NATIONAL INSTITUTE OF FISHERIES SCIENCE
We are the driving force to enrich oceans and fisheries industry

Human beings are directly and indirectly dependent on the sea. As the lung of the earth, the sea has provided primary proteins to over 1 billion people across the globe. Korea has enjoyed more benefits from the sea than other countries in an earlier era.

Unfortunately, however, the sea is now at grave risk due to unhealthy marine ecosystem caused by climate change. A sharp drop in fish production has been caused by overexploitation and intensive competition among nations to occupy more resources of the sea.

NIFS, the leading national institute fully dedicated to R&D on fisheries and oceans, carries out myriads of research to sustain and enrich the benefits that the sea has brought to human beings for ages. We are primarily committed to coping with climate change, developing overseas and coastal fishing grounds, monitoring marine ecosystems, creating advanced fishing gears and methods, building and managing fisheries resources and developing aquaculture technologies. We also spare no effort in responding to FTAs, developing and enhancing strategic items for export, ensuring seafood safety and undertaking a variety of tasks associated with national fisheries policy. The overall goals of our institute are to further grow the fisheries industry and to create more income for fishermen and fishing communities.

We will continue to value your opinions and suggestions to accomplish our overall goal.

Thank you.
Mission and Vision

Bringing happiness to people through R&D on oceans and fisheries

As the unique national R&D institute in charge of the oceans and fisheries science, NIFS is fulfilling various responsibilities: managing fisheries resources; monitoring marine and fishing ground environments; studying aquaculture, biotechnology and fisheries engineering; finding ways for sanitary processing of fishery products; preventing and establishing countermeasures against aquatic life diseases, and implementing fair test for aquatic plant varieties.

**Vision**

Development of fisheries technologies for the happiness of people

**Mission**

Development, use and value creation of fisheries resources

**Objective**

Becoming fisheries technology superpower by 2020 through 5 strategic projects

**History**

1921 Established as Fisheries Experiment Station
1949 Reorganized as Central Fisheries Experiment Station under the Ministry of Commerce and Industry
1963 Renamed as National Fisheries Research and Development Agency (in Young-do, Busan)
1989 Relocated to Gijang, Busan
1993 Established affiliated institutes (ESFRI, WSFRI, SESFRI, SSFRI)
2002 Renamed as National Fisheries Research and Development Institute
2015 Renamed as National Institute of Fisheries Science
NIFS is the key player to bring forth the nation to fisheries powerhouse

The structure of NIFS:
The headquarters has 13 divisions and 4 centers under three departments. There are 7 affiliated research institutes and 7 affiliated research centers.

- Managing fisheries resources and developing fisheries engineering technology
- Developing aquaculture technology and biotechnology
- Conducting research on the safety of seafood and developing utilization technology of seafood
- Conducting research on aquatic life diseases and disease control
- Monitoring marine environment and developing its conservation technology
- Coping with climate change
- Disseminating fisheries technology
Aquaculture will play a key role in providing seafood in the future

As the fastest growing food industry, aquaculture is expected to play a critical role in stable supplying of seafood for decades to come. NIFS has taken part in national aquaculture history from the very beginning to the present, the era of high-end technology. It will continue to take the lead in promoting aquaculture industry.
Advanced aquaculture technology

Biofloc Technology (BFT)
Biofloc consists of a variety of bacteria, fungi, microalgae, detritus and other suspended organisms. Microorganisms purify water by assimilating ammonia excretions to bacterial proteins and are fed to culture species again. Biofloc creates more income for fishermen. Its productivity is 30-50 times higher than that of pond culture.

Recirculating Aquaculture System (RAS)
RAS practices zero or minimal water exchange. Instead, it purifies water through physical and biological filtration and sterilization. It is the next-generation aquaculture system. It is highly advanced and eco-friendly. We will double our efforts not only to develop water treatment system but also to enhance our research to automate the system. This will help us develop and disseminate an energy efficient RAS system that enables us to produce safe and highly value-added culture species all year round.

Development and commercialization of genetically improved culture species
By analyzing the genetic diversity of wild and cultured broodstocks and conducting research to develop paternity test technology using genetic markers, we have developed fast growing species (olive flounder and abalone) and distributed their fertilization eggs and hatched larvae.
Research on eco-friendly Aquaculture

Enhancement of field researches to address outstanding issues

Addressing challenges in the field and disseminating technologies to fishermen
We have recruited a field service team to understand and address challenges fishermen face in the field. The team’s main tasks include conducting research on caged oyster culture, improving culture methods for sea squirt, developing pond culture technologies for sea cucumber and seeking methods for early commercialization of copper-alloy nets.

Development of eco-friendly formulated feed
In order to promote eco-friendly culture, we have undertaken research to develop high quality and highly efficient formulated feed. In addition, we strive to step up the competitiveness of aquaculture products by creating a manual on effective breeding management and supply program for formulated feed.

