CARC/NARO

**Central Region Agricultural Research Center
(Kanto, Tokai and Hokuriku Regions),
National Agriculture and Food Research Organization**

NARO
National Agriculture and Food Research Organization

Research to be conducted

Constructing smart production and distribution systems in suburban areas

We realize just-in-time production and distribution systems for very fresh, high-quality vegetables in suburbs, develop data-driven multiple farming of field crops in a long-term paddy-upland rotation, build a highly profitable crop rotation system through drainage measures appropriate to humid, heavy clay soil and optimization of cropping, and carry out research and development for export expansion.

Entrance of the Central Region Agricultural Research Center (Tsukuba City, Ibaraki Prefecture)

Hokuriku Reseach Station (Joetsu City, Niigata Prefecture)

Role of the Central Region Agricultural Research Center

The Central Region Agricultural Research Center was established as an organization specializing in agricultural research in the Kanto, Tokai, and Hokuriku regions in April 2021, through the reorganization of the former National Agricultural Research Center. The environment surrounding agriculture and farm management in these regions has changed significantly in recent years. Especially for paddy farming, scale expansion and management diversification have proceeded rapidly. In metropolitan suburban areas, such as Kanto and Tokai, stable supply of high-quality vegetables is strongly required by urban consumers. There is also a need to develop low-cost agricultural production technologies for expansion of agricultural exports. To meet the expectations of agriculture and farmars in these regions, the Central Region Agricultural Research Center works on research and technological development and diffusion to provide solutions to problems for agriculture and agricultural management in the regions, for example cutting-edge smart agricultural technologies, and production technologies and plant breeding that are tailored to consumer needs.

Soil cultivation and fertilizer reduction using green manure

Crop rotation system in a large-scale management unit

High-temperature-tolerant, high-yielding, good-tasting paddy rice variety 'Niji no Kirameki' (Left: Niji no Kirameki, Right: Koshihikari)

Organization Chart

2021.4.1

President　Auditor

Senior Vice President・Vice President

NARO Headquarters

Core Technology Research Headquarters
- ・RCAIT/NARO
- ・RCAR/NARO
- ・NGRC
- ・NAAC

Segment Ⅰ
- ・NFRI
- ・NILGS
- ・NIAH

Segment Ⅱ
- ・HARC/NARO
- ・TARC/NARO
- ・CARC/NARO
- ・WARC/NARO
- ・KARC/NARO
- ・IAM/NARO

Segment Ⅲ
- ・NICS
- ・NIFTS
- ・NIVFS
- ・NIAS

Segment Ⅳ
- ・NIAES
- ・NIRE
- ・NIPP

NCSS

BRAIN

Director

Department of Research Promotion (Tsukuba・Joetsu・Ano)
- ・Business Promotion Office
- ・Research Promotion Office
- ・Technology Application Research Team

Division of Vegetable Research (Tsukuba)
- ・Production Management Group
- ・Organic/Sustainable Cultivation Group

Division of Crop Rotation Research for Lowland farming (Tsukuba・Ano)
- ・Crop Rotation System Group
- ・Cultivation Improvement Group

Division of Lowland Farming Research (Joetsu)
- ・Crop Production System Group
- ・Crop Breeding Group

Agricultural Experiment Station Main Building (Kounosu City, Saitama Prefecture) early in the Showa period

Agricultural Research Center Main Building (present National Agriculture and Food Research Organization (NARO) head office), photo taken in 1985

