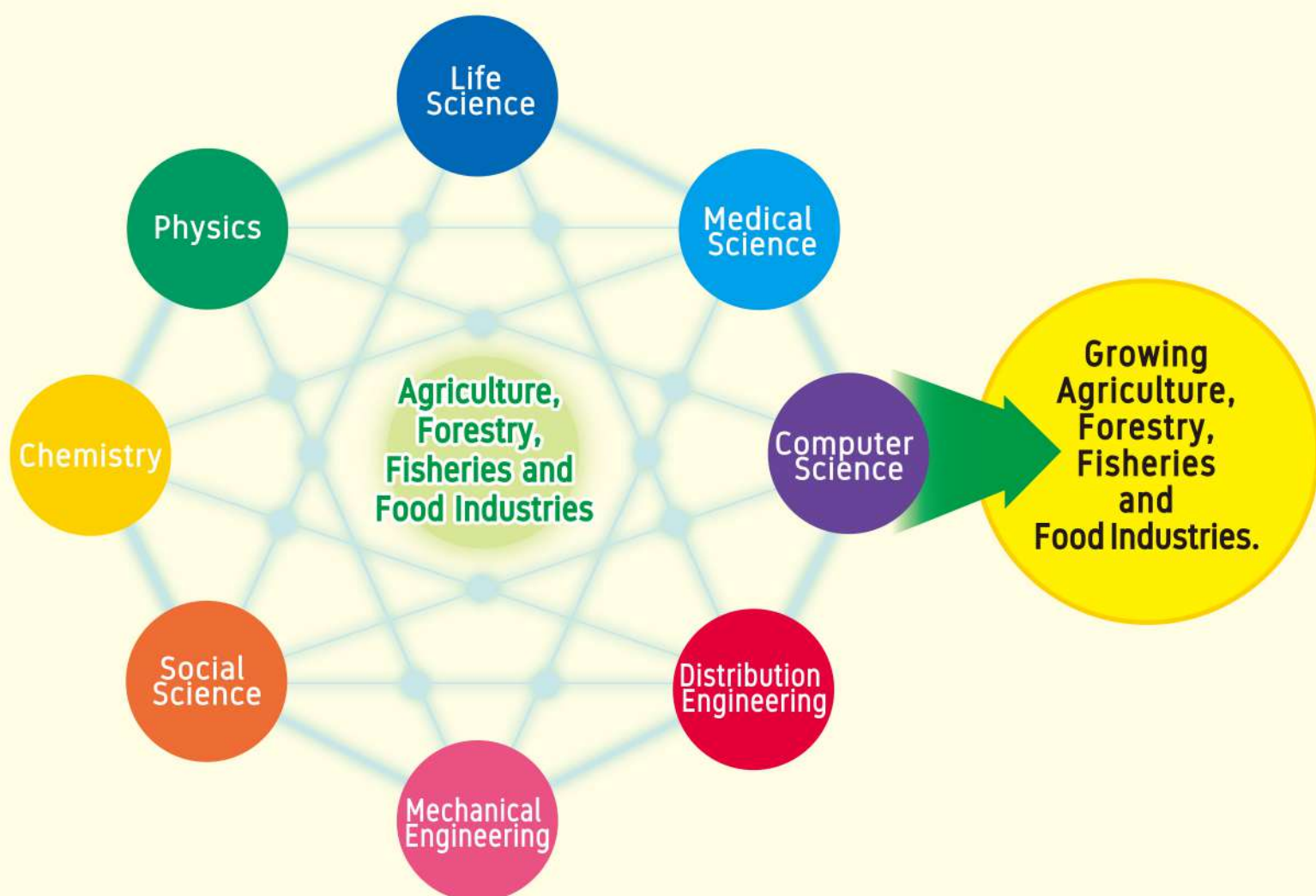


Field for Knowledge Integration and Innovation Technology List



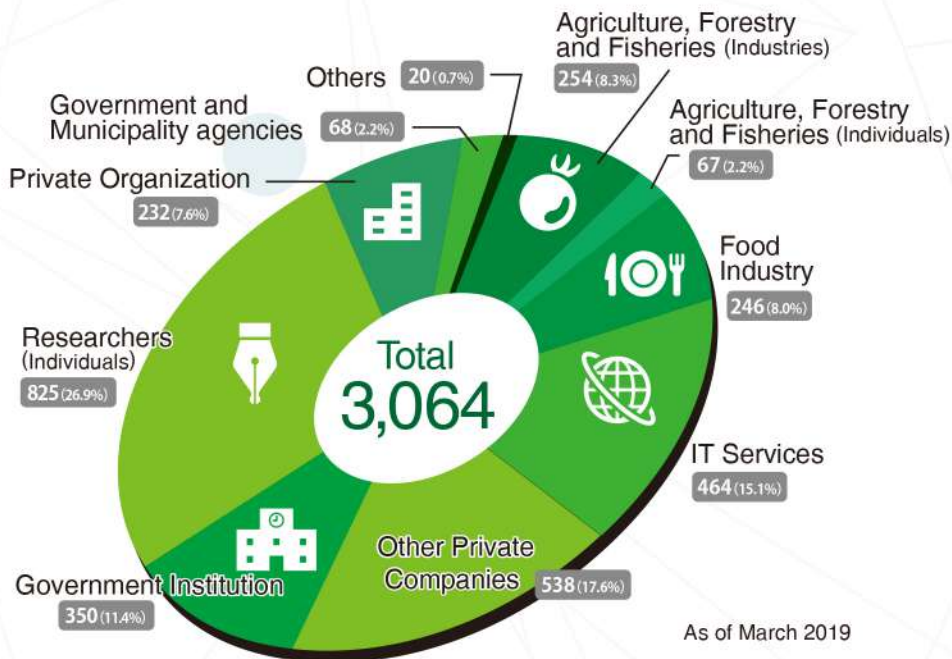
Field for Knowledge Integration and Innovation (FKII)

Council of Industry-Academia-Government Collaboration

New ideas/technologies are expected to strengthen agriculture, forestry, fisheries and food industries.

