

JIRCAS

2023-2024

Japan International Research Center for
Agricultural Sciences

Together for our food and planetary health





Together for our food and planetary health

Japan International Research Center for Agricultural Sciences

JIRCAS, a National Research and Development Agency under the Ministry of Agriculture, Forestry and Fisheries, plays a core role in international collaborations in the field of agriculture, forestry, and fisheries research in Japan.

We will contribute to solving global food and environmental problems through effective and intensive implementation of research and development and by strengthening the functions of the center.

History

1970

▶ Establishment of the Tropical Agriculture Research Center (TARC) by the Ministry of Agriculture and Forestry

1977

▶ TARC Headquarters was transferred from Kita-ku, Tokyo, to Tsukuba City, Ibaraki

1993

▶ Reorganization of TARC into Japan International Research Center for Agricultural Sciences (JIRCAS)

2001

▶ Restructured as Incorporated Administrative Agency (IAA) [Formulation of the First Medium-Term Plan]

2006

▶ [The Second Medium-Term Plan]

2011

▶ [The Third Medium-Term Plan]

2015

▶ Restructured as National Research

2016

Collaborative Research Countries and Regions



Main Objectives

- 1** To undertake comprehensive experimental research for technological advancement of agriculture, forestry, fisheries, and related industries in tropical/subtropical zones and developing regions;
- 2** To collect, analyze, and publish information of domestic and international researches which are relevant to agriculture, forestry, and fisheries;
- 3** To invest in and provide manpower and technical support to businesses that utilize the results of experimental research;
- 4** Through the above, to contribute solutions to global food and environmental problems as well as to the stable supply of agricultural, forestry, and fishery products and resources.

and Development Agency (NRDA)

▶ [The Fourth Medium to Long-Term Plan]

2020

▶ The 50th Founding Anniversary of JIRCAS

2021

▶ [The Fifth Medium to Long-Term Plan]

Basic Principles

Solutions to global food and environmental problems

JIRCAS will propose optimum technologies for solving difficult global problems such as food insecurity, malnutrition, and sustainable management of natural resources and the environment, by making full use of the most up-to-date scientific knowledge.

Center of excellence in the field of international agricultural research

JIRCAS, as the sole national research institute in the field of international agriculture, forestry, and fisheries representing Japan, will lead international scientific dialogues and contribute to national food security as well as to the prosperity and stability of international society.

Operation Policies

Maximization of the results of research and development

JIRCAS will always be aware of the outcomes and the actual utilization of research and study results, and work toward maximizing the results of research and development which can make a broad impact to the societies.

Strengthening of domestic and international collaboration and cooperation

JIRCAS will provide opportunities for collaboration and cooperation between domestic and foreign researchers, research institutes, administrative bodies, development agencies, farmers, and companies among others, and promote the creation of innovation in the area of agriculture, forestry, and fisheries.

Providing a pleasant and safe work environment

JIRCAS will provide a safe, pleasant, and rewarding work environment for all executives and employees, and continue to pursue efficient and high-quality activities.

Top Message

“Together for our food and planetary health”

The Japan International Research Center for Agricultural Sciences (JIRCAS), including its predecessor organization, has been conducting international joint research with local research institutes and universities in the tropics and subtropics as well as in developing regions for over 50 years. It is a unique Japanese national research and development agency that contributes to the improvement of agriculture, forestry, and fisheries technologies overseas, and eventually to the development of the world’s agriculture, forestry, and fisheries industries.

The situation surrounding the world’s agriculture, forestry, and fisheries industries has changed significantly with the times, but JIRCAS has consistently presented solutions to food and environmental problems through research and development, and has continued to make international contributions through science and technology. Expectations for novel technology development in agriculture, forestry, and fisheries have also changed during the era of large production increase led by the Green Revolution, the era of export competition between developed countries, the era of deepening awareness of global environmental problems, and the era of volatile food prices due to the economic crisis. Particularly in the countries and regions targeted by JIRCAS, the need for new technologies is changing drastically due to economic globalization, urbanization, and rapid economic growth. At the same time, the world’s expectations of Japan are also changing.

As global issues such as climate change become more apparent, many activities are being developed to achieve the Sustainable Development Goals (SDGs), which are shared goals of the international community. In September 2021, the United Nations Food Systems Summit was held, confirming that a series of activities related to food production, processing, transport, and consumption will be transformed into a sustainable system. In October 2020, Japan also declared its goal of achieving carbon neutrality by 2050, and so in May 2021, it issued a policy called the “Strategy for Sustainable Food Systems, MIDORI.” It aims to both enhance productivity potentials and ensure the sustainability of agriculture, forestry, fisheries, and food industries through innovation. The government has taken action and has been promoting initiatives to achieve this.

In light of these changes in the situation surrounding international agriculture, forestry and fisheries research, the Ministry of Agriculture, Forestry and Fisheries (MAFF) in March 2021 directed the 5th Medium to Long-term



Target (FY2021-2025) of JIRCAS, whose lofty mission is stated as follows: “As a research institution representing Japan in the field of international agriculture, forestry, and fisheries, JIRCAS aims to enhance agriculture, forestry, and fisheries technologies in the world, including Japan, and to contribute to the advancement of sustainable agriculture, forestry, and fisheries, towards the accomplishment of the government’s policy under the Basic Plan for Food, Agriculture and Rural Areas.” The target also specified two priority tasks: the effective and intensive implementation of research and development to contribute to solving global food and environmental issues, and the enhancement of function for collecting and analyzing multi-dimensional information related to the issues and for its broader dissemination.

Under the slogan “Together for our food and planetary health,” JIRCAS is systematically promoting its work by establishing a medium to long-term plan, annual plans, programs, and projects in order to achieve its Medium to Long-term Target. We shall always be aware of our mission as a national agency using public funds, and we will strive to work together to create new values for the common good of humanity. We look forward to your continued support and cooperation.