History

1893	Established as the Agricultural Experiment Station of the Ministry of Agriculture and Commerce (Nishigahara, Kita Ward, Tokyo)
1923	Established as the Agricultural Experiment Station Kounosu Test Site of the Ministry of Agriculture and Commerce (Kounosu City, Saitama Prefecture)
1923	Reorganized into the Kanto Tosan Agricultural Experiment Station of the Ministry of Agriculture and Forestry
1961	Renamed the Agricultural Experiment Station of the Ministry of Agriculture and Forestry
1981	Reorganized into the Agricultural Research Center of the Ministry of Agriculture, Forestry and Fisheries and relocated to Yatabe Town (present Tsukuba City), Tsukuba County, Ibaraki Prefecture
2001	Reorganized into the National Agricultural Research Center of the National Agricultural Research Organization
2015	Reformed from the Independent Administrative Institution to the National Research and Development Agency
2016	Reorganized into the Central Region Agricultural Research Center of the National Agriculture and Food Research Organization, National Research and Development Agency
2021	Reorganized into the Central Region Agricultural Research Center (Kanto, Tokai and Hokuriku Regions) of the National Agriculture and Food Research Organization, National Research and Development Agency

Division of research

Division of Vegetable Research (Tsukuba)

To realize just-in-time production and distribution systems for very fresh, high-quality vegetables in suburbs, we work on (1) developing efficient and labor-saving production technologies for field-grown vegetables, (2) cultivation techniques with less chemical fertilizer, (3) an organic growing system with weeding robots, reduced amounts of agricultural chemicals using natural enemies of insect pests and physical pest control, and (4) breeding of new varieties of sweet potato, which is a regional staple crop.

Cabbage production by advanced technology

Production Management Group

For vegetables, such as cabbage and sweet potato, we are developing a high-quality and labor-saving production system that meets regional needs. For cabbage, we are developing cultivation management technologies that realize planned uniform growth based on growth models, production and distribution systems for very fresh and high-quality vegetables using a yield prediction system, and labor-saving mechanization technologies that allow for scale expansion. For sweet potatoes, in order to respond to domestic demand and increase exports, we develop new varieties that meet the needs of the market and the growers, as well as labor-saving cultivation techniques that will contribute to the expansion of production.

The new variety 'Amahazuki' is characterized by high sugar content even soon after harvesting.

Organic/Sustainable Cultivation Group

We are developing a labor-saving, sustainable vegetable cultivation system that achieves both the supply of very fresh, high-value-added agricultural products and the reduction of environmental loads. We also work on (1) the application of organic materials such as green manure, (2) the reduction of inconsistencies in growth through variable fertilization, (3) the development of chemical fertilizer reduction technologies, (4) the development of a smart weeding system using devices including weeding robots, and (5) the development of an organic cultivation system for strawberries and leafy vegetables using natural enemies of insect pests and physical pest control.

Development of an organic growing system using a weeding robot

Division of Crop Rotation Research for Lowland farming (Tsukuba・Ano)

To secure the stable supply of domestically grown wheat and barley varieties and soybeans which have been in increasing demand in recent years, we pursue the development of a smart production system through workability improvement and growth control using (1) sensing data of cultivated field conditions and crop growth and (2) crop growth models. This will make it possible to build the data-driven multiple farming of field crops that allows for a 20-percent increase in the yield of soybeans, a 10-percent increase in the yield of wheat and barley varieties, and standardization of protein content in a long-term paddy-upland rotation system.

Developing smart technology for a work system in field crop rotation

From the top: (1) subsoil improvement through agricultural drainage measures; (2) actualization of smart tillage work by soil sensing; (3) seeding in a suitable period through the use of a high-speed ridging seeder; and (4) optimization of a work system including harvesting and technological assessment.

