

Open innovation in agriculture, forestry, fisheries and food industries

# Field for Knowledge Integration and Innovation

Business-Academia Cooperation Office,  
Agriculture, Forestry and Fisheries Research Council,  
Ministry of Agriculture, Forestry and Fisheries

# Greeting

The aim of the Field for Knowledge Integration and Innovation is to introduce ideas and technology from different industries to agriculture, forestry, fisheries and food industries; to generate innovative research results; to contribute to the creation of new products and businesses; and to achieve industry-academia-government collaborations and open innovation.

It was established in FY 2016, and the 2nd term began with the approach of the 6th year. Currently, there are over 4,000 members and about 170 R&D Platforms in operation. Lively activities are underway across the country.

New products and businesses are also starting to be realized. We hope that things will spiral upwards based on these examples of success.

In order to further increase the competitiveness of agriculture, forestry, fisheries and food industries in Japan through innovation, activities in the 2nd term focus on increasing the spread of smart agriculture, the creation of new businesses in the startup ecosystem, and encouraging development into overseas markets.

Also, the Ministry of Agriculture, Forestry and Fisheries, which runs the office of the council, established the Strategy for Sustainable Food Systems, MeaDRI in May 2021 with the aim of achieving sustainability and productivity improvements in agriculture, forestry, fisheries and food industries through innovation. The Field for Knowledge Integration and Innovation is expected to be a place that contributes to this strategy through innovation from industry-academia-government collaboration.

With everyone's collective wisdom, we would like to work together to sustainably grow Japan's agriculture, forestry, fisheries and food industries and to create new businesses.

Council of Industry-Academia-Government Collaboration,  
Field for Knowledge Integration and Innovation

President KAWAMURA Kuniaki



# Table of contents



General diagram of the Field for Knowledge Integration and Innovation .....	1
Council of Industry-Academia-Government Collaboration.....	3
R&D Platforms .....	5
Research Consortiums .....	6
Examples of R&D Platforms Results .....	7
Basic Policy for the 2nd Term.....	9
Creation of a Startup Ecosystem .....	10
Promotion of Smart Agriculture .....	11
Encouraging Development into Overseas Markets .....	12