KOYAMA Osamu
President

JIRCAS Medium to Long-Term Plan

FY 2021



2025

3 Main Programs



Environment



Food



Information

Development of agricultural technologies for climate change, resource recycling and environmental conservation

P8 ▶▶ P11

- Development of comprehensive agricultural technologies for climate change mitigation and adaptation in Monsoon Asia
- Development of carbon recycling technologies to address global issues caused by agricultural waste
- Development of planet-friendly agricultural production systems using biological nitrification inhibition (BNI) technology
- Evaluation of genetic resources for strengthening productivity and adaptability of tropical forests
- Development and evaluation of environmental conservation technologies for tropical islands through an approach emphasizing Yama-Sato-Umi (Ridge-to-reef agroecosystem) connectivity
- Development of sustainable land management technologies under extreme weather conditions in drylands

Technology development towards building a new food system with improved productivity, sustainability and resilience

P12 ▶▶ P15

- Development of resilient crops and production technologies
- Design of crop breeding and food processing of indigenous resources to create new and diversified demands
- Development of environment-friendly management systems against transboundary plant pests based on ecological characteristics
- Development and dissemination of sustainable aquaculture technologies in the tropical area based on the eco-system approach
- Development of sustainable rice cultivation and food production systems in Africa
- Development of soil and crop management technologies to stabilize upland farming systems of African smallholder farmers

Strengthening function as an international hub for providing strategic information on agriculture, forestry and fisheries, and mobilizing new research partnerships

P16 ▶▶ P19

- Strategic information hub for international agricultural research
- Practical application of global research results and establishment of a model platform for promoting private-sector research collaboration and creating new business ventures
- Towards the development of digital agriculture technologies in Sub-Saharan Africa (FY2021–2022)
- Advancement of tropical crop genetic resources utilization through the development of database technologies and research networking
- Accelerating application of agricultural technologies which enhance production potentials and ensure sustainable food systems in the Asia-Monsoon region (FY2022–)



Program A

Environment



Development of agricultural technologies for climate change, resource recycling and environmental conservation

In October 2020, the so-called “carbon neutral” challenge began in Japan when it announced its aim to achieve zero greenhouse gas (GHG) emissions by 2050 and realize a decarbonized society. In May 2021, the Ministry of Agriculture, Forestry and Fisheries formulated the Strategy for Sustainable Food Systems, MIDORI to actively contribute to this effort. To achieve carbon neutrality, it is important to reduce GHG emissions from agricultural production.

Accelerated GHG emissions through crop cultivation, livestock production, and extractive forest resource use can amplify the burden on people's lives and society. Many farmers in developing regions that rely heavily on agriculture, forestry, and fisheries are small-scale farmers; thus, reduced production due to floods and droughts can threaten their daily livelihoods. Clearly, the increase in atmospheric concentrations of GHGs can directly and indirectly hurt people's lives. We need a carbon-neutral society in order to realize the 17 Sustainable Development Goals.

The Environment Program of JIRCAS aims to achieve the twin goals of ensuring sustainability in the agriculture, forestry, and fisheries sectors and establishing appropriate resource management by maximizing resource use efficiency in developing regions that are heavily dependent on agriculture, forestry, and fisheries. To achieve these goals, we will work with national agricultural research institutes and other organizations in such countries, through cooperation, to develop technologies needed by small-scale farmers who are exposed to the effects of climate change, and for each country to achieve its own nationally determined contribution (NDC) target to reduce its GHG emissions. In addition, as part of the “MIDORI,” which is the culmination of Japan's science and technology innovation and a model for initiatives in the Asia-Monsoon region, we are promoting international joint research with countries in the region.

In developing regions that rely heavily on agriculture, forestry and fisheries, we will address the ongoing climate change on a global scale and maximize the efficiency of resource use so that the environment does not exceed a critical point, thereby achieving both sustainable agriculture, forestry and fisheries and appropriate resource management.



Accelerate research through domestic and international collaboration, and actively disseminate information to international networks

Development of carbon-neutral and sustainable agriculture, forestry and fisheries technologies that promote climate change mitigation and adaptation

Climate change measures

Climate change measures in Monsoon Asia
Adaptive forestry



Wide area water management, ICT utilization (Vietnam etc.)



Environmental adaptation model, growth prediction model (Indonesia, etc.)

Resource recycling

Carbon recycling
BNI-system



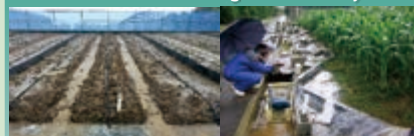
Microbial saccharification and gasification (Malaysia, Thailand)



BNI-enabled wheat, development of cultivation technology (India, Colombia etc.)

Environmental conservation

Yama-Sato-Umi agroecosystem connectivity
Sustainable land management in drylands



Soil erosion, soil runoff reduction (Philippines, Ishigaki)



Low-cost drainage improvement, efficient irrigation (India)

Climate Change Measures in Monsoon Asia Project

This project aims for social implementation and dissemination of technologies that could be applied by smallholder farmers to address climate change in the Asia-Monsoon region. These technologies are associated with mitigation measures such as GHG emissions reduction from paddy fields and livestock and soil carbon storage, and adaptation measures such as water-saving cultivation and improved water management. We plan to accumulate evidence that these technologies are easy for local farmers to accept and can lead to various co-benefits, and we will make policy recommendations to the governments of partner countries.

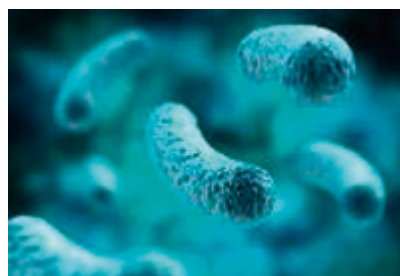
Furthermore, we will develop GHG mitigation technologies from both enteric fermentation and manure management through utilization of locally available resources. These technologies will be evaluated using GHG Life Cycle Assessment and improved through action research to make them more applicable to farmers.