In April 2016, the Council of Industry-Academia-Government Collaboration has been launched to encourage the networking and collaboration among various industries and fields.

Membership Composition

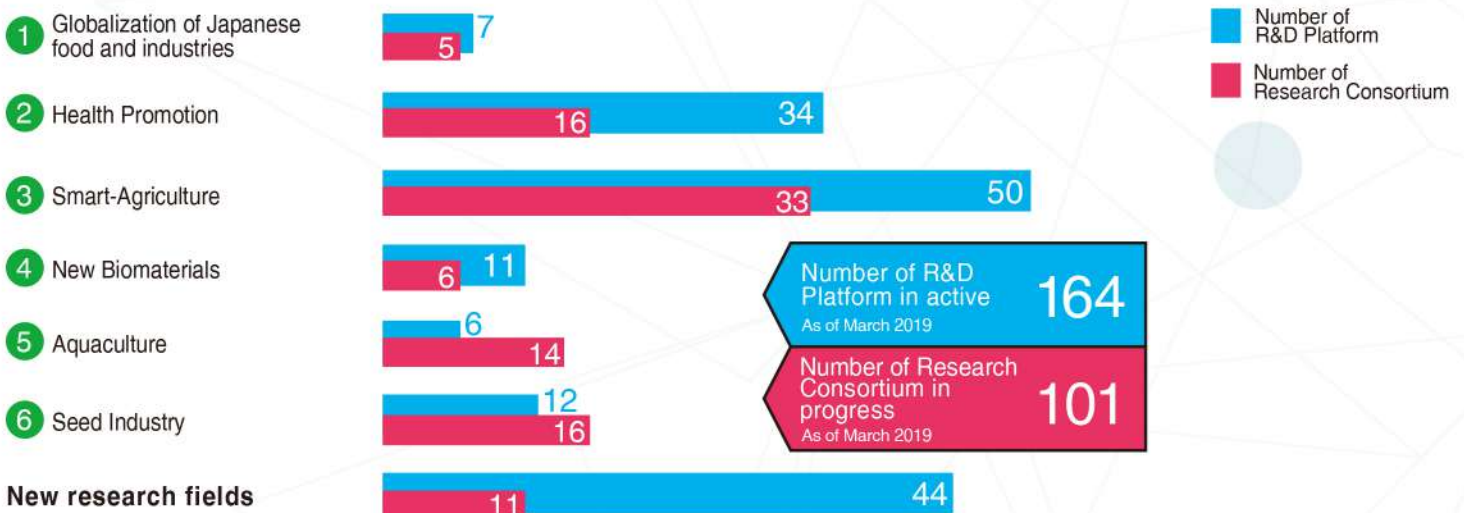


As of March 2019



Seminars/workshops are held regularly to encourage interactions among members.

