



NARO



Food and Agriculture for the Future

National Agriculture and Food Research Organization

NARO Mission and Social Contribution

Takeshi Horie, President



Our NARO mission is to conduct research and development on agriculture and food. NARO and its predecessors have developed many cultivars and agricultural technologies for agriculture and food which is closely related to people's lives. Its achievements are widely used by the agricultural sector, the food industry, agricultural machinery and materials manufacturers, national and local government, and safety inspection agencies. Our achievements are contributing to a stable and high quality food supply in Japan. The uncertainty of environmental issues and food supply is thought to be increasing in the 21st century. To contribute to the safety and security of sustainable development in Japanese society, NARO develops technology to secure a safe and stable food supply based on a high self-sufficiency rate, and also supports the recovery of agriculture and rural communities in areas affected by the Great East Japan Earthquake, as well as the conservation of rural community environments and national land and resources. We appreciate your continuous support, understanding, and cooperation with NARO.

About NARO

NARO is an independent administrative agency which was established through the integration of experimental research institutes under the Ministry of Agriculture, Forestry and Fisheries. It is the largest research organization addressing "agriculture, food, and rural communities" and conducts R&D for the development of agriculture in Japan. 14 research institutes and centers with different specialized fields are sharing the mission in different areas throughout the country.

■ Research and Development (R&D) Activities

Agricultural Technology Research

- Development of a safe and stable food supply system and improved food production power including paddy field rotation system, livestock production based on self-supplied feed, high revenue horticulture, environmentally sustainable agriculture, advanced production/distribution management and livestock infectious disease control.
- Development of technologies that are adaptable to global warming, biomass production and utilization systems.
- Development to clarify functions of agricultural products and food and utilization technology as well as technology for high quality agricultural products and foods, and advanced processing/distribution.
- Development of technology for operation and maintenance of agricultural facilities and regional resource maintenance engineering.
- Development of technology for agronomic soil decontamination and migration control for radioactive materials in agricultural products, etc.

Promotion and Enhancement of Agricultural Mechanization

- Development, improvement, inspection and appraisal of agricultural machinery that contributes to improving productivity, reduction in work load, efficient use of agricultural production resources, reduction of environmental impact and further, safety in agricultural work.

Basic Research

- Distribution of results from commissioning basic research of developing new technological solutions in bio-oriented technology to outside.

Promotion of Private Research

- Commissioning to private companies, etc. and distribution of results of applied research, commercial viability trials and research into technological solutions that contribute to the creation of new business in bio-oriented technology.

■ Staff Numbers and Budget

Staff numbers (as of January, 2012)

Executives: 15 (President, Senior Vice-president (1), Vice-presidents (10), Auditors (3)), Staff: 2,820 (includes 1,618 researchers)

The FY2012 Budget

51,400 million yen (includes 42,800 million yen of operating cost subsidies)

■ History

1893

Research institutes established as national experimental research institutes.

2001

National Agriculture Research Organization, Independent Administrative Agency.

2003

National Agriculture and Bio-oriented Research Organization, Independent Administrative Agency.

*Integrated with Bio-oriented Technology Research Advancement Institution.

2006

National Agriculture and Food Research Organization, Independent Administrative Agency.

*Integrated with National Institute for Rural Engineering, National Food Research Institute, National Farmers Academy (closed at the end of 2011).

Organization

NARO Hokkaido Agricultural Research Center (NARO/HARC)

1 Hitsujigaoka, Toyohira-ku, Sapporo, Hokkaido, 062-8555 Japan
 FAX: +81-11-859-2178
 E-mail: cryoforum@ml.affrc.go.jp

NARO Western Region Agricultural Research Center (NARO/WARC)

6-12-1 Nishi-fukatsucho, Fukuyama, Hiroshima, 721-8514 Japan
 FAX: +81-84-923-7893
 Email: www-warc@naro.affrc.go.jp

NARO Institute of Vegetable and Tea Science (NIVTS)

360 Kusawa, Ano, Tsu, Mie, 514-2392 Japan
 FAX: +81-59-268-1339
 Email: www-vegetea@naro.affrc.go.jp

NARO Tohoku Agricultural Research Center (NARO/TARC)

4 Akahira, Shimo-kuriyagawa, Morioka, Iwate, 020-0198 Japan
 FAX: +81-19-641-7794
 E-mail: www-tohoku@naro.affrc.go.jp

Headquarters

3-1-1 Kannondai, Tsukuba, Ibaraki, 305-8517 Japan
 FAX: +81-29-838-8989
 E-mail: www@naro.affrc.go.jp

NARO Agricultural Research Center (NARO/ARC)

3-1-1 Kannondai, Tsukuba, Ibaraki, 305-8666 Japan
 FAX: +81-29-838-8484
 E-mail: www@naro.affrc.go.jp

NARO Institute of Crop Science (NICS)

2-1-18 Kannondai, Tsukuba, Ibaraki, 305-8518 Japan
 FAX: +81-29-838-7488
 E-mail: www-nics@naro.affrc.go.jp

NARO Institute of Fruit Tree Science (NIFTS)