Providing technologies applicable to farmers with the aim of reducing GHG emissions from paddy fields and livestock

Carbon Recycling Project

In this project, we will develop a microbial saccharification-gasification bioreactor that generates methane, carbon dioxide, and hydrogen from agricultural waste with high efficiency. In addition, we will work on the development of nutritional pigments and fuel production technologies using the various gases generated, and the development of technologies for producing high value-added substances such as bioplastics. To recycle agricultural waste, it is important to understand the environmental impact of agricultural waste on a global scale. Therefore, we will propose utilization and management methods for agricultural waste by promoting GHG data conversion and crop impact assessment when agricultural waste is abandoned on agricultural land. Furthermore, we will promote the spread of carbon recycling technologies jointly with private companies, government agencies, local governments, and agricultural cooperatives, with the aim of facilitating social implementation.



Development of carbon recycling technology by microbial saccharification

BNI-system Project

JIRCAS has revealed that biological nitrification inhibition (BNI), the natural ability of certain plant species to control nitrification in natural ecosystems, enables crops to maintain high productivity while reducing environmental burden resulting from nitrogen fertilization, which has already far exceeded the planetary boundary. We had formed the BNI International Consortium with institutions globally and are working to develop BNI technologies to enhance production potentials and ensure sustainability.

This project is currently focusing on four crops, i.e., wheat, maize, sorghum, and *Brachiaria* pasture grass. To reduce the environmental burden of nitrogen fertilization of wheat, the world's second largest crop, we particularly developed BNI-enabled elite-wheat lines, and the lines are presently undergoing field evaluations for possible deployment in major wheat-growing regions such as the Indo-Gangetic Plain (IGP), a major wheat-producing area in India, where there is a growing demand for wheat. BNI research for maize, the most widely grown crop, had been initiated, and BNI compounds are being elucidated. We are further utilizing this clue to establish a maize production system with BNI.



BNI research by JIRCAS is currently focused on the above crops.

Adaptive Forestry Project

To promote effective forest restoration, this project conducts the following research activities on native tree species in Southeast Asia: (1) Evaluation of the growth and properties of wood, as well as their adaptability to environmental changes such as higher temperature and drought, to propose tree species and land suitable for planting, (2) Application of genomic selection to the breeding of teak in Thailand and dipterocarps in Malaysia and Indonesia to significantly shorten the breeding cycle,



Teak seed orchard

(3) Development of silvicultural techniques with growth prediction based on the evaluation of the physiological characteristics of tree species in order to plant an appropriate combination of tree species and strains that can adapt to the environment of the planting area, (4) Evaluation of the impact of tree planting on ecosystem functions and the proposal of operational guidelines for recovering these functions, and (5) Promotion of international networks to share the obtained information on tropical forest genetic resources.



Dipterocarp seedlings (left), Mangrove forest (right)

Yama-Sato-Umi Agroecosystem Connectivity Project

Aiming at sustainable development in tropical islands, this project will develop technologies to reduce environmental load through appropriate resource circulation from montane to coastal ecosystems (Yama-Sato-Umi Agroecosystem). In mountain areas, we will develop a rural livelihood system that improves water-soil conservation function and rural livelihood inspired by the Japanese Satoyama management. In the village, we will work on the development of a sustainable technology consisting of an underground irrigation system, organic matter application, and improved fertilizer application, as well as the development of a sugarcane cultivation system and potential breeding lines. Furthermore, we will focus on mangroves and macro- and microalgae in the hydrosphere environment to develop a water quality conservation system based on their biological functions. To ensure that the technologies developed by JIRCAS are applied in a sustainable manner and that they are widely utilized in the areas, we will also assess the environmental impact and clarify the applicable conditions for the introduction of our technologies.



Construction of technology and material cycle to reduce the environmental load of mountains, villages, and the sea

Sustainable Land Management in Drylands Project

Desertification, a phenomenon in which soil degradation occurs in drylands, is one of the most urgent environmental problems in the world. The frequency of extreme weather events such as droughts and heavy rains has risen markedly in recent years, threatening food and nutrition security especially where desertification has progressed significantly. To achieve sustainable agriculture and food and nutritional security, this project is developing a sustainable land management (SLM) strategy that conserves soil resources while maximizing the efficiency of water resource utilization. In northern India where salinization due to improper water management and waterlogging due to heavy rain are major problems, we will develop low-cost drainage improvement technologies that farmers can practice as farming activities based on Japanese technology. Furthermore, in order to deal with water stress caused by “drought” and “excessive intake of groundwater and deterioration of water quality,” we will develop an efficient irrigation technology that maximizes the efficiency of water resource utilization. In addition, we will evaluate the applicability and dissemination potential of the developed technology in order to promote widespread use.



Development of sustainable land management (SLM) by low-cost drainage improvement and efficient irrigation



Program B

Food



Technology development towards building a new food system with improved productivity, sustainability and resilience

The global food system is facing problems due to the effects of population growth and climate change, with the ongoing COVID-19 pandemic revealing a vulnerability in this food system and exacerbating the situation. It is therefore essential to strengthen the resilience of the food system in order to deal with not only pandemics but also various problems that are occurring or may occur in the future.

To increase the resilience of food systems in developing regions, it is necessary to address the diverse needs (i.e., social, economic, and biosphere needs) related to food systems. “Social needs” include quantitative and qualitative nutritional improvement and the realization of health through food. “Economic needs” include labor reduction / productivity improvement, maximum utilization of local resources, or promotion of agriculture that is resilient to risks such as climate change. “Biosphere needs” include the reduction of chemical fertilizers and pesticides, and the

conservation and regeneration of biodiversity. To address these needs, we expect to utilize advanced technologies such as ICT, IoT, and biotechnology.

In this program, we will build a “new food system that achieves improved food productivity and improved nutrition” through the development and use of technologies that respond to such diverse needs associated with food systems, in order to contribute to stable food production in the target area, to international food supply and demand, and to food and nutrition security. For this purpose, we will promote six projects for improving productivity, sustainability, and resilience. These projects are classified into “Crop and food processing technology development,” “Environment-friendly production base,” and “Food and nutrition security in Africa.”