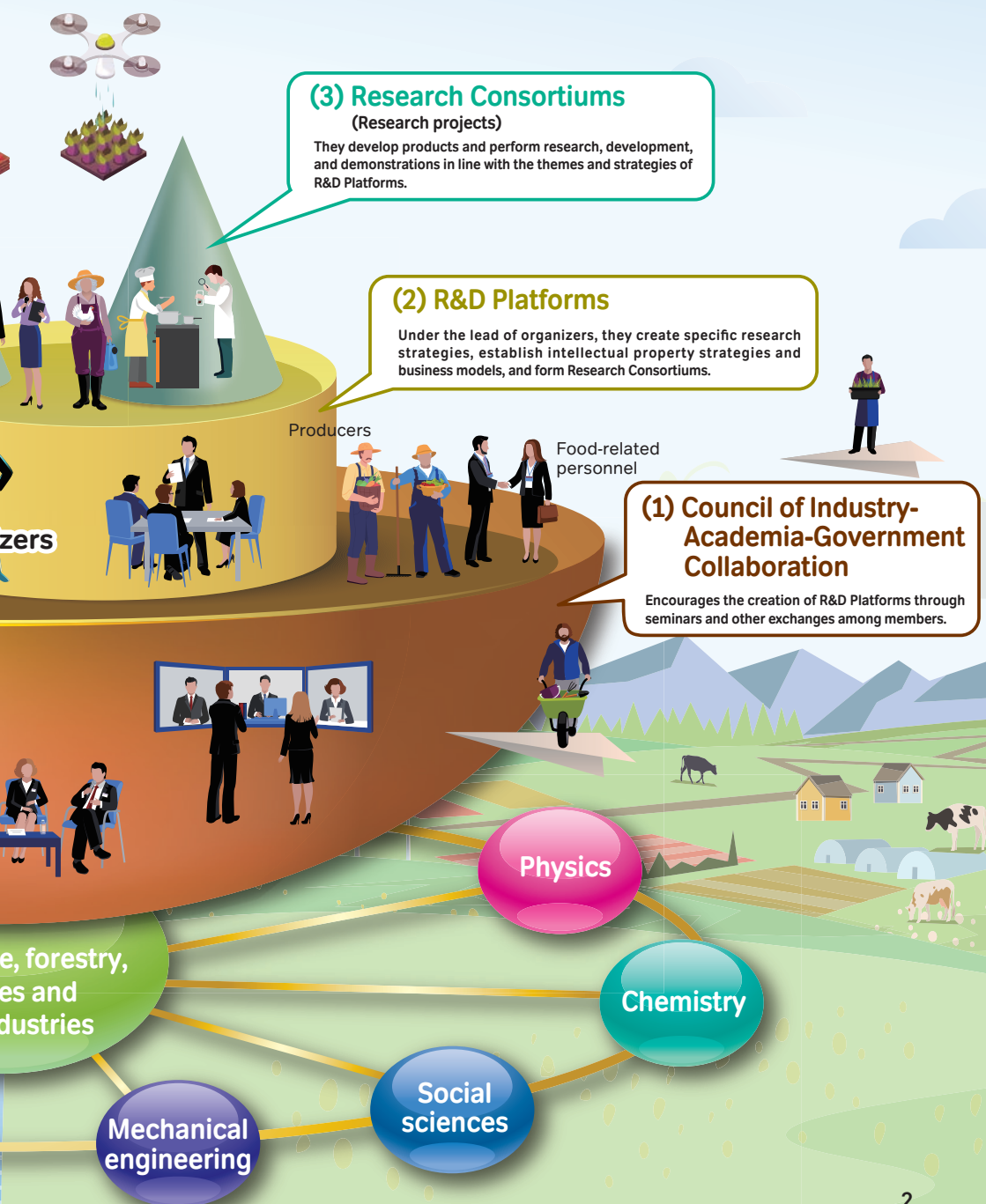


The new form of industry-academia-government collaboration

# Field for **Knowledge** Integration and Innovation

Council of Industry-Academia-Government Collaboration





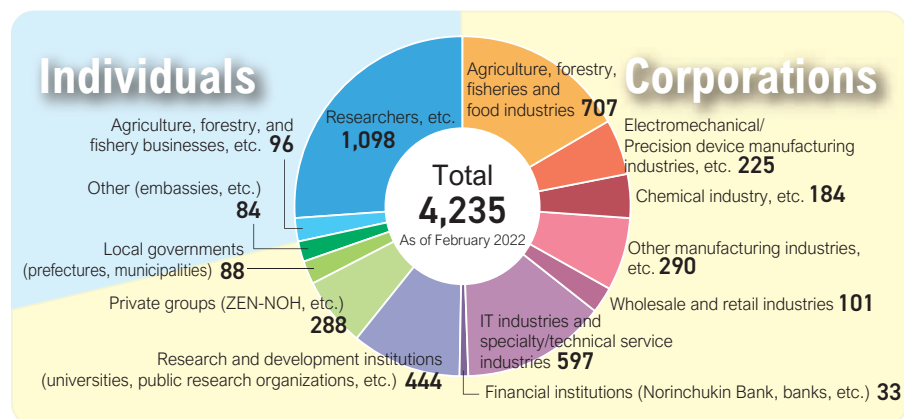
# (1) Council of Industry-Academia-Government Collaboration

The Council of Industry-Academia-Government Collaboration is an organization at the foundation of a three-layered structure that encourages the creation of R&D Platforms (→ P5) through the mutual exchange of information among members.

A wide range of corporations and individuals have become members, including universities, companies, local governments, private groups, producers, and others from industry, academia, and government. The total number of council members as of FY 2021 exceeded 4,000.

