges currently facing the institutional system associated with benthic fisheries co-management in Chile. The meeting served as a space for dialogue and collective building, aimed at understanding the evolving roles of various institutions, existing collaborative relationships, and the gaps that still hinder more coordinated and participatory management. Through group activities, the workshop successfully incorporated diverse institutional experiences and perspectives, acknowledging progress made while identifying areas where coordination needs strengthening and new working strategies must be developed.

The workshop also provided an opportunity to review the functioning of key co-management mechanisms currently in place for open-access areas. In this context, participants analyzed factors that facilitate stakeholder participation as well as those that act as obstacles to achieving more effective governance of benthic resources. The second day of work concluded with the creation of a national matrix of gaps, incorporating—for each issue—its causes, consequences for management plans, the institutions involved, and potential solutions. The diversity of participating stakeholders allowed for a common challenge to be addressed from various perspectives: how to consolidate co-management as an effective tool for the administration, conservation, and sustainable use of benthic resources.



public institutions, academia, researchers, and civil society organizations involved in the management of these resources.

Nancy Barahona Toledo, the project leader and a senior researcher at IFOP, emphasized that "the conservation and sustainable use of benthic resources depend not only on improved management tools but also on the ability of the institutions and stakeholders involved to work in a coordinated, participatory, and collaborative manner."

She further noted that "experiences like this demonstrate that moving toward sustainable management requires strengthening the ties between researchers, those who design and implement public policies, and those who directly participate in resource management and conservation processes."

The work carried out during the workshop provides new inputs to further strengthen the institutional framework underpinning the co-management of benthic fisheries in Chile. The challenge ahead lies in transforming the identified gaps into opportunities for improvement by strengthening coordination and participatory mechanisms, thereby advancing toward more effective, participatory, and sustainable management.

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After several months of monitoring, IFOP detects the first signs of mussel reproductive activity in the Los Lagos Region

IFOP's Monitoring and Surveillance Program for Mytilid Larval Availability—currently in its Stage XIV since March 2026—has detected a sharp increase in mussel larvae, with counts exceeding 500,000 larvae per cubic meter in Pichicolo. Starting in mid-August and early September, researchers began detecting the presence of pre-competent mussel larvae, marking the first signs of new reproductive events for the species.

Since March of this year, the Fisheries Development Institute (IFOP)—through the Environment Department of its Aquaculture Research Division—has been conducting Stage XIV of the Monitoring and Surveillance Program for Mytilid Larval Availability, continuing a monitoring series that has been underway in the Los Lagos Region since 2013.

During the initial months of this stage, sampling across the various monitoring sites did not record significant abundances of mussel (**Mytilus chilensis*) larvae. This situation persisted until mid-August, when researchers began to observe changes in larval dynamics.

Consequently, from mid-August onwards—with increasingly clear evidence by early September—the presence of pre-competent mussel larvae has been recorded. This serves as a significant signal within the species' reproductive cycle and indicates that new gamete releases have occurred in the natural populations being monitored. A signal marking a key moment in the reproductive cycle

The detection of pre-competent larvae is a particularly important indicator for tracking the season, as it signals that the reproductive process has reactivated following a period of low larval abundance. Analysis reveals isolated records of pre-competent larvae in June—99.03 larvae/m³ in Castro and 1,372.27 in Compu—followed by a marked shift in larval dynamics starting in August, and notably, an extraordinary surge in early September 2026. The jump from August to September 2026 is quantified by the rise from 2,382 larvae/m³ in Compu to 509,024 in Pichicolo and 209,966 in Hornopirén.

However, the presence of these larvae does not in itself imply the immediate onset of seed collection. It serves as an early signal that requires follow-up monitoring over the coming weeks to track changes in abundance and determine the larvae's progression toward more advanced developmental stages—and eventually toward competence and settlement.

From spawning to settlement: a process requiring monitoring. Continuous monitoring allows us to observe how this process unfolds over time across different sectors of the Los Lagos Region, bearing in mind that reproductive and larval dynamics can vary significantly across locations and seasons. The data from Hornopirén underscore the scale of the phenomenon, while the other stations demonstrate that this is not merely an isolated occurrence.

Key information for mussel farming

For the mussel farming industry, timely knowledge of larval dynamics is crucial, given that a significant portion of mussel production relies on the natural availability of seed and its subsequent capture using collectors. In this context, the program's results provide scientific information regarding when changes in larval abundance begin to appear, how these events are distributed across the region, and how the various stages of larval development progress.

This information is particularly significant at this time, as the first records of pre-competent larvae begin to signal a shift from what was observed in previous months. Monitoring will continue over the coming weeks to determine whether these initial signs translate into a sustained increase in larval abundance and the subsequent appearance of larvae competent for settlement.