They all contribute primarily to Goal 2 (Zero Hunger) of the Sustainable Development Goals (SDGs).

Through technology development and utilization in response to the diverse needs related to food systems, we will build a “new food system” to contribute to stable food production in the target area, international food supply and demand, and food and nutrition security.



Resilient Crops Project

Frequent extreme weather caused by global climate change, environmental degradation due to rapid population growth, and crop production in marginal areas have disrupted crop production and threatened world food and nutrition security. Global warming and rapid population growth are exacerbating global challenges, making it difficult to respond with conventional breeding strategies.

This project aims to contribute to reducing global hunger and malnutrition and strengthening food and nutrition security on a global scale by enabling resilient crop production, even in adverse environmental regions around the world. To this end, we will utilize cutting-edge technologies to develop breeding materials and production technologies that contribute to strengthening resilience to external disturbances such as environmental stresses of the main crops (rice and soybean) and the low-use crop (quinoa).



Rice (left) and Soybean (center) as the main crops and Quinoa (right) as the low-use crop

Indigenous Crops and Foods Design Project

The environment surrounding “food” and “agriculture” in the world is changing due to climate change, globalization, and infectious diseases. The way food is produced, distributed, and consumed is entering a period of change. Improvement of nutrition in developing regions can be achieved through cross-disciplinary research activities on the quality of indigenous crops and traditional foods. Currently, technological innovations observed in IoT-related fields and next-generation sequencers have made it possible to comprehensively analyze the functionality and processing characteristics of indigenous crops and traditional foods at the molecular level.

This project clarifies the functionality and processing characteristics of indigenous genetic resources (rice, ginger, yam, etc.) and traditional foods (fermented foods, etc.) in Laos, Nigeria, and Japan with advanced technology for the development of production technologies, breeding materials, and food processing techniques that contribute to solving the global challenges of food and nutrition.

Transboundary Pest Management Project

This project aims to contribute to the stable supply of food and nutrients with low environmental impact, which is the SDGs’ target, by contributing to the establishment of an international management system for transboundary plant pests whose damage is expanding. To this end, we will collaborate with organizations, including international organizations, on efficient and environmentally friendly control technologies against desert locust, rice planthoppers, and fall armyworm, which are global problems. In addition, we will present an economic evaluation model that will guide the development of a comprehensive control technology efficiently when a new transboundary plant pest problem becomes apparent.

Ecosystem Approach to Aquaculture Project

For fishing villages and agricultural and mountain villages in Southeast Asia, aquatic products are an important source of income and a vital source of nutrients such as proteins and minerals. However, the socio-economic background of local communities, including micro fisheries farmers, is complicated. To develop and disseminate practical aquaculture technologies, an ecosystem approach that comprehensively discusses local needs and the use of aquaculture farms with relevant parties in advance is helpful.



Various native crop genetic resources and traditional foods



Transboundary plant pests causing widespread damage



This project will strategically revitalize the tropical fisheries sector by developing and disseminating sustainable aquaculture technologies through an ecosystem approach to the aquaculture industry, and by socio-economic analysis of the community. Furthermore, we aim to contribute to the formation of a healthy community by improving the nutritional status of the residents. To this end, we will revitalize the fishery industry and improve nutrition by continuously developing and disseminating aquaculture technologies through community-based aquaculture ground management that maintains the ecosystem.



Community-based aquaculture ground management that maintains ecosystem functions

Africa Rice Farming System Project

In sub-Saharan Africa, where food security is the most lagging in the world, one in four people suffer from chronic hunger. In order to secure stable food supply in the region and eradicate hunger, as listed in the SDGs, food production technologies that can adapt to unstable cultivation environments and make effective use of limited resources, such as water and nutrients, are required.

This project aims to build a sustainable food production system centered on rice cultivation by creating new technologies and knowledge that will increase production of rice, the region's main crop, and improve people's nutrition.



Construction of a sustainable food production system centered on rice cultivation for Africa

Africa Upland Farming System

In the savanna regions of Africa, stable food production is threatened by frequent extreme weather events and progressive soil degradation. In order to support the increasing food demand due to rapid population growth in sub-Saharan Africa, it is necessary to revitalize field crop cultivation in the region and stabilize agricultural production by developing soil and crop management technologies according to the characteristics of the region.

In this project, we will develop soil and crop management technologies that improve productivity, profitability, and sustainability in wet-savannas (northern Ghana) with relatively high agricultural production potential and dry-savannas (Burkina Faso, etc.) facing severe soil degradation and agro-climatic risks. We will also recommend measures to promote the dissemination of technologies that will stabilize small-scale field crop systems in Africa.