Safety enhancement of aquatic medicines
To secure the safety of fishery products and control aquatic life diseases, we are developing highly efficient aquatic drugs and disease preventable vaccines. We are also working on developing aquatic drugs using medical herbs in order to prevent the abuse and overuse of aquatic antibiotics. We will also take the lead in developing world-class vaccines by securing the original technology of aquatic vaccines.
Responding to FTA and promoting strategic export items

Promotion of strategic export items
We have carried out research to promote the export of 10 strategic items that have high growth potential: olive flounder, abalone, sea cucumber, bluefin tuna, Pacific oyster, Japanese eel, grouper, shrimp, laver and ornamental fish. As a result, we have become the 2nd country that has successfully produced artificial fertilization eggs of bluefin tuna in the world. We have also produced fast-growing triploid oysters and artificial seeds of ornamental fishes.

Development of aquatic seeds and restoration of fisheries resources
The Golden-Seed Project (GSP) has been carried out to build strong foundations for aquaculture. GSP supports researches to develop not only superior seeds but also new seeds of olive flounder, groupers, abalone and laver. We will also commit ourselves to restoring pollack in the East Sea by developing seed production technologies, monitoring diseases and developing low-temperature live food organisms with practically formulated feed.

Responding to FTA
In responding to FTAs that we have concluded with many states, we are laying the foundation for researches to minimize potential damages the FTAs might bring about and strengthen the competitiveness of our fishery products in the global market. Our key tasks are to develop seed production technology for stable production and supply of fishery products, to accomplish the automation of aquaculture to lower production costs and to develop processing technology of aquaculture products and local brand products that are customized to meet the consumption trends of countries of export.
We secure fisheries resources in a sustainable manner through scientific researches

We carry out scientific researches to predict production variation in coastal waters and distant waters. We also strive to secure fisheries resources by developing high-end fisheries biotechnology and fisheries engineering technology.
Systemic survey and management of fisheries resources

Scientific survey and assessment on fisheries resources
We survey, assess and manage fisheries resources considering their ecological characteristics for sustainable use and conservation of fisheries resources in coastal waters. We also provide information on fishing condition, suggest catch policies that reflect ecological characteristics of fish, perform stock assessment and management of species that need to be restored, estimate total allowable catch and survey marine mammals.

Forecast of fishing condition in Korean waters
We provide scientific forecasting information about monthly and seasonal abundance, migration period and fishing areas of the major species, in the attempt to use them in a sustainable and effective manner.

Securement of catch quota of distant water fisheries
We perform stock assessment and management by working with international communities for the stable supply and securement of fisheries resources from distant water fisheries. We also develop strategies to facilitate tasks with international fisheries organizations and find ways to effectively manage fisheries resources. Through international scientific observer program, we strive to conserve and manage marine animals that are on the protection list such as sea birds and marine turtles.

International fisheries organizations with Korea as its member state
Conservation and use of fisheries resources

Integrated information management system for fisheries resources
Keeping up with the global trend to strengthen sovereignty over natural and genetic resources in many countries, Korea enforced a relevant law in 2012 to manage information about fisheries and genetic resources through the Marine Genetics Resource Database.

Development of biomaterials from aquatic life and study transformation
Marine life-based effective bio materials with high activity are the core of future biotechnology. We are using genetic information obtained from genome sequencing and performing analysis of effective aquatic organisms to develop future aquaculture technologies and study the biological phenomenon of aquatic life.

Analysis of the characteristics and utilization of marine genetics resources
We are establishing a gene identification system to identify the country of origin of domestic and imported fishery products. To that end, we are conducting population genetics analysis and developing DNA markers and molecular identification technologies that can help us figure out the original population of composite food. We also arrange imported fishery products according to their species and search genetic information about them.
**Study on eco-friendly fishing using advanced technologies**

**Development of eco-friendly fishing gears for sustainable fisheries**
The abandoned, lost or discarded fishing gears (ALDFG) made from polyamide and polyethylene are the root causes of ghost fishing, deterioration of fishing grounds and shrinking fisheries resources. To prevent problems caused by ALDFG, we have developed biodegradable fishing gears that can be decomposed in seawater without harmful impacts on the marine ecosystem. Such technology along with eco-friendly fishing methods will help us realize sustainable fisheries.

**Development of energy-saving fisheries technologies**
Our research focuses on reducing the resistance and improving the performance of fishing boats for safe fishing activities. Additional research endeavors include modernizing coastal fishing boats, developing highly efficient LED fish-luring lamps and recycling thermoelectric modules-based waste heat. This will not only help us save fuel and fishing operation costs but also help us cut carbon emissions.