So that the potential of the council, which integrates the knowledge of its many members, can be fully used for innovation, the council plans many opportunities for exchange such as seminars and poster presentations, it encourages matching diverse “needs and seeds”, and it also establishes relationships for the formation of R&D Platforms.

## Member composition



## Council activities





## Collaboration and exchange among members and platforms (Poster presentations)

The council holds yearly poster presentations in order to encourage mutual exchange and collaboration among members, R&D Platforms, and Research Consortiums. These events are attended by many non-members and the press, and they are an opportunity for participants to widely introduce the details of their activities, research results, examples of commercialization, etc., to those both inside and outside of the council. In FY 2021, the event was held in a hybrid form on the internet through specialized websites and online sessions.



## Promotion of results

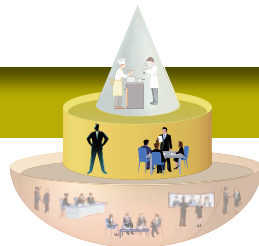


Various opportunities are established to gain wide recognition for the results of the Field for Knowledge Integration and Innovation.

At the Agribusiness Creation Fair (held by the Ministry of Agriculture, Forestry and Fisheries), participate to widely promote their activities through exhibition booths and seminars.

Also, as a part of initiatives to support the commercialization of these results, particularly for food industries, members are given the opportunity to participate in the JF Food Service Buyer's Exhibition and make proposals to restaurant and retail buyers.

## (2) R&D Platforms



R&D Platforms are research groups formed by council members with shared goals. Under the lead of the organizer, they specify a research theme and establish intellectual property strategies and business models. Also, in order to increase the number of members in a platform, encourage collaboration among members, and form a Research Consortium, many platforms hold study group and seminars.

In order to support the establishment of research strategies and conceptual business plans by platforms, the Council of Industry-Academia-Government Collaboration shares knowhow on how to operate platforms and successful examples of product and business creation through Business Creation Conferences and seminars with the participation of organizers.

### The five areas of industry

In order to clarify the direction of research and development in the council, form R&D Platforms, and encourage collaboration among platforms, the platforms have been classified into the following five areas of industry. In order to advance product and business creation, these classifications are based on industry rather than research.

**Smartization** Smart Agriculture, Forestry, and Fisheries and Smart Food Chains

**Healthy Food** Delicious and Healthy Food Development

**Sustainability** Sustainable Agriculture, Forestry, Fisheries and Food Industries

**Export Promotion** Promoting Export and International Collaboration regarding Agriculture, Forestry, Fishery, and Food Products/Technologies

**Biotechnology** Biotechnology-based Business Creation

### Innovation platform for aquaculture industries

**Sustainability**

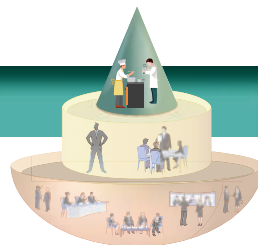


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The platform aims to create an industry that is highly profitable, reliable, and international as well as a new business model, and a new environmental-friendly and low-cost aquaculture system that produces safe, trustable, high-quality marine products. Through industry-academia-government collaboration and cooperation with other fields, the platform aims to solve problems in the marine industry and to create new businesses in order to promote research and development as required and develop the market.

Currently, over 200 members from various fields and industries are participating in the platform. The number of members is increasing due to study groups and on-site tours related to aquaculture. Many consortiums have been established from the platform, and they are involved in developing cultivation technology for octopuses, eels, and salmon.