Crop Rotation System Group

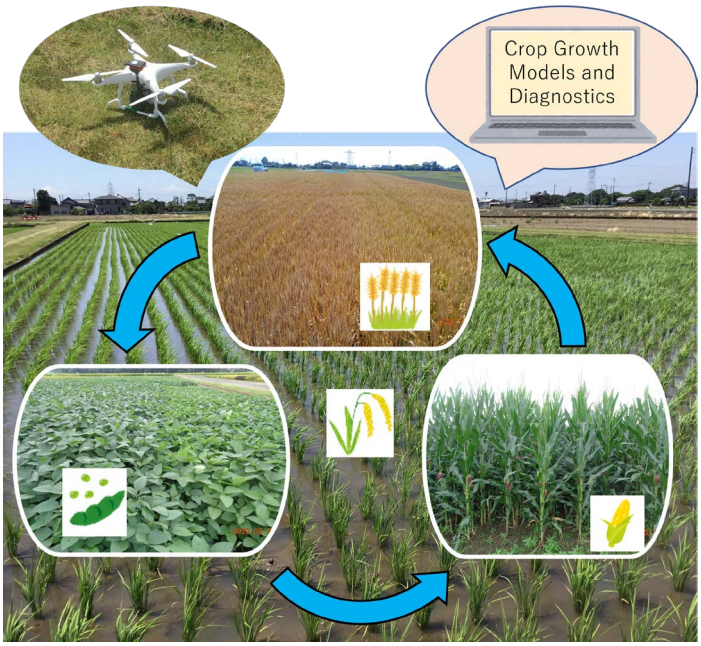
We are developing smart technologies that set up soil conditions suitable for the growth of field crops through the introduction of agricultural drainage measures and optimization of tillage based on soil sensing. Along with these technological developments, we conduct research on technology assessment for the application of a high-efficiency seeder designed for a short and suitable work period, and for the optimization of an increasingly complex work system.

In cooperation with the cultivation improvement group, we also seek to ensure stable yields and quality through the selection of crops suitable for a field crop rotation system and proper fertilization management, thereby developing an ideal field crop rotation system in an upland field converted from the rice paddy.

Cultivation Improvement Group

We aim to (1) present a sustainable crop rotation system based on stable, high-quality, and high-yield production technologies for wheat, barley, soybean, and corn for feed and on control of soil organic matter in a long-term upland field converted from the rice paddy; (2) establish growth measurement technology that uses sensing data based on sensors at hand and drones; (3) help opitimize the management of additional fertilizer and pest control through the development and use of highly accurate crop growth models, and planning of an appropriate cropping season in a crop rotation system.

In cooperation with the crop rotation system group, we are constructing a sustainable crop rotation system for multiple farming.



Building a sustainable field crop rotation system

Development of a sustainable crop rotation system that combines wheat and barley varieties, soybeans, corn for feed, and other crops in a converted field by using smart technologies such as sensing and crop models.

Division of Lowland Farming Research (Joetsu)

We are developing highly efficient and profitable paddy field crop rotation systems through drainage measures suitable for humid heavy clay soil specific to snow-covered areas along the Sea of Japan and optimization of cropping. The systems consist of high-yielding cultivation of barley and soybean varieties with high yield and good quality and direct sowing of high-yielding paddy rice varieties on a dry paddy field to expand exports. We are also developing new varieties of paddy rice, barley, and soybean that fit the needs of buyers, growers, and consumers and are suitable for cultivation in the Hokuriku region.

Achieving labor savings through coordination between a self-driving tractor and a manned tractor

Crop Production System Group

For paddy rice, we aim to clarify the yield potential of high-temperature-tolerant and high-yielding varieties, extend the cropping season using direct sowing on a dry paddy field and establish stable and high-yielding cultivation techniques. For dry field crops, we pursue the development of high-yielding cultivation techniques, such as remote sensing. We also work on providing labor savings and faster work speeds by smart farm machines, promoting automation and stabilization through the use of ICT, and developing data-driven smart fertilization and pest control technologies using yield and quality information.

A general-purpose ICT combine harvester that is harvesting barley while automatically acquiring information on the cultivated land and crops.