Supporting food and nutrition security for the African people



Program C

Information



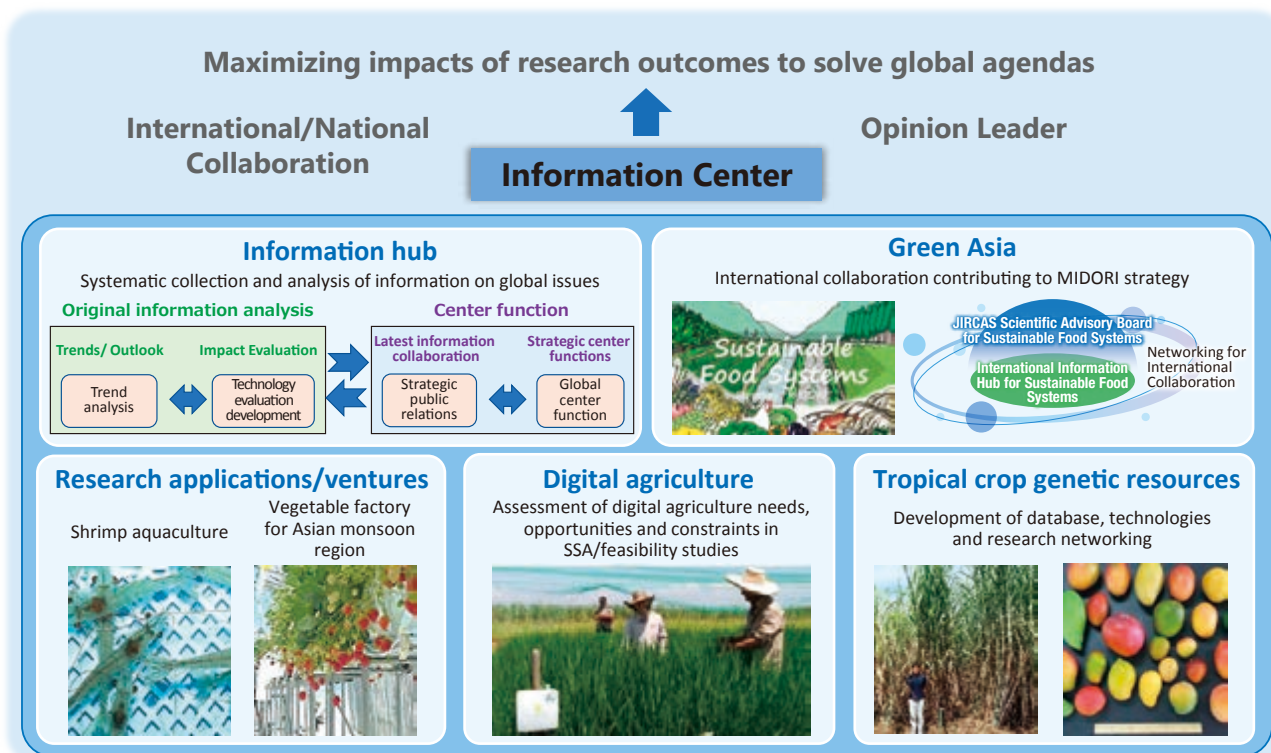
Strengthening function as an international hub for providing strategic information on agriculture, forestry and fisheries, and mobilizing new research partnerships

Today, global food systems are exposed to multiple challenges including climate change, the presence of transboundary pests and diseases, and pandemic outbreaks. Risks inherent in imbalances in the demand and supply of globally traded agricultural commodities can be instantly transmitted through global food systems, adversely impacting the economic performance of importing countries and regions, and worsening inequality through disproportionately affected socio-economically vulnerable groups. Furthermore, the projected acceleration of changes in food demand, both in quantity and quality, with population growth and urbanization prospects in some developing countries, can bring about disruptive impacts on all stages of global food systems from production, distribution, and consumption. This could potentially threaten global food security if the global communities remain uninformed and unprepared.

It is therefore essential for policy makers to access the latest, systematically compiled information on global food system development and trajectories based on scientific knowledge, so as to participate in opportunities to set global agendas. Similarly, it has become increasingly important for scientists to access the latest information on the challenges and drivers affecting global food systems, in order to identify opportunities for science, technology, and innovation to play a role in providing solutions.

The Information Program aims at collecting, analyzing, and providing strategic and evidence-based information on the challenges affecting the agriculture, forestry, and fisheries sectors and global food systems in increasingly more complicated and multi-faceted societies, and to disseminate this information widely, and serving as an opinion leader, to guide and mobilize collective actions to solve global issues.

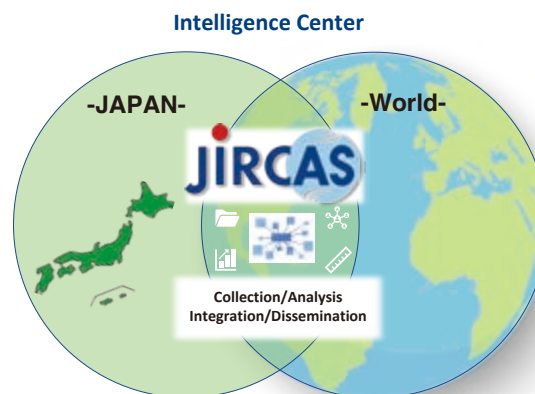
Collect, analyze and provide strategic and evidence-based information on challenges affecting the agriculture, forestry and fisheries sector and global food systems in increasingly more complicated and multi-faceted societies, as an opinion leader.



Information Hub Project

In recent years, with the acceleration of the speed at which new developments in science, technology, and innovation are transforming our societies, the readiness of interdisciplinary collaboration to adopt advanced technologies defines the competitiveness of a country. Information collection and analysis of global megatrends affecting food and nutrition security will play an important role in the transformation of global food systems into a sustainable one for both human and planetary health.

This project is engaged in the systematic collection and analysis of information on new developments in the agriculture, forestry and fisheries sectors, in order to derive recommendations over the role of science, technology, and innovation in the transformation of global food systems.



Collecting, analyzing, and disseminating information on trends in the global food system

Research Applications/Ventures Project

Much of JIRCAS's output in its 50-plus years of experience in conducting research in developing regions has been disseminated through its joint research project counterparts (i.e., national agricultural research institutions and/or government agencies); thus, until the present, there have been few examples of research results being widely applied in the private sector and the relevant markets.

This project specifically aims at scaling up JIRCAS's research outputs through the establishment of new business models that will enable us to tailor and optimize technologies in both a local and international context through collaboration with the private sector in Japan as well as in developing countries.

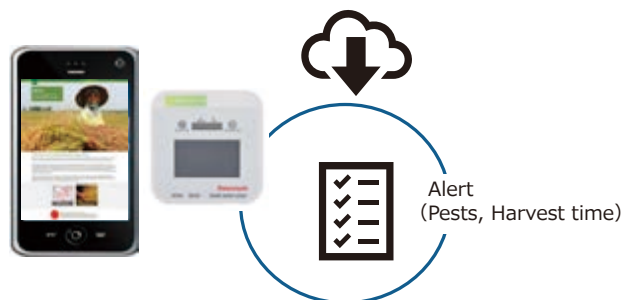


Land-based shrimp production (top), Greenhouse-based vegetable production (bottom)

Digital Agriculture Project (FY2021–2022)

These days, there has been an increased expectation for digital agriculture to solve the compounded challenges affecting food security in developing countries, including climate change and agricultural labor constraints, by improving efficiency in resource use. However, the lack of critical information on enabling vs. constraining conditions for the application of digital agriculture in locally specific contexts has hindered the realization of its potentials.