Over a Decade of Tracking Larval Dynamics

IFOP's Monitoring and Surveillance Program for Mytilid Larval Availability has been running continuously since 2013, serving as a long-term source of

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scientific data for understanding the reproductive and larval dynamics of mytilids in the Los Lagos Region.

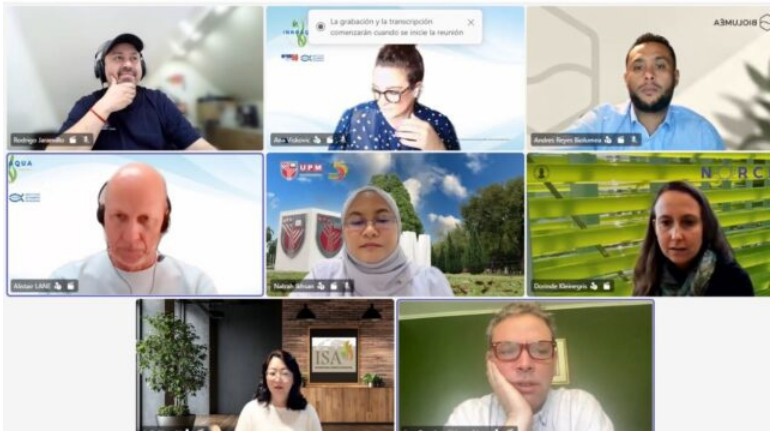
The continuity of this monitoring allows for the comparison of behavior across different seasons and the identification of natural variability in reproductive processes, generating data that contribute to better planning for seed collection activities.

Results are made available to users via *Semilla Endémica*, a platform developed by IFOP that facilitates the visualization of data regarding larval abundance and other relevant information for tracking seed availability.

Thus, as the 2026–2027 season progresses, IFOP continues to monitor mytilid larval dynamics in the Los Lagos Region, paying close attention to how the initial signals observed during August and September evolve.

Upcoming sampling events will be crucial for determining how these abundance levels change and whether the early signals currently observed translate into greater availability of larvae in advanced developmental stages—information that is vital for the mussel farming sector and for understanding the natural cycles underpinning this industry.





IFOP participates in the second INNOAQUA international webinar on algae-based innovation for sustainable aquaculture

Puerto Montt, September 2026 – The Fisheries Development Institute (IFOP), through its Environment Department (Aquaculture Research Division), helped organize the second international webinar titled “Algae-based innovation for next combined aquaculture production II” in collaboration with the European Aquaculture Society (EAS). This activity is part of the INNOAQUA project—funded by the European Union via the Horizon Europe program (https://innoaquaproject.eu/about/)—which seeks to contribute to the development of a sustainable and diversified aquaculture industry through the large-scale demonstration and implementation of innovative algae-based feeds and solutions, guided by principles of ecology, circularity, and digitalization.

The event took place online on Friday, September 11, 2026. IFOP researchers Johana Ojeda Palma and Rodrigo Jaramillo Teufert participated in organizing the event; together with the European Aquaculture Society (EAS), they coordinated the logistics and content for this second session of the INNOAQUA webinar series.

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The session was moderated by Rodrigo Jaramillo Teufert (IFOP) and Dr. Dorinde Kleinegris of NORCE Research (Norway), the INNOAQUA project director. The presentations were followed by a panel discussion moderated by Dr. Alistair Lane (Executive Director, European Aquaculture Society). The full program and speaker biographies can be viewed at the following link: https://lnkd.in/eAFMWrxR

Holding this event reaffirms the Institute's commitment to international cooperation in research applied to sustainable aquaculture. Interview with Dr. Alistair Lane, Executive Director, European Aquaculture Society.

Biography of Alistair Lane



Alistair Lane has served as Executive Director of the European Aquaculture Society (EAS) since 2000, managing this international non-profit association, which has over 1,000 members across more than 60 countries. After obtaining a Master's degree in Marine Biology, he worked for over a decade in the aquaculture sector in the UK, France, and Spain, holding positions in distribution, marketing, and general management.

He has a particular interest in aquaculture communication and has participated in various European initiatives related to the sustainable development of the sector. He currently contributes his expertise to the European Commission's Aquaculture Assistance Mechanism, supporting the Strategic Guidelines for EU aquaculture. He regularly presents aquaculture-related issues to European policymakers and acts as an expert for the European Commission and the Research Council of Norway in the evaluation of research and innovation projects.

What was the main motivation for organizing this second INNOAQUA webinar on seaweed extracts?

