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SMA and IFOP Sign Collaboration Agreement to Strengthen Aquaculture Sector Oversight

The agreement includes the exchange of scientific and technical information, improvements to monitoring systems, the creation of a permanent technical working group, and the implementation of training programs to strengthen environmental oversight of aquaculture in Chile.

The Superintendency of the Environment (SMA) and the Fisheries Development Institute (IFOP) signed a collaboration agreement aimed at strengthening environmental oversight of the aquaculture sector in Chile through the use of high-quality scientific information and the development of joint technical capabilities.

IFOP is a Chilean scientific and technical research institution linked to the fisheries and aquaculture sector. Its role is to support the sustainable development of fisheries and aquaculture by generating scientific and technical information to inform public policy decisions, particularly through the Undersecretariat of Fisheries and Aquaculture (SUBPESCA).

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The new agreement includes, among its main objectives, the exchange of oceanographic information and data relevant to the environmental management of aquaculture. This will provide updated inputs for evaluating the environmental performance of fish farms and their surrounding areas. It also includes technical support for updating and improving the online connectivity of Salmon Farming Centers (SFCs), as well as the development of new environmental monitoring projects.

The agreement also establishes collaboration on specialized studies and analyses, for example, on harmful algal blooms (HABs) and the evaluation of environmental impacts caused by anthropogenic activities and natural events, both locally and globally.

Another key aspect of the agreement is the creation of a permanent IFOP-SMA technical working group, which will serve as a coordination body for joint initiatives, defining work priorities, and reviewing results.

Finally, the agreement includes the development of training and technical education programs aimed at strengthening the skills of professional and technical teams involved in environmental oversight and marine monitoring.

Superintendent Marie Claude Plumer highlighted the importance of this agreement, stating that "this alliance allows us to strengthen environmental oversight of the aquaculture sector based on technical information and scientific evidence, improving our ability to anticipate risks, focus our oversight efforts, and better protect the country's marine ecosystems."

She added that "the work of the SMA together with IFOP will allow us to align criteria, optimize resources, and ensure the continuity of our cooperation efforts."

For his part, IFOP's Executive Director, Gonzalo Pereira, emphasized the significance of this agreement because, "on the one hand, it represents recognition of IFOP's technical capabilities and those of its professionals, and on the other hand, it will allow both institutions to access the valuable information each possesses on aquaculture and marine environmental issues for their institutional purposes."

Furthermore, the authority emphasized that "for IFOP, access to the data accumulated over the years of the Superintendency's existence is invaluable, as it will contribute to the research lines developed by the Aquaculture Division."

Finally, it noted that this agreement complements the network of agreements IFOP has signed with universities and other national public entities on issues related to fishing, aquaculture, and the marine environment.

This agreement builds upon previous work carried out between the SMA and IFOP, such as the development of an environmental inspection manual for Salmon Farming Centers (CES), created in 2021 as part of an initiative funded by the Regional Fund for Triangular Cooperation for Latin America and the Caribbean (GIZ). This manual standardized criteria and tools for the environmental inspection of these centers.

Strengthening International Ties: IFOP Welcomes Delegation from the Korean Maritime Institute (KMI)

The Fisheries Development Institute (IFOP) welcomed a distinguished delegation from the Korean Maritime Institute (KMI), marking a significant step in strengthening international scientific cooperation.

Scientific Exchange and Collaboration

The meeting focused on the exchange of knowledge about the jumbo squid (Dosidicus gigas) fishery. Chilean and Korean researchers discussed relevant

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topics such as catch volumes and the current stock status of this resource, a species of high commercial and ecological interest to both countries.

IFOP was represented by experts from the Fisheries Research Division, led by its head, Dr. Carlos Montenegro, along with researcher MSc. Karen Belmar, a specialist in the jumbo squid fishery, and Marcelo Nilo, Head of International Affairs and Cooperation, along with Dr. Patricia Zárate, Head of the Fisheries Assessment Department, Carlos Techeira, Head of the Resource Assessment Department, and other authorities, were present.