Crop Breeding Group

We conduct research on breeding of paddy rice, barley, and soybean. For paddy rice, we pursue the development of high-yielding and good-tasting varieties suitable for home meal replacement and eating out, and characteristic varieties such as super-high-yielding rice and rice suitable for noodle making for expansion of rice exports. For barley, we develop varieties suitable for cultivation in a cold climate and/or heavy snow areas, and superior varieties with sticky texture and health functionality. For soybean suitable for the Hokuriku regions, we develop varieties with high-yielding ability and disease resistance in a converted field from paddy field of heavy clay soil, and breeders' lines that are waterlogging-resistant or rich in color.

Left) Rice boiled with the sticky barley 'Haneumamochi'
Right) High-yielding and good-tasting paddy rice variety 'Tsukiakari'

Department of Research Promotion (Tsukuba・Joetsu・Ano)

Technology Application Research Team (Tsukuba)

For large-scale management, we facilitate the optimization of cropping system through the seletion of suitalbe transplantation timing and cultivars using the "growth prediction" function of the "cultivation management support system" developed by NARO, demonstrating a 10-percent increase in yield of paddy rice by using the "diagnosis on fertilizer supplementation" function.

In addition, through the clarification of "efficient operation method for automatic operational agricultural machinery", we optimize the cropping system of numerous cultivated fields and the operation method for automatic operational agricultural machinery in large-scale management.

Automatic direct seeding on flooded paddy field. Seeding 'Nijinokirameki' coated with iron.

Business Promotion Office

Industry–academia collaboration coordinators and agricultural technology communicators are assigned to promote cooperation with universities, public reseach organizations, private companies, or other organizations and the dissemination of R&D results of the NARO. We work on promotion activities using standard operating procedures (SOP) and technical guidance according to requests from production sites.

Research Promotion Office

“Promotion Team”, “Intellectual Property Team”, “Public Relations Team”, “Staff Management and Training Team”, “Planning and Cooperation Team for Hokuriku Research Station”, and “Coordinator, Smart Agriculture” are assigned to contribute to smooth operation of center.

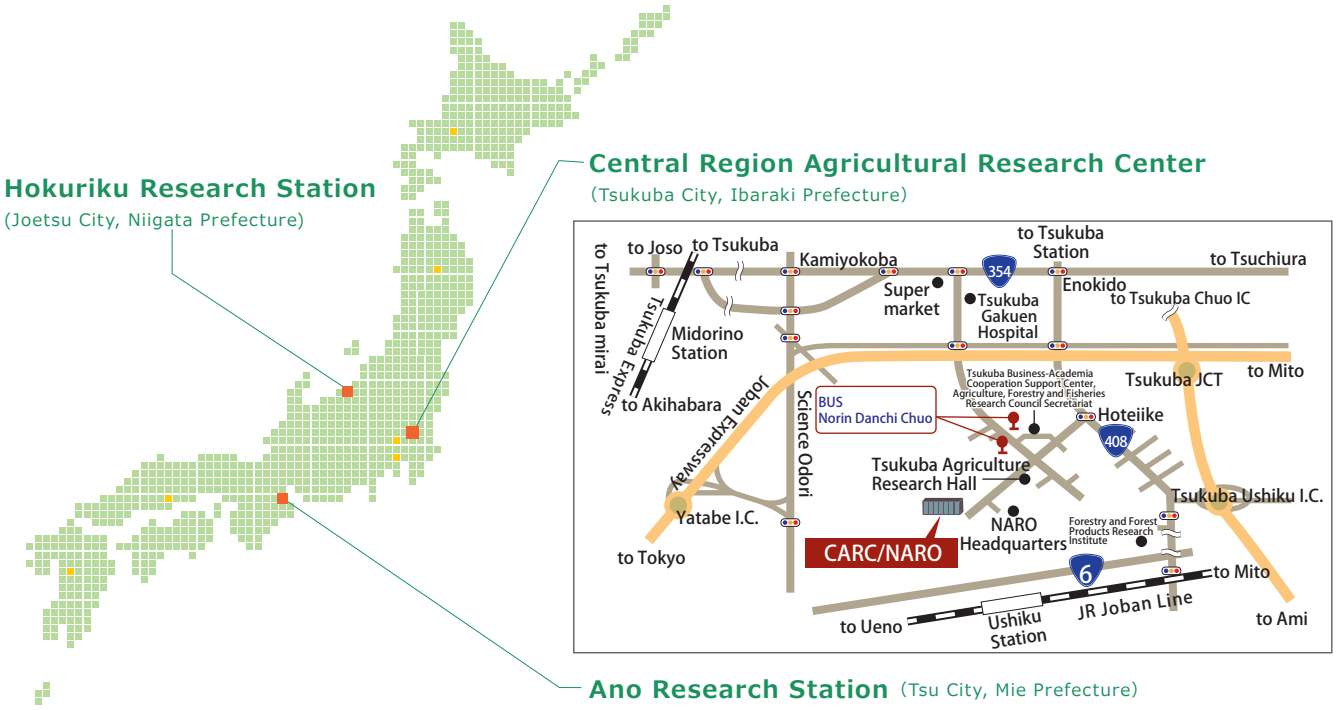
Summer vacation public event by NARO (Tsukuba City)