Research fields currently encouraged



Technology List

Contents

No.1

Research Consortium

Development of plant factory system of Asian monsoon model

Members

Mitsubishi Chemical Corporation, etc.

No.2

Research Consortium

Research and development of functional foods to improve human health

Members

Yukiguni Maitake Co., Ltd., etc.

No.3

Research Consortium

Advanced Bio-carbons (ABC) Consortium

Members

Research Initiative for Supra-Materials, Shinshu University, etc.

No.4

Research Consortium

Development of marketing for Timber Windows and Canvas

Members

ARS Co., Ltd., etc.

No.5

Research Consortium

Development of Large Scale Marine Aquaculture System

Members

Nippon Steel Engineering Co. Ltd., etc.

No.6

Research Consortium

Development of the novel Japanese brand fish which possess export competitiveness by land-based recirculating aquaculture system (RAS)

Members

Maruha Nichiro Corporation, etc.

No.1

Research Consortium

Development of plant factory system of Asian monsoon model

Members

Mitsubishi Chemical Corporation, Panasonic Corporation, FUJIFILM Corporation, Sharp Corporation, Citizen Electronics Co., Ltd., TAKII & Co., Ltd., HORIBA Ltd., National Agriculture and Food Research Organization, Japan International Research Center for Agricultural Science, Nagoya University, Osaka University, The University of Tokyo & Hokkaido University.

Technology/Product Outline

- 1 Solar-typed plant factory that can be used in hot and humid environments.
- 2 Heat shielding film to reduce running costs.
- 3 Cultivation technology for high-quality tomatoes and strawberries.
- 4 Certification indicators, sensors, and seedling raising equipment that guarantee the quality of Japan Premium Vegetables.
- 5 Plant factory Operation system and agricultural management training system using ICT and AI.