2-1 Fujimoto, Tsukuba, Ibaraki, 305-8605 Japan
 FAX: +81-29-838-6437
 E-mail: faq-fruit@ml.affrc.go.jp

NARO Institute of Floricultural Science (NIFS)

2-1 Fujimoto, Tsukuba, Ibaraki, 305-8519 Japan
 FAX: +81-29-838-6842
 E-mail: www-flower@naro.affrc.go.jp

NARO Institute of Livestock and Grassland Science (NILGS)

2 Ikenodai, Tsukuba, Ibaraki, 305-0901 Japan
 FAX: +81-29-838-8606

National Institute of Animal Health (NIAH)

3-1-5 Kannondai, Tsukuba, Ibaraki, 305-0856 Japan
 FAX: +81-29-838-7880
 Email: www-niah@naro.affrc.go.jp

National Institute of Rural Engineering (NIRE)

2-1-6 Kannondai, Tsukuba, Ibaraki, 305-8609 Japan
 FAX: +81-29-838-7609
 Email: xx052002@affrc.go.jp

National Food Research Institute (NFRI)

2-1-12 Kannondai, Tsukuba, Ibaraki, 305-8642 Japan
 FAX: +81-29-838-7996
 Email: www-nfri@naro.affrc.go.jp

Bio-oriented Technology Research Advancement Institution (BRAIN)

1-40-2 Nisshin, Kita, Saitama, Saitama, 331-8537 Japan
 FAX: +81-48-654-7129
 Email: info-brain@ml.affrc.go.jp

NARO Kyushu Okinawa Agricultural Research Center (NARO/KARC)

2421 Suya, Koshi, Kumamoto, 861-1192 Japan
 FAX: +81-96-249-1002
 Email: q_info@ml.affrc.go.jp

● Locations of NARO institutes/centers

Promoting Research Projects

NARO launched a new 5 year research and development period as its third mid-term plan on 1st April, 2011. In order to achieve the goals laid out by the government, we have set tasks for each of our 6 R&D cornerstones and are making progress with our research.

- 1

Stable Food Supply System P4–P7

Research and development for securing a second green revolution and food safety, and delivering sustainable agriculture
- 2

Climate Change and Biomass P8

Research and development for responding to global warming and forming a recycle-based society
- 3

New Markets & Future Industries P7–P8

Research and development for creating added-value agricultural produce/ food and creating new business through the fusion of primary, secondary, and tertiary industries
- 4

Rural Resources P9

Research and development for the recovery of agriculture and rural communities in areas affected by natural disasters and the conservation of national land and resources
- 5

Responding to Nuclear Accidents P10

Research and development for the recovery of agriculture, the re-opening of farms and the production of safe agricultural produce
- 6

Research and Development for Promoting Agricultural Mechanization P11

Research and development for innovative machinery improvement that supports farming sites

1

Stable Food Supply System

We develop technology to significantly enhance agricultural production power and guarantee the safety of agricultural products and food in order to improve Japan's food self-sufficiency rate and provide a stable supply of safe and secure food.

Highly Productive Crop Rotation System

We develop high-productivity paddy field crop rotation systems adapted to regional conditions, focusing on rice, wheat and soybeans. Our goals are to reduce production costs by around 50% and to increase arable land utilization rates by around 20%.



Dry seeding rice cultivation system using a high-efficiency grain drill that can be used for both rice and wheat

We establish crop rotation systems for field and vegetable crops that respond to diverse needs such as minimizing working hours and reducing costs. We also develop bulb onion varieties that produce less loss during processing and short-leaved bunching onion varieties that are suited for short-term/labor-saving cultivation and that are late bolting and can be harvested in both spring and summer.



Cultivation of direct-seeded onion for processing use with the aim of shortening working hours (photo shows simultaneous fertilizing/seeding device that can apply phosphate fertilizer in advance just under the seeding depth)

This program aims to develop rice cultivars suitable for food business use or a rice-wheat double-cropping system and high-quality wheat and soybean cultivars as well as their utilization techniques, to improve productivity of field crops.



A rice cultivar with higher yield, lodging resistance, and good eating quality

As well as socioeconomic evaluation of new technology and new cultivars, we construct regional agricultural business models utilizing new technology. We also develop management technology to support young workers engaging in agriculture.



Our website: <http://fmrp.dc.affrc.go.jp/> provides farm planning support programmes and research result publications.

Feed Production and Feeding Management

In order to improve domestic feed self-sufficiency rates, we breed forage crop cultivars including high yield rice and corn and develop technology for domestic feed production, preparation and utilization, technology for low-cost dairy cattle feed and technology for lean beef production through grazing.



Harvesting ear corn as domestically produced concentrates as an alternative to imported concentrates

Livestock Production

We develop technology for healthy feeding with high production efficiency through feed with precise nutritional management and functionality in order to produce healthy livestock products in a stable manner. We also develop livestock breeding improvement technology through evaluating the genetic performance of livestock and researching useful genetic information and conception improvement technology.