Visit to Cutting-Edge Laboratories

The Korean delegation complemented their visit with a technical tour of IFOP's facilities. They toured the Oceanography, Age, and Growth Laboratories, learning firsthand about the methodology and equipment that support fisheries and environmental research in Chile. The visit was guided by Dr. Montenegro and Dr. Francisco Cerna, Head of the area.

The day concluded with the expectation of strengthening cooperation between IFOP and KMI, opening the door to future research partnerships that will benefit the sustainable management of marine resources.

IFOP Highlights the 10th Seminar on Research and Innovation Applied to Mussel Farming (SIIAM)

The Mussel Larval Monitoring Program of the Fisheries Development Institute (IFOP) actively participated in the 10th Seminar on Research and Innovation Applied to Mussel Farming (SIIAM), held on November 27 at the CEDUC UCN-Castro facilities. The event brought together leading researchers, academics, and representatives from the production sector, solidifying its position as a key forum for the exchange of scientific knowledge and collaboration with the mussel farming industry. In this context, Dr. Cristian Segura Rivera, a researcher at IFOP, presented the paper "Mussel Seed Collection and Detachment Behavior in Environmentally Contrasting Zones." This presentation generated significant interest due to its findings on anomalies linked to physical factors such as temperature and salinity, associated with food availability for broodstock, as well as variations in pre-competent and competent larval abundance and seed detachment at the Yates and Compu stations, analyzed from a time-series perspective. Also in attendance were professionals from the program: M.Sc. Cristina Stuardo, M.Sc. (c) Óscar Ramírez, and Macarena Herrera.

The event was characterized by its dynamism and multidisciplinary approach, featuring oral and poster presentations that addressed highly relevant lines of research for the sector's development. Among the topics discussed were studies on oxidative stress, the effects of dinoflagellate toxins on bivalve aquaculture, innovation in circular economy production models, advances in traceability and safety during product transport, genetic connectivity of mussels in different locations, and the presence of microplastics in the marine environment. Within this framework, IFOP highlighted the role of the Mussel Larval Monitoring Program, an initiative of the Environmental Department of the Aquaculture Research Division,

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which is currently strengthening its territorial reach through the Endemic Seed platform. This platform provides broader access to updated, validated, and strategically valuable information for the mussel farming sector.

These meetings also represent a key opportunity to network with other working groups, share experiences, and enrich perspectives on the challenges facing the sector. From the technical discussions and questions generated at the seminar, new lines of research and inter-institutional collaborations emerged, allowing for joint efforts to be directed toward emerging problems and a comprehensive understanding of the ecological and productive processes associated with mussel farming. In this regard, the Monitoring Program team emphasized the importance of participating in these forums, where applied science engages directly with the needs of the region.

Dr. Cristian Segura's presentation garnered significant audience attention, prompting numerous questions and a particularly enriching technical exchange. The questions that arose after his presentation reflected the sector's interest in understanding in depth the patterns of environmental variability and their direct influence on seed availability—fundamental knowledge for production and management decisions. This interaction also facilitated the planning of new collaborations between universities, institutes, and industry stakeholders, reinforcing the value of generating accessible and relevant public science.

A particularly significant moment of the seminar was the recognition given to Dr. Cristian Segura Rivera for his historic contribution as the manager and creator of SIIAM a decade ago, when he served as Head of Projects at INTEMIT. The tribute acknowledged his vision and initial commitment to consolidating this scientific forum, a task that continues today with distinction under the leadership of Dr. Camila Barría, current Head of Projects at the Institute of Mussel Farming Technology. IFOP extended its gratitude to INTEMIT and AMI Chile for their ongoing support in organizing and promoting the seminar, emphasizing that this collaboration has allowed for the maintenance and strengthening of a flagship event for the sustainable development, innovation, and competitiveness of Chilean mussel farming.

Second Training Workshop for Scientific Observers from the O'Higgins, Biobío and Los Ríos Regions

At the facilities of the Fisheries Development Institute, Talcahuano Headquarters, the Second Workshop of the Benthic Fisheries Monitoring Project (PSPB) was held between November 17 and 20, which included the presence of Scientific Observers from the regions of O'Higgins, Biobío and Los Ríos. This instance was intended to address four topics:

- Learn about the general functioning of the National Fisheries and Aquaculture Service (Sernapesca) and its work within the framework of the Bivalve Mollusk Sanitary Program (PSMB).
- Update the knowledge associated with the Arauco Gulf Management Plan.
- Learn general aspects about algae.
- Review topics associated with the Benthic Fisheries Monitoring Program.