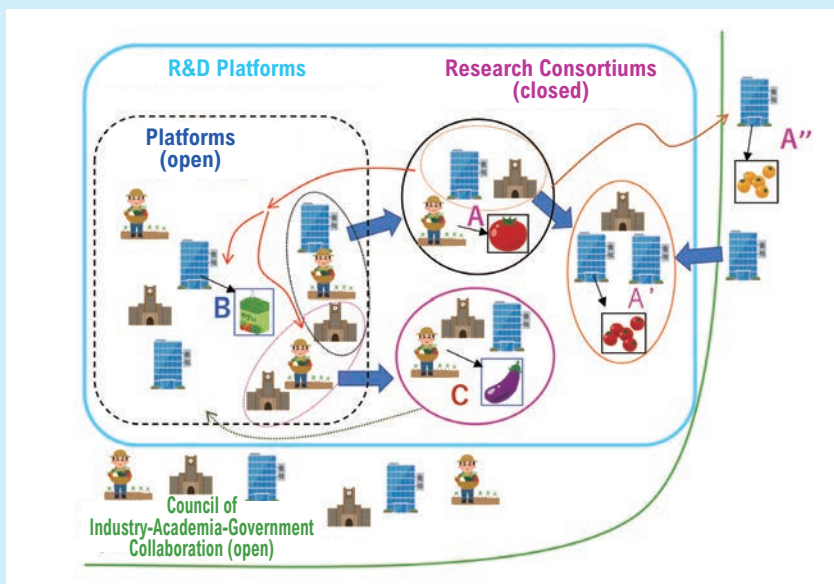
### (3) Research Consortiums



Research Consortiums are smaller groups established within platforms. They perform collaborative research projects led by a research representative, and they act as a working group for technological development and commercialization.

In the Field for Knowledge Integration and Innovation, consortiums are formed for the purpose of solving various research problems in agriculture, forestry, fisheries and food industries. They encompass phases from basic research through product development. The activities have various sources of funding. Consortiums involved in funding programs related to the Field for Knowledge Integration and Innovation make up the minority at 26%. Consortiums funded by the Ministry of Agriculture, Forestry and Fisheries or other ministries or local governments make up 36%, and the remaining activities are self-financed by private companies, etc.

#### Ecosystem for product creation



The goal of a platform is not always research and development through a consortium. It is important for not just the research results, but also the management and networking knowhow, etc., to make its way back to the platform for the formation of subsequent consortiums and product creation by the participating companies. It is up to the skill of the organizers to make the ecosystem function for the creation of products and businesses through research and development.

# Examples of R&D Platforms Results

## R&D Platform for high-functionality plant factories

Smartization

### Organizer: MATSUSHITA Konosuke

Research and development are underway with a focus on the social implementation of the research seeds of Shimane University in order to stimulate the hilly and mountainous areas in the San'in region.

Specialized hydroponic cultivation methods are used to commercialize low-potassium Shimane Yume Melons and related products, which have about 40% less potassium than conventional melons, and hypoallergenic Shimane Yume Wheat and its related ingredients and foods.



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## R&D Platform for a livestock production system using ICT

Smartization

### Organizer: IKEGUCHI Atsuo

With the collaboration of members from universities, livestock farms, and the IT industry, the platform aims for sustainable operations and productivity improvements through the use of ICT and big data.

Various ICT products have been put on the market for livestock farming, such as milking robots, waste transport robots, automatic bedding distribution machines, and other forms of automation for work inside barns. There is also a next-generation enclosed dairy house system with a forced push-pull low-profile cross ventilation (LPCV) system that controls the local environment by using imaging to detect the position of cows and alleviate heat stress for cows and workers; it also improves work productivity and milk yields through the real-time detection of milk quality and the discovery of issues with individual cows based on motion detection. Other product examples include Digital Mekan, which estimates the weight of pigs without contact based on image processing, and Robococco, an autonomous robot for detecting deceased chickens.



Next-generation enclosed dairy house system

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Digital Mekan



Robococco



## Self food planning platform for achieving health longevity in society

Healthy Food

### Organizer: SHIBUYA Takeshi

NARO, along with companies and universities with an interest in functional agricultural products that include numerous functional ingredients, have gathered with the aim of innovating health, food, and lifestyles through proposals for dietary protocols that achieve health longevity.