Within INNOAQUA, the EAS leads international cooperation tasks aimed at fostering networking and international collaboration in aquaculture (and seaweed) research with entities outside Europe. To this end, the EAS—in collaboration with the other partners—has spearheaded the organization of these two webinars to disseminate project results and promote knowledge exchange and the replication of developed solutions, focusing on Southeast Asia for the first webinar and South America for this second one.

How do you view South America's position in the current global aquaculture landscape? The development of aquaculture in South America has been characterized by the production of salmon, trout, and mussels in Chile; shrimp in Ecuador and Venezuela; and freshwater fish (especially tilapia) in Brazil. However, the region possesses the necessary resources and expertise to further develop the production of algae (macroalgae and microalgae) for both food and non-food applications; this is one of the reasons why we have decided to focus this second webinar on this subject and its potential.

We are pleased to welcome Leila Hayashi as the webinar's first speaker; as the current president of the International Seaweed Association, she will provide an overview of the current situation and future trends in the region.

How important are regulatory development and biosecurity for the sector's long-term sustainability?

The regulatory framework for seaweed production is fragmented and requires further development, not only in South America but also in Europe. This process is currently underway, and European platforms such as EU4Algae are assisting policymakers in creating appropriate regulations that enable the sector's growth.

Biosecurity is also fundamental to the production sector—not only to protect native and non-native species but also to ensure the safety of operators and value-chain partners, given that secondary processing and value-added activities require seaweed products that meet high standards of quality and purity.

Europe and South America have much to learn from each other in these areas.



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Where do you see the most promising research opportunities in the seaweed sector—both in South America and globally—over the next five to ten years?

The research and innovation agenda for seaweed production is currently being defined across all regions of the world. In Europe, this agenda focuses on several key pillars; the EU Algae Awareness Summit, recently held in Berlin in October 2025, outlined the actions needed to unlock the full potential of seaweed in sectors such as human and animal nutrition, biomaterials, biostimulants, cosmetics, and pharmaceuticals, by achieving critical mass, further industry consolidation, and increased investment. It was agreed that Europe must move beyond simple collaboration and advance toward consolidation, following models that foster vertical integration and strategic alliances. Undoubtedly, this situation applies equally to your region and other parts of the world.

What role can international collaboration—such as the INNOAQUA initiative—play in accelerating this research?

All the regions that make up the "algae world" face unique challenges, yet they also share many common issues regarding production technologies, extraction, purification, and value-added generation. The work carried out by INNOAQUA is part of this journey; through effective communication of its results, it can contribute to the body of knowledge needed to drive our sector forward.

Biography of Dorinde Kleinegris



Dorinde Kleinegris is a Principal Researcher in the field of microalgae at NORCE (Norway) and holds a part-time position as an Associate Professor of Marine Biotechnology at the University of Bergen. She holds a background in bioprocess engineering from Wageningen University. Dr. Kleinegris's research focuses on microalgae strain selection and improvement, cultivation and process design, as well as techno-economic and life-cycle assessments of the microalgae production chain. In addition to her scientific involvement and project supervision, she possesses extensive experience in project management at European and national levels, as well as in bilateral projects with industry.

From a bioprocess perspective, what are the main technical bottlenecks in scaling up microalgae cultivation sustainably?

It all begins with the microalgae strains we use. Most of them have not yet been truly domesticated—that is, transformed from wild strains into genuine "crops"—by improving their initial traits of interest while simultaneously ensuring good growth and robustness during large-scale production. If we look at traditional agriculture, domestication and genetic improvement have been taking place for tens of thousands of years; although we possess far more knowledge and techniques today than in the past, there is still a long way to go in improving microalgae strains. Furthermore, in my view, automation and process control are fundamental. The productivity levels achieved in the laboratory under strictly controlled conditions are not yet matched outdoors, where fluctuating weather conditions and other challenges inherent to large-scale cultivation come into play. It is key to understand how to balance achieving optimal growth conditions with minimizing energy consumption and associated costs. Likewise, it is crucial to move beyond merely producing biomass to creating a final product; rather than limiting ourselves to whole, dried cells, we should adopt a biorefinery approach where all valuable algal components are extracted and utilized in products, ensuring that every fraction is fully exploited and yields the highest possible value. Finally, it is about all those small contributions that, combined, generate a major impact—such as reducing nutrient costs, for instance, by using waste streams as fertilizers.