Each topic was addressed with regional guests. Thus, the presentations from Sernapesca were delivered by Iván Oyarzún Mundaca, Marine Biologist, currently serving as Acting Regional Director of Biobío, and by Claudio Durán Muñoz, Veterinarian specialized in Quality Assurance Programs. On the other hand, the topic related to the Arauco Gulf Ma-

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gthen and standardize operating criteria. He also emphasized the quality of the presenters and the presentations by the collaborating institutions. The closing practical activity was very illustrative for the identification of macroalgae species.

nagement Plan was presented by the Zonal Fisheries Directorate of the Ñuble and Biobío regions, represented by Carlos Veloso Romero, Marine Biologist and Lawyer, who serves as the Benthic Fisheries and Caletas Law Officer, among other roles, together with Roberto San Martín Valdebenito, Marine Biologist and researcher at the Fisheries Department of INPESCA, directly linked to advisory work for the Management Plan.

During the second day, participation included Erasmo Macaya Horta, Marine Biologist and PhD in Marine Biology, whose main research line focuses on the study of marine macroalgae. He works at the University of Concepción and delivered a presentation on macroalgae, emphasizing the species commercialized in Chile, followed by a practical activity for species identification. From IFOP, the workshop benefited from the valuable participation of Pablo Araya, Marine Biologist and semi-senior researcher of the Benthic Fisheries Monitoring Project.

Throughout the workshop, participants had high interaction with each guest, where they clarified doubts, discussed issues, and achieved significant collective learning. This activity highlighted the collaborative approach among participating institutions, including Nelson Salas Jiménez, Marine Biologist and coordinator of the project's observer team.

IFOP senior researcher Nancy Barahona Toledo, responsible for this geographical area within the project and organizer of the workshop, stated: "This instance allowed us to advance in the training of Scientific Observers, creating a space for learning and strong collaboration, which will undoubtedly have a positive impact on the Benthic Fisheries Monitoring Project."

For his part, IFOP Regional Director Sergio Flores Claramunt highlighted the importance of these instances with interregional work teams to stren-

IFOP Researcher Karen Belmar Attends International Workshop on Giant Squid in Peru

MSc. Karen Belmar Salinas was invited to participate in the APEC Workshop "Development and Application of Ex Post Regulatory Impact Assessment (RIA) Indicators for the Fisheries Management of Jack Mackerel and Giant Squid in APEC Economies." This project is implemented by the Ministry of Production (PRODUCE) of Peru.

The event took place on November 13 and 14 in Lima, and included the participation of delegations from Peru, Chile, Indonesia, Thailand, Japan, and China. The researcher gave two presentations: "Monitoring the Giant Squid Fishery in Chile" and "Satellite Tagging of Giant Squid in Chile: Preliminary Results in Two Sectors."

"These kinds of events enrich the exchange of perspectives on methodologies and research conducted in other countries. They also provide an opportunity to meet and network with international researchers. Regarding the presentations, the delegations showed interest in the work carried out by IFOP, and a very interesting atmosphere of questions and discussion ensued," commented Karen Belmar Salinas, project manager for the jumbo squid monitoring project.

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Scientific Vessel Abate Molina Sets Sail to Investigate Anchovy

On November 13, the scientific vessel Abate Molina set sail from the Port of Valparaíso to investigate the current state of the anchovy population.

The overall objective of the research cruise, led by fisheries engineer Francisco Leiva, is to conduct a coastal hydroacoustic survey in the Atacama Region to assess the anchovy stock present in the study area.

The vessel is captained by Takashi Abe, and the crew includes professionals, technicians, and the Abate Molina's crew.

Training in the Use of Fire Extinguishers and First Response to Health Emergencies for the Crew of the BC Abate Molina and Dra. Barbieri

In October and November, training sessions on the Use of Fire Extinguishers and First Response to Health Emergencies were held for the crews of the research vessels Abate Molina and Dra. Barbieri.