Frozen spinach that is rich in lutein, which helps maintain eye health, is being commercialized as a Food with Functional Claims. Also, fresh eggplant and eggplant supplements are being commercialized based on research results suggesting that eggplants have 3,000 times more choline ester, an ingredient that improves blood pressure and mood, than other vegetables.



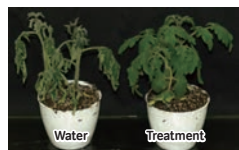
## R&D Platform for innovative agricultural production technology based on plant stimulation

Sustainability

### Organizer: NARUSAKA Yoshihiro

This platform aims to develop technology that activates the capabilities of plants and new technology for agriculture production.

Bio-stimulant materials increase plant activity and have a positive effect during periods of plant stress and growth. The Research Institute for Biological Sciences of the Okayama Prefectural Technology Center for Agriculture, Forestry, and Fisheries and Katakura & Co-op Agri Corporation jointly developed and have begun to sell Strong Liquid (micronutrient fertilizer), a material that combines the micronutrients required for plant growth with betaine, a substance that improves resistance to environmental stress.



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# Basic Policy for the 2nd Term (FY 2021 through FY 2025)

In the 2nd term, which began in FY 2021, the improvements made during the 1st term of the Field for Knowledge Integration and Innovation will be used to provide focused support for the creation of products and businesses based on research results and to improve the competitiveness of Japan's agriculture, forestry, fisheries and food industries through innovation.

## 1 New initiatives

Creation of a startup ecosystem (→ P10), promotion of smart agriculture (→ P11), Encouraging development into overseas markets (→ P12, etc.)

## 2 Things to be reviewed

Renewal of the platform classifications (categorization by target area of industry), etc.

## 3 Continued initiatives

Maintaining the three-layer structure, training organizers, protecting intellectual assets, strengthening marketing activities, evaluations of activities by outside experts



## Activities of the 1st term (FY 2016 through FY 2020)

During the 5 years from the start of activities in FY 2016 through FY 2020, developments were focused on activities to acquire members, to create matching opportunities for members, to hold seminars related to the intellectual property rights required to link research results with new businesses, and to share information. As a result, a platform for open innovation was achieved for exchange across various industries.

# Creation of a Startup Ecosystem

In order to create a startup ecosystem for agriculture, forestry, fisheries and food industries in the 2nd term, venture firms aiming to develop innovative technology or establish new businesses using already-developed technology will be given greater encouragement to participate so that startups can be matched with the underlying technologies of universities, perform research and development for business creation, and expand their businesses through collaboration with large companies.

## Comprehensive support for startups

In order to create new businesses in the agriculture, forestry, fisheries and food industries, the Ministry of Agriculture, Forestry and Fisheries started to provide comprehensive support for startups in FY 2021. Using the new Japanese SBIR (Small Business Innovation Research) system, startups aiming to create service business entities, develop new technology, or start a new business will be supported while they participate in the framework for industry-academia-government collaboration that had been promoted previously. In FY 2021, five research and development themes were established, there was an open call for applications, and 16 topics were accepted.

Seamless support for the research and development to be performed by startups is provided across three phases, including feasibility studies, the creation of prototypes, and public demonstrations. Accordingly, support is provided for the "emergent research" of young researchers that precedes the startup stage.

Support is provided for continual support activities such as the search for startups, the matching of companies in Japan and overseas, the effective use of incubators, and other activities performed by venture capital (VC) firms. Additionally, support is provided to establish an environment to quickly grow startups to be active internationally.

### Comprehensive support program for startups (SBIR support)

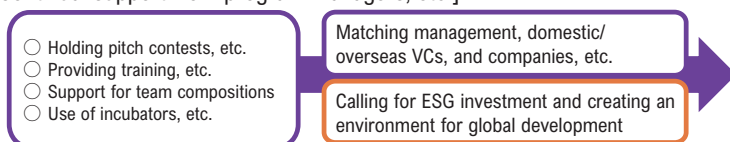


#### [Research and development]



\* Support is also provided for participation in overseas exhibitions, etc.