This project collects and analyzes evidence-based information on the opportunities and constraints of the application of digital agriculture in the sub-Saharan Africa region, in order to assess potentials and barriers and subsequently formulate strategies to promote its development.



Understanding the needs of agricultural digitization technology and assessing its adaptability

Tropical Crop Genetic Resources Project

JIRCAS possesses a diverse collection of tropical crop genetic resources, including sugarcane, indica-type rice, tropical fruits, and *Brachiaria* (tropical grass for forage). With the increasing threats posed by global climate change, it is imperative to ensure sustainable production of such tropical crops, which can contribute to the stable production of food and biomass crops, increase of production areas and diversification of food and nutrition both in developing countries and in Japan.

This project aims at advancing the management and utilization of diverse tropical crop genetic resources



Various tropical crop genetic resources possessed by JIRCAS

through development of databases, technologies, and research networks with domestic as well as international partners so as to contribute to sustainable production and utilization under adverse agricultural environments in tropical and sub-tropical areas including Japan.



Sugarcane



Tropical fruits

Various tropical crop genetic resources possessed by JIRCAS

Green Asia Project (FY2022–)

To promote the transformation of global food systems, a wide range of innovations must be generated in all processes, from production to consumption and disposal. From this perspective, Japan has formulated the Strategy for Sustainable Food Systems, MIDORI, which aims to develop and implement the latest science, technology, and innovations in agriculture, forestry, fisheries, and food-related sectors, including smart agriculture, forestry, and fisheries, that can contribute to food systems transformation.

Countries in the Asia-Monsoon region, which includes Japan, share many characteristics: distinctive climatic conditions such as high temperatures and humidity, an abundance of paddy fields, and a high proportion of small and medium-sized farmers. Therefore, this project will utilize JIRCAS's international network to address regional agricultural challenges, which differ from those in Europe and the United States, and test and disseminate scalable agricultural technologies suitable for the region through international collaboration, information dissemination, and applied research, thereby contributing to the Strategy "MIDORI." The results of the project and their dissemination through international fora and reports will contribute to enhancing production potential and ensuring sustainable food systems in the region.



Establishment and dissemination of basic agricultural technologies suitable for the Asia-Monsoon region



Source: MAFF Web site
(https://www.maff.go.jp/e/policies/env/env_policy/meadri.html)

Southeast Asia Liaison Office

The Southeast Asia Liaison Office was established in 1972 in Bangkok, Thailand, as a base for JIRCAS's activities in the region. It is currently located in the Department of Agriculture, Thailand, adjacent to Kasetsart University. It conducts surveys to monitor trends in agriculture, forestry, and fisheries research, collects local information, and disseminates JIRCAS's research results by providing information through the Thailand Science and Technology Fair and through seminars organized by JIRCAS. In addition, it provides support to JIRCAS's joint research activities, such as ensuring compliance with registration procedures for varieties bred jointly with research institutions in Southeast Asian countries.



Meeting with officials of the Department of Agriculture, Thailand, in the conference room of the Southeast Asia Liaison Office

Tropical Agriculture Research Front (TARF)

● Location

Ishigaki Island (24°1-35' N, 124°5-20' E), where the Tropical Agricultural Research Front (TARF) is located, is a subtropical island with a diverse ecosystem spread from Mt. Omoto (526 m above sea level) to the coral-rich seas. The island is about 2,100 km southwest of Tokyo and 270 km northeast of Taipei. It has an area of 221 km² and is surrounded by coral reefs. It has a humid subtropical climate with an annual average temperature of 24.5°C. Although annual average precipitation is high (as much as 2,095.5 mm), droughts caused by high temperatures during the summer are not uncommon. Several typhoons every year bring not only blessed rain on the island but also severe wind and salinity damage due to strong sea breezes.

● Roles

TARF conducts research and development of agricultural production technologies that can be applied to developing regions and island regions in the tropics and subtropics, taking advantage of the area's climatic and geographical conditions. It implements basic and fundamental experiments that are difficult to perform at project sites overseas using its 21-hectare experimental field and various greenhouses as well as the open laboratory facilities (lysimeters). As the only national agricultural research organization located in the subtropics, TARF is thus entrusted with an important mission.

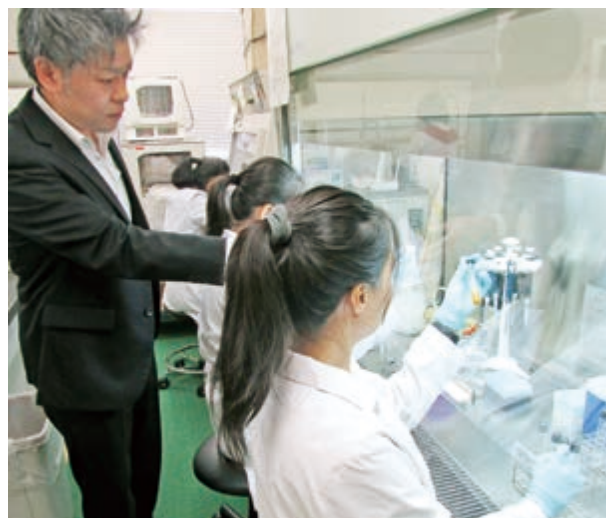


Research Exchange Programs

Every year, JIRCAS invites around 70 researchers and research administrators from collaborative research organizations to conduct joint research projects (Collaborative Research Projects). JIRCAS also invites some 5 researchers from developing countries to stay for one year and perform collaborative experiments in the laboratories of Tsukuba Headquarters, in the Tropical Agriculture Research Front, or other JIRCAS project sites to support the ongoing research activities and improve their research capabilities (JIRCAS Visiting Research Fellowship Program).