The activity was carried out in coordination between the Risk Prevention Area of the Human Resources Department of IFOP (the Fisheries Development Institute) and the Chilean Safety Association (ACHS), as part of the ongoing effort to strengthen preventive and emergency response skills.

During the sessions, participants received theoretical and practical instruction on the correct use of portable fire extinguishers, learning to recognize different types of fire and safe initial control procedures. They also received training on first aid and emergency medical care, reinforcing their ability to react to incidents on board. The training included CPR with electronic mannequins trained by specialists for this procedure (infants, children, adult men and women), as well as AED training for the correct and timely use of automated external defibrillators (AEDs).

These initiatives are part of the IFOP 2025 Preventive Work Plan, which aims to consolidate a culture of safety and self-care in all operational units, both on land and at sea, ensuring safer and better-prepared work environments for emergencies.

The workshops included the distribution of a printed manual of the content, a practical evaluation of the simulation exercises, and a subsequent written evaluation.

Participants practiced with real equipment among team members, using

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bandages of different sizes, practice tourniquets, and face masks for ventilation.

The training was conducted by a Kinesiologist on the ship Dra. Barbieri and by a Nurse on the ship Abate Molina, both with extensive experience in the field.

Workshop on Seabird Conservation in Fisheries

The workshop "Seabirds and Fisheries," organized by BirdLife International's Marine Programme, was held at the Hotel Faro Azul, located in the Cerro Alegre neighborhood of Valparaíso. The workshop aimed to review progress and work undertaken to reduce interactions between seabirds and fishing operations, as well as the status of conservation efforts at breeding sites for key species such as the albatrosses of southern Chile. During the event, participants exchanged experiences, knowledge, and proposals, fostering a collaborative approach among public institutions, research centers, and non-governmental organizations.

Marine biodiversity is facing a rapid and alarming decline globally due to unsustainable human activities, which have caused significant damage to natural ecosystems. In Chile, seabirds are particularly threatened by climate change, the presence of invasive alien species, and bycatch associated with various fisheries.

In this context, the Fisheries Development Institute (IFOP), through its research programs on discards and bycatch, along with monitoring projects for the main national fisheries, has made significant progress in recording, analyzing, and understanding the variables that influence these impacts. These efforts have strengthened the generation of key scientific information to guide mitigation measures and support the conservation of these species.

The activity was led by the Albatross Task Force (ATF-Chile), a conservation task force belonging to BirdLife International, and included the participation of representatives from the Fisheries Development Institute (IFOP), the Undersecretariat of Fisheries and Aquaculture (SUBPESCA), the Chilean Navy (DIRECTEMAR), the National Fisheries and Aquaculture Service (SERNAPESCA), as well as researchers and organizations dedicated to marine wildlife conservation.

On this occasion, Luis Adasme, a researcher at IFOP and member of the Seabird Bycatch Working Group (SBWG) of the Agreement on the Conservation of Al-

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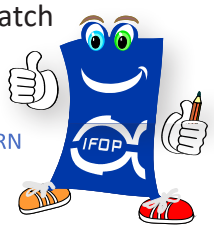

batrosses and Petrels (ACAP), emphasized the importance of collaborative work, stating:

"Meeting to strengthen collaboration between public sector institutions and NGOs dedicated to seabird conservation in Chile is fundamental. These kinds of opportunities allow us to coordinate concrete actions and advance the ecosystem approach incorporated into the current Fisheries Law."

Cristián G. Suazo, coordinator of the BirdLife Albatross Task Force in Chile: "Meeting to establish collaborative networks for marine conservation in our waters is fundamental. Chile is among the most important countries for oceanic seabirds such as albatrosses and petrels, which are distributed in remote areas that require multiple efforts and expertise for their protection. Both the colonies and the feeding distribution of our albatrosses require joint actions in terms of regulations and monitoring of compliance with conservation measures to support the viability of their populations."

Marcelo García, coordinator of the Biodiversity and Ecosystem Approach Unit of the Undersecretariat of Fisheries, highlighted the regulatory advances and early involvement in mitigating bycatch in national fisheries. As a member of the Agreement on the Conservation of Albatrosses and Petrels (ACAP) since 2007, Chile's participation has allowed it to access the best international advice on mitigation measures and best practices to reduce bycatch in fisheries. The workshop presented an advanced document on improvements to mitigation measures in trawl fisheries that considers ACAP Resolution 8.5 issued in May 2025, which declared a state of crisis in albatross conservation worldwide.