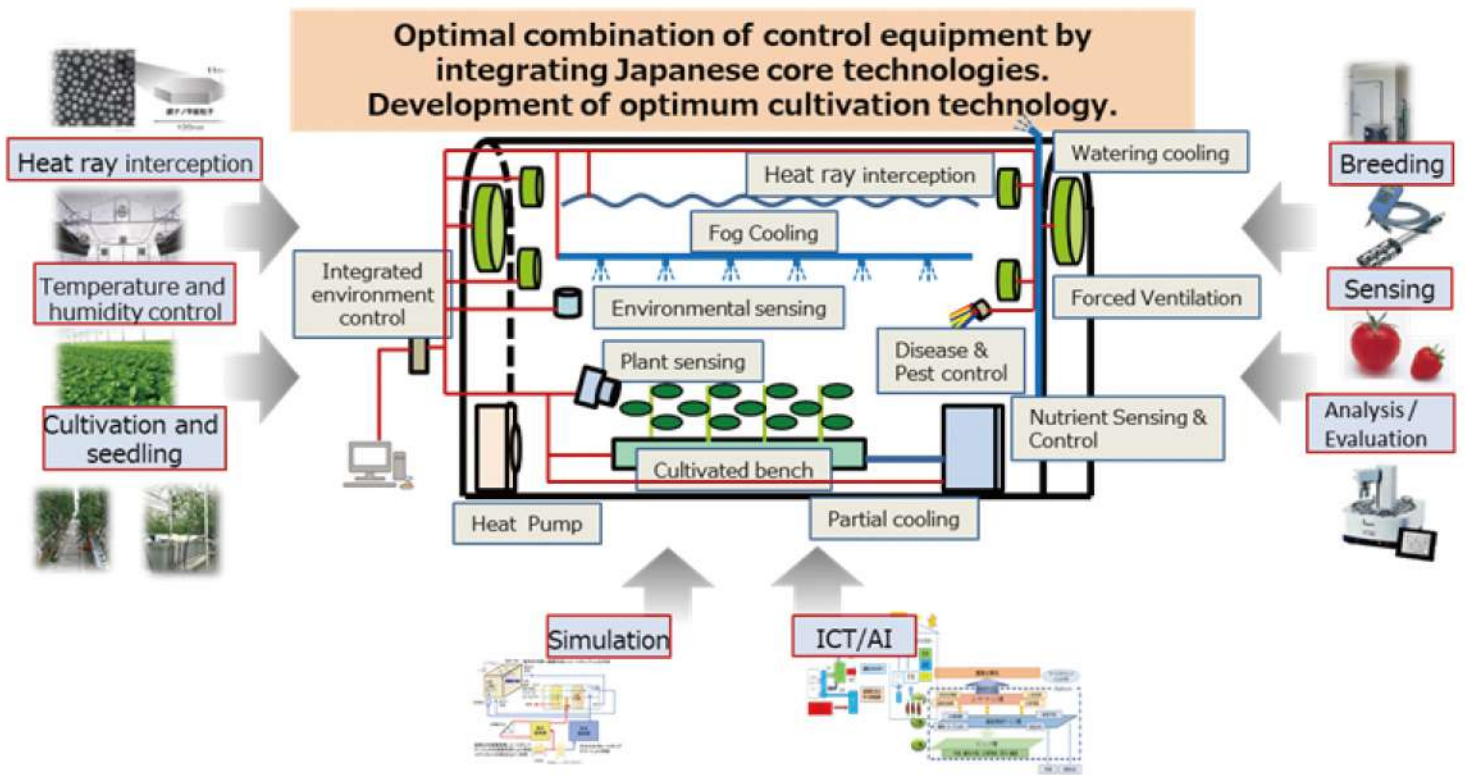


Fig.1 Over view of Plant factory system.



Fig.2 Growth of tomatoes and strawberries.

Members

Yukiguni Maitake Co., Ltd., Chubu University,
University of Toyama & Yaegaki Bio-industry, Inc.

Technology/Product Outline

- 1 Discovery of mushroom materials, especially Maitake (*Grifola frondosa*) to prevent viral infections; Effective against influenza (flu), herpes simplex and mouse norovirus infections by oral administration (Pharmacology).
- 2 The first established case of producing pure ergothioneine from natural sources, purified by using only water and ethanol.

1

Pharmacological effects of anti-viral infection by oral administration of Maitake(M-51 strain, dried powder 5mg/day/mouse, *p.o.*).

Virus	Suppression of viral yield	Symptom improvement effect	Increase in neutralizing antibody titer
Flu	+	+	+
Herpes simplex	++	++	ND
Noro	+	+	+

++: Strong, +: Moderate, ND: Not Determined

2

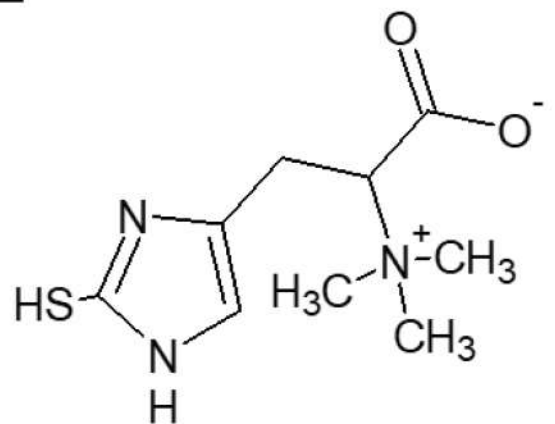
Process for producing pure ergothioneine from mushrooms.