**Development of fisheries-ICT converged technologies**
We have conducted research to apply ICT for fisheries to advance its infrastructure and services. To that end, we are working on putting in place a management system to set net fisheries and automatic feeders based on Internet of Things (IoT) and wearable mobile devices. Developing various fishing tools and equipment that can be used in the fields is another focus of our research.
It is obvious that global warming has changed the seawater temperature of Korea. Since the 1960s, NIFS has monitored and forecasted changes observed in the marine environment of Korea to provide information to fishermen in real-time. Such information is invaluable in establishing national ocean policies and conserving marine ecosystems.

We do everything we can do to respond to climate change and conserve marine ecosystem
Investigation and forecasting of changes in coastal marine environment

Monitoring of coastal marine ecosystem
We have established a NIFS Serial Oceanographic Observation System (NSO) to carry out regular observation on marine environments using satellites and autonomous observation equipment. We are also operating an information database on oceans and fisheries. Using collected data and an ocean circulation model, we are developing an ocean forecast model.

Mitigating fisheries damages caused by climate change
Climate change has caused growing damages to coastal fisheries. To address this problem, we provide real-time ocean information to fishermen and establish short-term ocean models. Additional tasks include studying the interaction between atmosphere and ocean and finding ways to provide necessary information to people using ICT.

Establishment of big data-based information database on oceans and fisheries
More tools such as drone, IoT-based observation tools and real-time monitoring system of fishing grounds have become available for in-situ observation. Our job is not only to standardize different data structures from various fields but also to cooperate with relevant competent authorities and build big data platform which will enable us to provide valuable services using the integrated data.

Real-time water temperature information service by the smart phone application

207 stations of NIFS Serial Oceanographic (NSO) Observation System in Korean waters

Sea surface temperature variation predicted by climate change scenario RCP 4.5 (top) and RCP 8.5 (bottom)
Study on how to respond to red tide and jellyfish

Monitoring the occurrence of harmful organisms
Mitigation of fisheries damages through real-time information service
Red tide and jellyfish are the main culprit to mass mortality of culture species. They are harmful to human beings as well. To mitigate damages to fisheries caused by these harmful organisms, we have established a monitoring system nationwide. Through this system, we provide real-time information on the occurrence and appearance of harmful organisms. We also study their physio-ecology to develop technology to help minimize damages caused by them and their interaction with marine environments.

Commercialization of eco-friendly red-tide control materials and field application
Clay dispersal has been a primary measure to control red tide. However, it has caused marine pollution. Thus, we are working on alternative materials to replace it. Our mission is to develop new and effective materials to control red tide through evaluating their field applicability and implications in benthic ecosystems and culture species.

Study of new harmful organisms introduced by climate change
Ballast water discharged by ships and invasive species entering into Korean water following currents are risk factors to our seas. These harmful organisms including toxic plankton and venomous jellyfish destroy marine ecosystems and disrupt marine leisure activities of people. To address these problems, we have established and operated a systemic observation system to track the appearance and origin of invasive species.
Establishment of ecosystem-based fishing ground management system

Monitoring of fishing ground environment and real-time information service
We monitor culture farm environments on a regular basis to mitigate damages caused by pollution and abnormal oceanic conditions. We not only provide necessary information to fishermen in a swift manner but also have established an information system on fishing ground environments to prevent any damages to culture farms.

Monitoring chemical contaminants and performing risk assessment
We conduct monitoring and risk assessment of legacy contaminants to define the status and trends of contaminants in estuarine, coastal, and marine ecosystems. We evaluate pollution and its toxic effects on fisheries. We detect hazardous chemicals in fisheries environments. We work with several government bodies to safely manage and control chemical contaminants in seafood and its environments. Our key researches are to provide information on the status and trend of contaminants in fisheries environments, develop standard analytical methods for seawater, sediments and fisheries, identify pollution sources and pathways and develop technology to reduce the levels of contaminants in fisheries.

Korea Laboratory Accreditation Scheme (KOLAS)
The Korea Laboratory Accreditation Scheme of the Korea Agency for Technology and Standards (KAST) has recognized the excellence of the quality control system and technical prowess of NIFS. NIFS is the only national institute certified as an official accredited laboratory that can test 26 chemical components in seawater and marine sediment. It provides certified test results to relevant government organizations and fishermen.
We strive for the production of safe seafood and the creation of high added values

We monitor harmful substances throughout Korean waters. In addition, we establish management guide to provide safe seafood to people and raise added values of fishery products. We also set up a system to monitor, diagnose and control aquatic diseases to improve the health of culture animals and secure the safety of seafood.
Study the industrialization of seafood

Promotion of converged food industry
To further promote food industry, a promising future industry, we have established cooperative ties with fisheries producers, processing industry and distributors. We are also conducting researches to advance the processing industry from simple processing industry to the one that creates high added values.