IFOP at the 44th Meeting of the Working Group Fish Stock Assessment (WG-FSA), of the Scientific Committee (SC) and the CCAMLR Commission, Hobart, Australia

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) is an intergovernmental organization established by an international convention within the framework of the Antarctic Treaty System. The Commission, assisted by the Scientific Committee, is responsible for developing and implementing the necessary measures for the management and conservation of fishery resources and associated ecosystems in the Southern Ocean.

In this context, between October 6 and 17, 2025, the WG-FSA meeting was held in Hobart, Australia, where Chile presented proposals for research plans on toothfish (*Dissostichus spp.*) for CCAMLR statistical areas 48.2 and 48.3A. These initiatives were presented on behalf of IFOP by Dr. Carlos Montenegro Silva, Head of the Fisheries Research Division at IFOP. In addition, Dr. Roberto Licandeo participated as an advisor to this initiative.

Currently, in the Convention Area, fisheries are conducted targeting Patagonian toothfish (*Dissostichus eleginoides*), Antarctic toothfish (*Dissostichus mawsoni*), mackerel icefish (*Champsocephalus gunnari*) and Antarctic krill (*Euphausia superba*). The management of these fisheries is carried out under a precautionary approach, and the management objectives seek to balance conservation with the rational use of resources while preserving pre-existing ecological relationships.

The following individuals attended the 44th meetings of the Scientific Committee, SCIC (Standing Committee on Implementation and Compliance), SCAF (Standing Committee on Administration and Finance) and the Commission as part of the Chilean delegation:

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Juan Enrique Loyer. Head of the Antarctic Affairs Division, Ministry of Foreign Affairs (Head of Delegation)

Renato Segura. Ministry of Foreign Affairs

Francisco Lértora. National Border and Boundary Directorate (DIFROL)

Francisco Santa Cruz. Chilean Antarctic Institute (INACH)

Lucas Kruger. Chilean Antarctic Institute (INACH)

Carlos Montenegro. Head of the Fisheries Research Division of IFOP

Juan Francisco Santibáñez. Head of the Fisheries Development Division, Undersecretariat of Fisheries and Aquaculture

Pablo Ortiz. SERNAPESCA

Rear Admiral Nelson Saavedra. Director of Maritime Interests and Aquatic Environment of the General Directorate of Maritime Territory and Merchant Marine

Valeria Carvajal. President of FIPES

Enrique Gutiérrez. General Manager of Pescachile

During the 44th meeting of the Scientific Committee, chaired by Mr. César Cárdenas of INACH, the results of research activities from national scientific programs of CCAMLR Members were analyzed. Additionally, updates were provided on programs aimed at collecting the data necessary for the effective management of the Southern Ocean, including elements such as fishery monitoring, scientific observers on board fishing vessels, and ecosystem and marine debris monitoring programs.

Furthermore, reports were presented on the intersessional work of the Committee's five working groups, which are:

Ecosystem Monitoring and Management Working Group (WG-EMM), Fish Stock Assessment Working Group (WG-FSA), Statistics, Assessments and Modelling Working Group (WG-SAM), Incidental Mortality Associated with Fishing Working Group (WG-IMAF) and Acoustics Survey and Analysis Methods Working Group (WG-ASAM).

Finally, one of the most noteworthy aspects of the Chilean delegation's participation in the 44th CCAMLR meetings was the representation of all sectors involved in the topics under discussion, with strong participation from government institutions, industries with fishing interests in the Southern Ocean, and interaction with international organizations such as FAO, IUCN, IWC, ASOC, COLTO, ARK, SCAR, among others.

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IFOP Talcahuano presents itself at "STEAMverso, young people with Science"

The Filidor Gaete Monsalve Bicentennial High School and the INCAR Center organized the event "STEAMverse, Youth with Science: Interdiscipline and Innovation, from the Classroom to the Future", aimed at promoting scientific thinking, creativity and innovation from an interdisciplinary perspective. A team from IFOP Talcahuano participated in the event, composed of Cristian Villouta, Raúl Rojas, Héctor Pastor, Diego Mendoza, Bastián Muñoz, Miguel Vegas, Rui-Feng Wang, Heraldo Álvarez, Danilo Oro and Bryan Muñoz from the pelagic monitoring and discard projects.