Open field tour by CARC. Demonstration of cultivation of sticky and healthy barley 'Kihadamochi'.

Science Class for Food and Agriculture by the Hokuriku Reseach Station (Joetsu City). This has been held since 1989, with a total of 15,000 participants.

Location

Map



Address and Access

Central Region Agricultural Research Center (Tsukuba City)

2-1-18 Kannondai, Tsukuba City, Ibaraki Prefecture 305-8666
Tel 029-838-8510 Fax 029-838-8574

- From Midorino Station of TSUKUBA EXPRESS, get on a TSUKU-BUS (Jiyugaoka Shuttle), then get off at Hanare Kouen; or get on a Kanto Tetsudo bus bound for Tsuchiura Station West Exit (about 20 minutes), then get off at Nohrin Danchi Chuo.

Note: Some buses do not stop.

- From Tsukuba Station of TSUKUBA EXPRESS, get on a TSUKU-BUS (Nanbu Shuttle) at Tsukuba Center bus stop 2 (about 20 minutes), then get off at Nohrin Danchi Chuo.
- From West Exit bus stop 4 of Ushiku Station of the JR Joban Line, get on a Kanto Tetsudo bus bound for Yatabe Syako, Seibutsuken Owashi, or Tsukuba Daigaku Byouin (about 20 minutes), then get off at Nohrin Danchi Chuo.
- By car: About 5 km from Yatabe IC of Joban Expressway; about 5 km from Tsukuba Ushiku IC of Ken-o Expressway

Hokuriku Research Station (Joetsu City)

1-2-1 Inada, Joetsu City, Niigata Prefecture 943-0193
Tel 025-523-4131 (Main) Fax 025-524-8578

- About 10 minutes by taxi from Takada Station of Echigo Tokimeki Railway, Myoukou Haneuma Line
- By car: About 4 km from Joetsu IC of Hokuriku Expressway
  About 6 km from Joetsu Takada IC of Joushinetsu Expressway

Ano Research Station (Tsu City)

360 Kusawa, Ano-cho, Tsu City, Mie Prefecture 514-2392
Tel 059-268-1331 (Main) Fax 059-268-1339

- About 20 minutes by taxi from West Exit of Tsu Station of the Kintetsu Nagoya Line or the JR Kisei Main Line
- By car: About 5 km from Geinou IC of Ise Expressway

Contact

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※Cover photo: Planting of cabbage in an experimental field to develop chemical fertilizer reduction technologies using organic materials

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○Suitability for recycling: Recyclable into paper. This booklet is made only from material (A-rank) suitable for recycling into printing paper in accordance with the Printing-related criteria in the basic policy based on the Law on Promoting Green Purchasing.

Planning & Editing by Central Region Agricultural Research Center, National Agriculture and Food Research Organization
2022.9 500