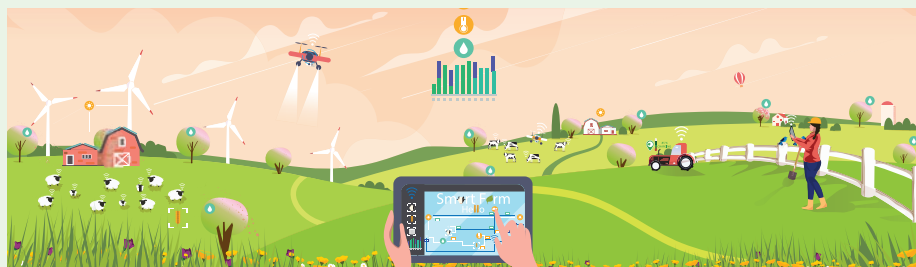
#### [Continual support from program managers, etc.]



# Promotion of Smart Agriculture

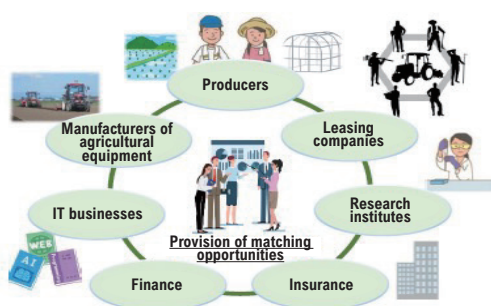
Smart agriculture, which introduces advanced technology such as robots, AI, and the IoT to agriculture, is expected to bring productivity improvements, solutions to issues such as a shrinking agricultural workforce and an aging population, reductions in the environmental burden of chemical pesticides and fertilizer, and improvements in sustainability.

The council, which aims for open innovation across industries, has set “smart agriculture, forestry, and fishery industries and smart food chains” as one of the five areas of industry. In order to support the activities of council members and R&D Platforms that contribute to smart agriculture, meetings to exchange ideas and matching seminars will be held, and industry-academia-government collaboration related to smart agriculture will be promoted.



## Platform for creating new services in smart agriculture

Smartization



Various members participate, including service businesses that support agriculture, manufacturers of agricultural equipment, leasing companies, and insurance companies. In order to create new services that contribute to the spread of smart agriculture, information is being shared on smart agriculture and services that support agriculture, and matching opportunities are being provided.

# Encouraging Development into Overseas Markets

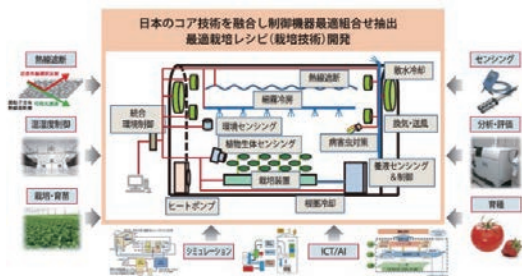
Over 60 embassies in Tokyo have joined the Council of Industry-Academia-Government Collaboration as of February 2022, and joint events, etc., are held to support the exchange of technology with overseas research institutes. Also, events are held to introduce technology uncovered in the Field for Knowledge Integration and Innovation. As of January 2022, the council has been recruiting overseas members to accelerate collaboration for research and development and the creation of products and businesses.



## Asian Monsoon PFS Consortium

**Export  
Promotion**

### R&D Platform for farm complexes in Society 5.0



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This platform aims to develop a highly profitable IT greenhouse that can function even in high temperature and humidity areas through the fusion of materials technology, temperature control technology, LED and sensor technology, cultivation technology, and ICT and AI technology in order to improve profits for operators, shift the market from imports back to domestic products, and improve competitiveness in overseas markets.

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Currently open to new members