"The event sought to motivate students to explore the fascinating STEAM universe (Science, Technology, Engineering, Art and Mathematics), promoting active learning, collaboration and critical thinking as essential tools for building solutions to tomorrow's challenges," said Cristián Villouta, Field Coordinator of the Pelagic Discard Project, which includes dissemination of its activities.

"Students were able to participate in workshops, presentations and interactive experiences, as well as visit scientific stands presented by various universities and collaborating institutions, including our institute. IFOP had an outstanding participation with hands-on interaction with students, such as collecting biological samples from specimens, examining samples under a specialized magnifying lens, and presentations on the institutional role and the work of scientific observers, in addition to a stand full of information. All these efforts aimed to bring science and technology closer to the school community," said Sergio Flores Claramunt, Regional Head of the Biobío Office.

IFOP promotes scientific outreach in Calbuco

WITH INTERACTIVE ACTIVITIES ON MUSSEL FARMING AND MARINE ECOSYSTEM HEALTH

On October 30, in Calbuco, with the aim of bringing marine science closer to the school community, professionals from the Aquaculture Research Division of the Fisheries Development Institute (IFOP) participated in the Science Fair of San Miguel School in Calbuco, with informational and demonstrative stands. The event brought together students from different schools, teachers and families from the commune, who were able to learn, in a practical and engaging way, about the scientific work carried out by IFOP in the region.

Professionals Macarena Herrera, Óscar Ramírez and María Paz Navarrete, from the Departments of Environment and Hydrobiological Health, presented content related to mussel farming, the study of other marine cultures and the analysis of parasites extracted from free-living, native and farmed fish. The presentations combined technical information with game-based activities that encouraged participation, especially among primary and secondary school students.

In the exhibition area, visitors had the opportunity to interact with educational materials and with the interactive platform of the Mussel Larval Monitoring Program, a project developed by IFOP in its thirteenth stage. This digital tool allows real-time visualization of larval monitoring processes in different areas of the country, providing key data to understand the reproductive cycle of mussels and their relationship with environmental conditions. The platform is also a valuable scientific outreach tool that facilitates the learning of oceanographic and biological concepts in an accessible way for students and teachers.

Later in the afternoon, the IFOP team visited the Calbuco Polytechnic High School, where they delivered an educational talk on mussel farming and the sustainability of marine resources. During this session, the main challenges of the mussel farming sector were addressed, such as environmental management, water quality and the possibilities of measuring

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variables in simple ways to implement research initiatives from the classroom.

The activity included a practical component using paper microscopes (Foldscope), led by researcher Óscar Ramírez, which allowed students to observe microscopic organisms and understand their importance in the balance of the aquatic ecosystem.

These activities, developed jointly by the Aquaculture Research Division, the Department of Environment and the Department of Hydrobiological Health, reinforce IFOP's commitment to scientific education, applied research and the training of new generations interested in the conservation and responsible use of marine resources. The collaborative work among these units has made it possible to create a comprehensive educational approach that combines science, technology and citizen participation.

IFOP's presence in Calbuco is particularly significant considering that this commune is one of the main development centers for mussel farming in Chile, an activity that represents an economic and social pillar for the south of the country. In this context, interaction with educational institutions seeks to strengthen the link between scientific research and the local community, contributing to the construction of a more aware and participatory ocean culture.

Likewise, the incorporation of playful methodologies and interactive tools has allowed students to better understand the importance of environmental monitoring, ecosystem health and aquaculture sustainability. These experiences encourage scientific curiosity, critical observation and respect for the marine environment, fundamental pillars for advancing toward more sustainable management of aquatic resources.

Finally, IFOP's participation in this fair and in outreach activities at the Polytechnic High School reaffirms the relevance of the institution's work in research, education and territorial engagement, highlighting its commitment to disseminating scientific knowledge and supporting the sustainable development of coastal communities in the country.