For young Japanese researchers who will take future roles in international researches, JIRCAS has a practical education program, which dispatches postdoctoral researchers and graduate students to the project sites and collaborative organizations in developing regions.

Furthermore, JIRCAS together with MAFF hosts an annual commendation ceremony to recognize three young researchers from overseas who show outstanding performance and research achievements. This award was initiated in 2007 to increase motivation among young researchers who are actively contributing to research and development in agriculture, forestry, fisheries and related industries in developing countries (Japan International Award for Young Agricultural Researchers).



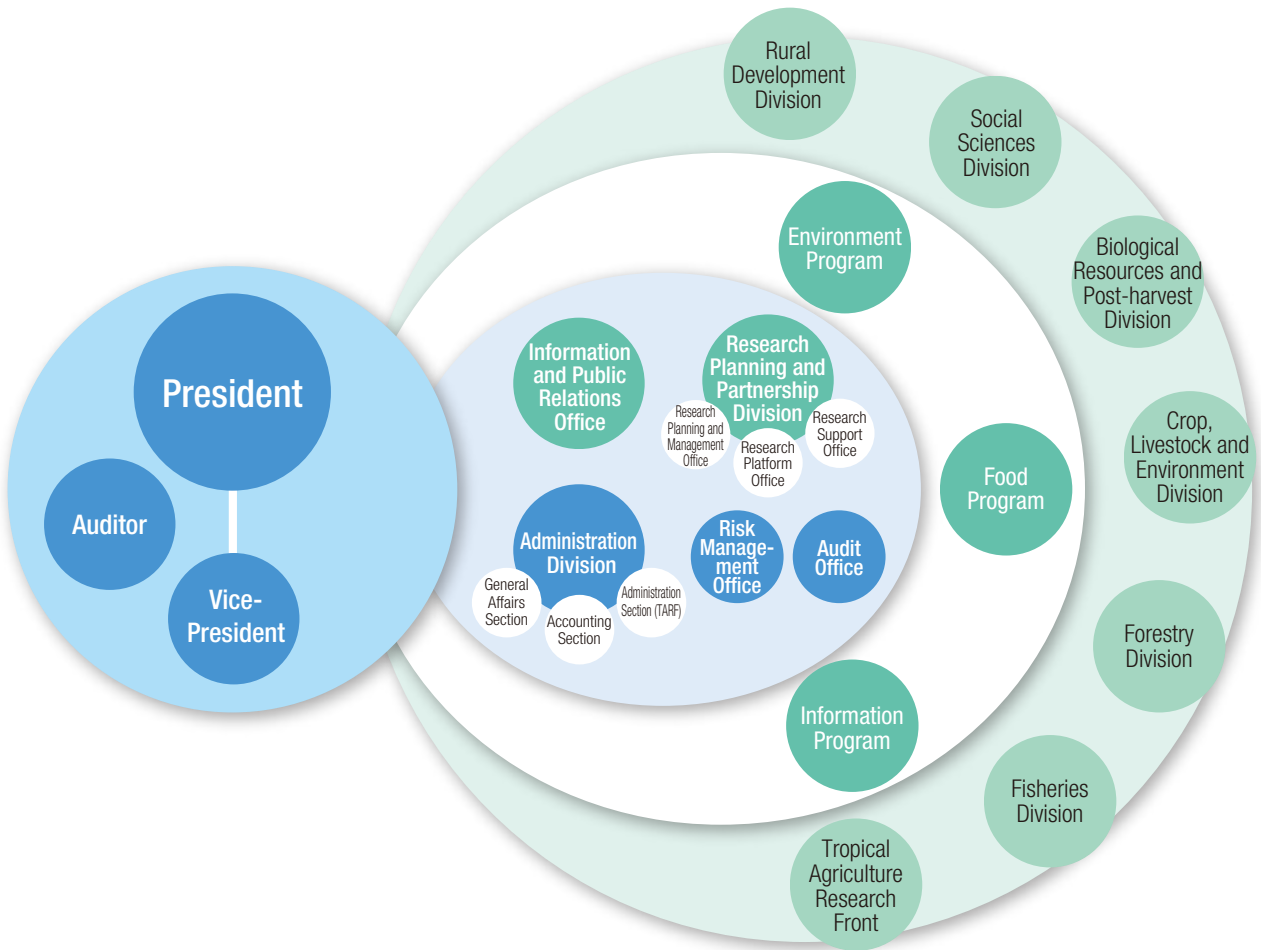
International Symposium and Workshops

JIRCAS organizes international symposium which are based around themes of central importance to international research. Symposium presentations and discussions deal with research topics aimed at solving problems in agriculture, forestry, fisheries, and related industries towards sustainable development in developing countries.

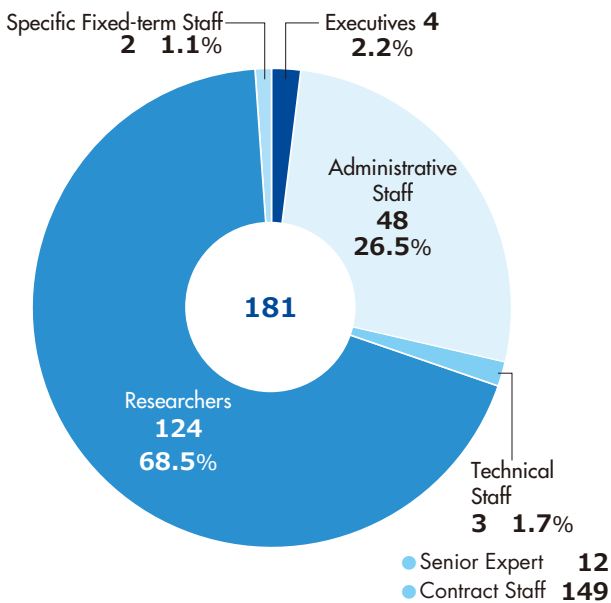
JIRCAS also presents workshops and seminars, in Japan as well as in overseas research sites, on issues affecting global agriculture, food, and the environment. The most recent trends in research are reported and introduced by the world's leading researchers and then discussed.