Eringi (*Pleurotus eryngii*)

**Tamogitake (*Pleurotus cornucopiae*)
mycelium**

- ↓ Cultivation
- ↓ Purification
- ↓ Crystallization

Ergothioneine crystal



Members

Research Initiative for Supra-Materials, Shinshu University, The University of Tokyo Institute for Future Initiatives, Graduate School of Agricultural and Life Sciences, The University of Tokyo, Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Department of Chemical Science and Engineering, Tokyo Institute of Technology, Kyoto Institute of Technology, NISSIN KOGYO CO., LTD., Bando Chemical Industries, LTD., The Yokohama Rubber Co., Ltd., Fukoku Co., Ltd., Kowa Rubber Industries co., Ltd., SAKAGAMI SEISAKUSHO LTD., KITAGAWA INDUSTRIES CO., LTD., Nano Summit Co., Ltd., Internet Initiative Japan Inc., Sango Co., Ltd., RENFRO JAPAN Co., Ltd., MIZUNO Corporation, KINYOSHA CO., LTD. & Daikin Industries, Ltd.

Technology/Product Outline

- 1 Nanomaterials creation technology, and achievements in practical application, and nano-nano composite technology as a common base.
- 2 Main use of forest resources based bio-nanocarbon and nanocellulose.
- 3 Creation of innovative new materials such as materials that combine lightness, strength and toughness, and new functions.
- 4 Practical application development with companies.

seals



Wearable and washable vital sensor



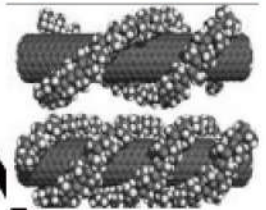
Tray type deodorizing equipment



Agricultural machine belt



Carbon fiber binder



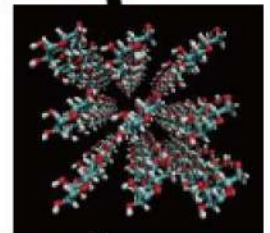
material:
thinned wood, bamboo, leaves, etc.

nanocellulose, purified forest material, lignin and other extracts

bio-nanocarbon

composit

cellulose nanofiber model



Ultra-light and high-strength materials (rubber and resin), deodorant / adsorbents, thermoelectric / dielectric materials, etc

EMC products



Proactively applying innovative materials to agriculture

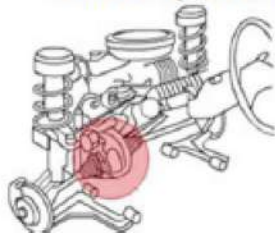
Agricultural forestry tires



Roller for agricultural machinery



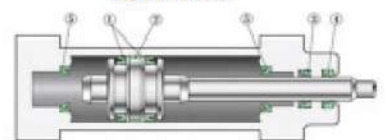
Oil seal products



Watertight rubber products



cylinder



Members

ARS Co., Ltd., Maruoka Co., Ltd. & Howdy Co., Ltd.

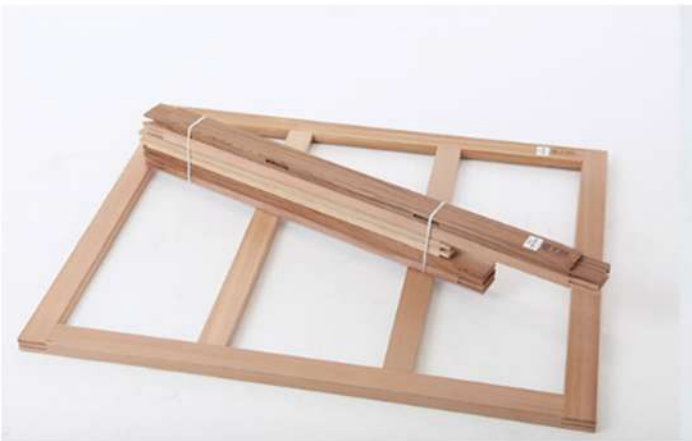
Technology/Product Outline

- 1** Timber Windows
 - Wooden window frames with higher airtight, thermal and fire-proof performances.
 - Natural and recyclable products providing warm and cozy atmosphere.
- 2** Art Canvas
 - Natural wooden products with high assembly precision.

Timber Windows



Stretcher Strips



Canvas



Development of Large Scale Marine Aquaculture System

Members

Nippon Steel Engineering Co., Ltd., Nippon Suisan Kaisha, Ltd., Yumigahama Suisan Kaisha, Ltd., Kurose Suisan Co., Ltd., Panasonic Corporation, The University of Tokyo, Tottori University of Environmental Studies, National Institute of Technology, Yonago College, Tottori Prefectural Fisheries Research Center, Miyazaki Prefectural Industrial Technology Center, University of Miyazaki & Miyazaki Prefectural Fisheries Research Institute.