How important are techno-economic and life-cycle assessments in determining whether a microalgae-derived product is truly sustainable, rather than merely technically viable? In my opinion, this is incredibly important, because ultimately, no one will commercialize the production of these microalgae-based products if

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the economics—in particular—are not sustainable. Our goal is to employ life cycle assessment (LCA) and techno-economic analysis (TEA) from a very early stage—using data from our pilot plant—to identify the key parameters and bottlenecks influencing environmental and economic impacts. This will guide us in determining where to focus our research: eliminating or at least mitigating these bottlenecks should have the greatest impact on making the process more environmentally and economically viable. Naturally, scaling up and obtaining more realistic data—comparable to commercial operations—will improve the accuracy of the results. At the same time, I believe it is important to bear in mind that many microalgae-derived products could be compared to existing products made via production processes that have been operating and undergoing optimization for decades. Therefore, while understanding current performance is important, it is equally crucial to forecast future performance and the associated environmental and economic impacts.

What role do you think AI and process optimization will play in the future of algae-based aquaculture?

Building on my earlier comment regarding the vital importance of automation and process control, I believe that AI—along with smart sensors and monitoring systems—can help us much more quickly identify the optimal production targets we should aim for, in both the biomass production and processing phases. Furthermore, I believe that AI and tools like digital twins can guide us in understanding consumer behavior and determining which products will be in highest demand.

Given Norway's strong tradition in aquaculture research and leveraging the link INNOAQUA has already established between NORCE and IFOP, do you see potential for greater strategic collaboration between the two institutions in the future?

I observe many shared strengths and complementary profiles—both when comparing Norway and Chile and when analyzing NORCE and IFOP—that lay a very solid foundation for collaboration. Both Norway and Chile possess beautiful, rich coastal environments ideal for macroalgae production and are home to abundant microalgae species of great interest; furthermore, both countries are exploring the use of algae as a cornerstone of sustainable aquaculture and the blue economy. Likewise, both are leading salmon-producing nations facing similar challenges regarding production sustainability, novel feed ingredients, and environmental footprints. At an institutional level, NORCE boasts robust capabilities in algae biotechnology, ranging from strain improvement to process design and optimization—including circular economy approaches such as land-based integrated multi-trophic aquaculture. For its part, IFOP possesses deep, detailed knowledge of Chile's coastal ecosystems and local species—including the study of invasive species and pests—as well as the relationship between algae and salmon production and sustainability; it also maintains close ties with the industry and regional policymakers. I believe this combination enables a highly compelling interhemispheric collaboration; one could start by focusing on algae within sustainable aquaculture—for instance, jointly addressing the role they can play in removing nutrients derived from salmon production—or by testing algae-based value chains through parallel pilot projects in Norway and Chile to understand similarities and differences regarding markets, regulations, and logistics

IFOP and ACHS strengthen their strategic alliance to advance occupational health and safety

THE SIGNING OF THE COLLABORATION AGREEMENT REAFFIRMS BOTH INSTITUTIONS' COMMITMENT TO RISK PREVENTION, THE WELL-BEING OF INDIVIDUALS, AND THE STRENGTHENING OF A CULTURE OF OCCUPATIONAL HEALTH AND SAFETY.

On September 22, the Fisheries Development Institute (IFOP) and the Chilean Safety Association (ACHS) formalized a collaboration agreement, marking a RETURN





significant milestone in the joint work both institutions are undertaking regarding Occupational Health and Safety (OHS).

This agreement represents a significant step toward consolidating a strategic alliance aimed at strengthening preventive management, promoting safe and healthy work environments, and continuing to build an organizational culture where caring for people is a fundamental value.

During the event, IFOP Executive Director Luis Parot highlighted the importance of having a strategic partner like ACHS, acknowledging the value of institutional collaboration in addressing current and future challenges regarding workplace safety and health.

The session included two technical presentations. The first was delivered by Carlos Rodríguez, IFOP's Risk Prevention Officer, who addressed the importance of strengthening a culture of occupational health and safety; he emphasized that caring for people is a shared responsibility and that daily decisions are crucial for establishing sustainable preventive management.

Meanwhile, Álvaro Sanhueza, a Risk Prevention Expert at ACHS, presented the key progress and results of the joint work carried out during 2026, as well as the challenges and priorities that will guide the collaboration between the two institutions during the 2026–2027 period. Furthermore, the Executive Director highlighted the performance and commitment of IFOP's Risk Prevention Officer, Carlos Rodríguez, and his team, acknowledging the work done to strengthen the Institute's preventive management.

This recognition underscores the importance of the sustained effort to integrate risk prevention into the Institute's various activities, fostering employee participation, management commitment, and the continuous improvement of occupational health and safety conditions.

A partnership for continued progress

This agreement will enable IFOP to strengthen its preventive capabilities and jointly address the health and safety challenges associated with its scientific, technical, and operational activities—whether at its facilities or during research conducted in the field and aboard its vessels.

With this significant milestone, both institutions look forward to a new phase of collaboration, reaffirming their commitment to the well-being of their people and to integrating occupational health and safety as a pillar of institutional excellence.

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