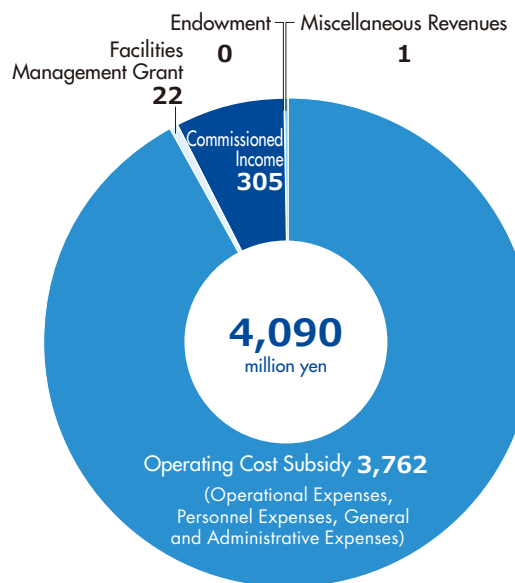
Organization



Personnel (As of April 1, 2023)

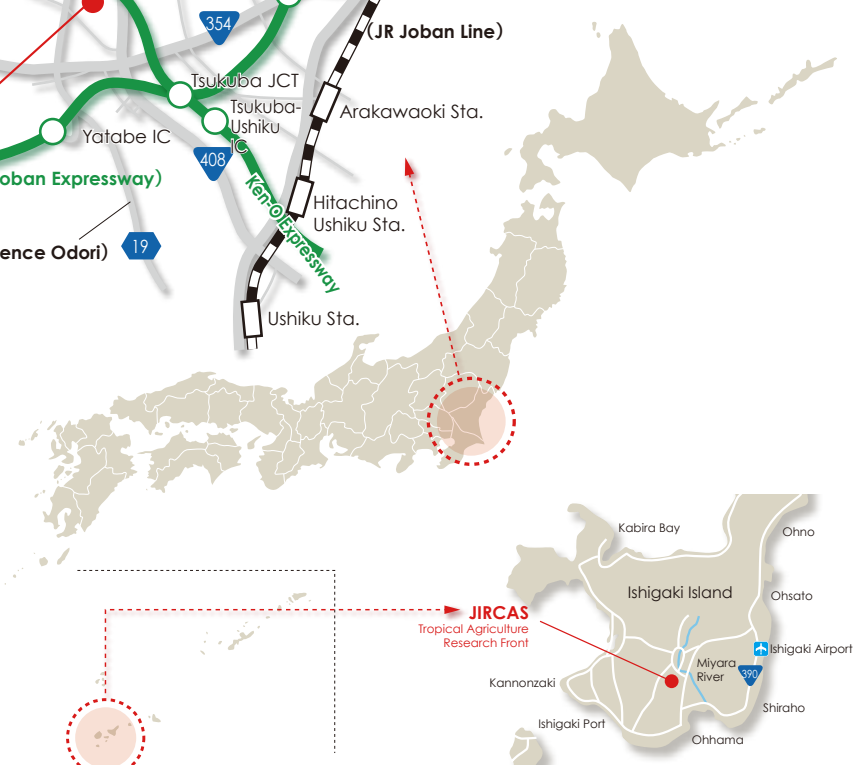
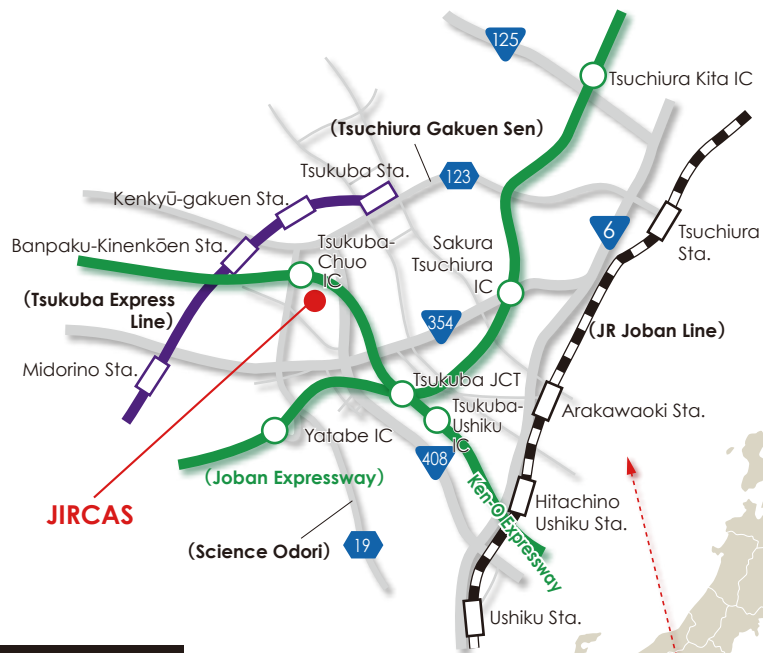


Budget (FY2023)



"Commissioned Income" is an estimated amount.

Transportation Guide



Access		
Bus	Train	
Narita Airport	Tsukuba Express	JR Joban Line
Limousine for Tsuchiura about 80 minutes	Akihabara Sta. about 50 minutes	JR Ueno Sta. about 1 hour
▼	▼	▼
▼	▼	▼
▼	▼	▼
TSUKUBA Center	Banpaku-Kinenkōen Sta.	JR Ushiku Sta.
Taxi about 10 minutes	Taxi about 10 minutes	Taxi about 20 minutes
▼	▼	▼
▼	▼	▼
▼	▼	▼
JIRCAS		





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