Technology/Product Outline

- 1** Automatic Feed System : Remote control facilities to transport the pellet type feed into each cage through pipelines by compressed air.
- 2** Large Scale Submergible Cage : Underwater steel cage system (30m-50m square and 20m depth) has larger size compared to conventional system (10m square and 10m depth).

“Automatic Feed System” and “Large Scale Submergible Cage” will provide farmers following solutions;

Expansion of feeding area

Mass-production

Labor-saving

Less impact on marine environment



Automatic Feed System

Large Scale Submergible Cage

No.6

Research Consortium

Development of the novel Japanese brand fish which possess export competitiveness by land-based recirculating aquaculture system (RAS)

Members

Maruha Nichiro Corporation, KITZ Corporation, JX ANSI Corporation, JXTG Nippon Oil & Energy Corporation, Japan Fisheries Research and Education Agency, Yamagata prefecture & National Institute of Technology, Kagawa College.

Technology/Product Outline

- 1** KITZ smart aquaculture system : Innovative land-based recirculating aquaculture system with water quality management automatically controlled and rearing data managed by cloud ICT.
- 2** High-grade cherry salmon (Masu salmon : *Oncorhynchus masou*) : Land-based recirculating aquacultured cherry salmon, a high-grade Japanese endemic species with ASC international certification.
- 3** Organic Astaxanthin : Non synthetic, natural astaxanthin from *Paracoccus carotinifaciens* for salmon meat pigmentation.
- 4** Full life cycle land-based recirculating aquaculture : Specific pathogen free (SPF) smolt production and systematic selective breeding could be performed by growing eyed eggs to adult fish within land-based recirculating aquaculture system.
- 5** Anaerobic bioreactor : Zero-emission could be achieved by treating organic effluent with this bioreactor using specific anaerobic microorganism.

The analysis of culture characteristics of cherry salmon




Water temperature · DO · pH · Light · ammonium · feeding rate etc.

Grasp of the optimal culture conditions


Achievement of high growth and high survival

The demonstration of cherry salmon culture by innovative land-based aquaculture system




KITZ smart culture system

Data management by cloud ICT



Warning mail (24h/365d)

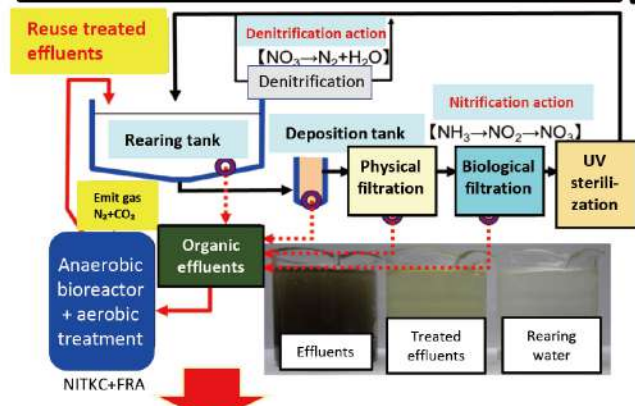
Automatic control



Automatic management of water quality

The demonstration of high efficiency land-based aquaculture by complete management


The demonstration of zero-emission land-based aquaculture




To be consistent with environmental preservation and land-based aquaculture

The development of specified feed for cherry salmon

The utilization of yeast residue



Improvement of breeding results by reducing cost through fish meal alternatives




Coloration: natural red meat

Astaxanthin from nature

The production of high valued cultured fish


Get International Certification



Develop an international brand of the highest grade cherry salmon

[Differential Factors]

- Japanese endemic species
- High quality meat and color
- Complete environmental preservation
- Safe and secure material



Make a trial calculation of practical applications and an assessment of commercialization in International market

Build a novel aquaculture business model for export

MAFF

**Ministry of Agriculture,
Forestry and Fisheries**

Contact: Business-Academia
Cooperation Office, Ministry of Agriculture,
Forestry and Fisheries

<https://www.knowledge.maff.go.jp/en/fkii.html>
For Inquiries, Email: gikaikoho@maff.go.jp

MAFF & FKII 