Development of youth-tailored high value-added fishery products
We encourage sustainable consumption of fishery products by developing customized foods that suit adolescents’ taste. Moreover, we actively promote the wellness image (e.g. ‘high-protein’ and ‘low-calories’) in developing processed fishery products to revitalize the seafood industry and pioneer new export markets.

Development of additional domestic species for surimi
We conduct research to evaluate the potential of deep-sea species that are not commercially used and domestic species that are temporarily oversupplied as sources for surimi. We will provide solutions for current issues about surimi production including the securement of potential sources for surimi, standardization of processing technologies and development of technologies to streamline the manufacturing process.
Sanitary survey and safe management of fishery products

Systemic management of designated shellfish growing areas
We are conducting sanitary surveys in 7 shellfish growing areas designated for exports and 64 coastal areas for shellfish production to establish a sanitary management system that meets the global standard. We are also striving for improvements in sanitary management to establish shellfish production system to allow people to safely enjoy shellfish products.

Enhancement of Norovirus monitoring and tracing studies on contaminant sources
Norovirus is a common cause of food poisoning in winter seasons. It is mainly developed from water or food contaminated by infectious feces. In order to provide safe fishery products, we are examining the contaminant source of Norovirus, providing management measures, evaluating the adequacy of contaminant management and defining the contaminant source by tracing studies.

Damage control by providing information and control measures on the occurrence of shellfish poisoning
Nationwide monitoring is being conducted in coastal areas to prevent food poisoning caused by paralytic shellfish poisoning and minimize its damage to fishermen. The monitoring results are shared with 11 central and local government agencies. Preemptive measures are taken to block poisonous shellfish from being distributed by promptly providing information on the occurrence of shellfish poisoning to the public through NIFS website and smart phone application.
Study on aquatic life diseases and establishment of disease control system

Study on aquatic life diseases and development of disease control technologies
In order to prevent disease-borne mass mortality of aquaculture animals, we are building foundations for disease research by examining the characteristics and development of pathogenic organisms of aquatic lives. We have also started to establish an integrated national aquatic disease control system since 2016.

Management of notifiable aquatic diseases and establishment of integrated national aquatic disease control system
In order to prevent the spread of contagious aquatic life diseases, we have designated 20 notifiable aquatic diseases and provided comprehensive and systemic preventive measures. In addition, we perform monitoring and surveillance on invasive contagious diseases in culture farms and implement follow-up measures after the breakout of diseases.

Legal tasks: permission of aquatic life medicines
NIFS is implementing legal tasks including permission on the manufacturing of aquatic medicines and manufactured items, authorization of vaccines, and animal pharmaceutical audit. An electronic civil service system for pharmaceuticals of aquatic animals is in operation to help the tasks of licensing pharmaceuticals so that the procedure is quick, convenient, and simple.

Domestic disease management system for aquatic life

Electronic civil service system for aquatic medicines
International cooperation

We take the lead in advancing and disseminating fisheries science technologies through international cooperations

We are seeking measures for developing maritime and fisheries science technology by adopting advanced science technology and establishing international network with advanced countries including the U.S. and Japan. Also, we are leading the globalization of fisheries technology by introducing our fisheries science technology through the management of ODA projects with countries in need.

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<tr>
<th>Nation (region)</th>
<th>Project Name</th>
<th>Field</th>
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<tbody>
<tr>
<td>Tanzania</td>
<td>The 2nd year of 2011 Yeosu Project</td>
<td>suitable cultivation site, aquaculture ecology</td>
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<td>Sri Lanka</td>
<td></td>
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<td>Grenada</td>
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<tr>
<td>Algeria (Ouargla)</td>
<td>Technical support on shrimp aquaculture at the Sahara desert</td>
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<td>Algeria (Algiers)</td>
<td>Support for industrialization of fishing and aquaculture</td>
<td>Fisheries and aquaculture industry</td>
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<td>Myanmar (Mandalay)</td>
<td>Building foundations for inland aquaculture industry</td>
<td>Inland Aquaculture Research Center</td>
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Major ODA projects of NIFS
Research Vessels

National Institute of Fisheries Science

- TAMGU NO.21 GT 990t
- TAMGU NO.20 GT 885t
- TAMGU NO.3 GT 369t
- TAMGU NO.7 GT 79t
- TAMGU NO.17 GT 31t

West Sea Fisheries Research Institute

- TAMGU NO.8 GT 282t
- TAMGU NO.2 GT 90t
- TAMGU NO.12 GT 70t

Southeast Sea Fisheries Research Institute

- TAMGU NO.10 GT 27t
- TAMGU NO.19 GT 10t
- TAMGU NO.11 GT 27t

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Coastal Wetland Research Center
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Seaweed Research Center
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