Measuring the availability of nutrients ingested by dairy cattle in milk production and establishing the Japanese Feeding Standard

Innovative Horticultural Production Systems

We develop high-revenue, low-cost, low-carbon cultivation technology that upgrades horticultural facility environmental control technology.

We develop Solanaceous and Curcubitaceous vegetable varieties that are suitable for nutriculture, strawberry varieties that can be produced year round in a stable manner and flower varieties with new colours, etc.



Improvement of production efficiency and reduction of production costs for tomatoes, cucumbers and bell peppers, etc. cultivated in solar-powered plant factories

We breed new varieties of citrus, apple, grape, Japanese pear, peach, persimmon and tea, etc. that respond to the needs of producers and consumers. We develop labor-saving agricultural technology by improving coloring and fruit set management and lowering tree height.



Breeding varieties such as Shine Muscat (left: released in 2006) that respond to needs and development of labor-saving technology using Citrus Parental Line Norin No.6 (right) which has the traits of high productivity and easy fruit picking.

Sustainable Agricultural Production Systems

To respond to tight international supply and demand of fertilizer resources and to manage soil nutrients properly, we promote the recycling of organic resources, the simple evaluation of soil/organic materials and the use of biological function so as to develop integrated soil fertility management that cuts chemical fertilizer application by 20% or more of the norm.



Pellet compost (bottom left) shows higher phosphorus utilization rate through direct access to plant roots.

We develop environmentally-sustainable agricultural production technologies adapted to regional conditions. We also systemize easy-to-incorporate organic agricultural technologies that respond to the demand for domestic organic produce and the increase in new organic agricultural businesses.



Application of rice bran and mechanical weed control

In order to develop sustainable crop protection technology using biological function, etc. we study new environment-friendly pest control techniques that can replace pesticides such as virus vaccines that have reduced virulence and indigenous natural enemies, and construct an integrated pest and weed management system.



Virus vaccine treatment prevents the pepper virus disease caused by the Pepper Mild Mosaic Virus (PMMoV).

Advanced Farming and Management Systems

In order to realize highly accurate field operation and half-reduction of workload, advanced production management systems based on information and robot technology are examined and demonstrated.



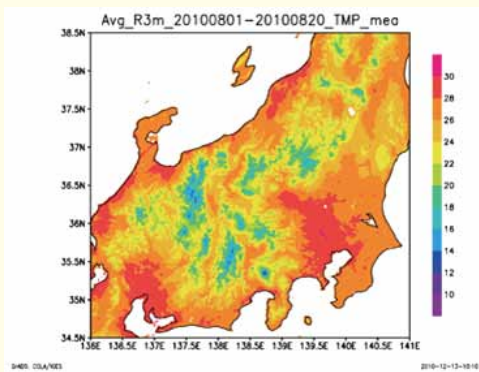
Unmanned rice-planting robot

2

Climate Change and Biomass

We develop mitigation and adaptation technologies to respond to global warming issues in agriculture. We also conduct research and development for the promotion of biomass use.

We develop risk management systems for minimizing the adverse impacts of climate change such as high or low temperature effects on crops and livestock, abnormal weather conditions or insect pests and diseases. We also develop methods for reducing greenhouse gas (GHG) emissions from crop fields and livestock, and to clarify the carbon storage potential of agricultural fields as a reservoir of carbon dioxide.



Temperature distribution map in August 2010 when high-temperature damage on rice grain quality occurred

We select and improve biomass crops and develop new technology for low-cost and high yield cultivation. We also develop bio-fuel conversion technology focusing on unused or rarely used resources, and technology for the use of various kinds of biomass in a comprehensive manner.



Erianthus - extremely high yield biomass crop

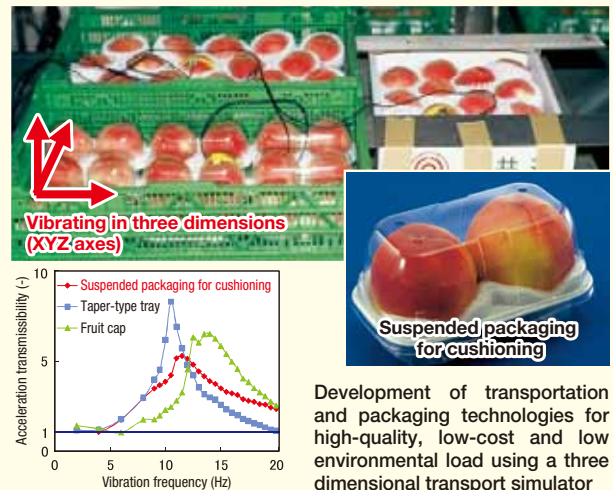
In order to promote industry for new markets and future industries, we develop high quality agricultural produce and food. We also develop technology to create new industries and new demand utilizing cutting-edge techniques.

This program aims to develop potato, sweet potato, sugarcane, buckwheat, rapeseed and sesame cultivars with high quality and/or positive processing characteristics in order to increase the profitability of regional agriculture.



New cultivars of potato with high-anthocyanin contents (top, right) and delicious sweet potatoes for table use (bottom, left)

We develop distribution and processing technologies for produce and food that fulfils consumer and customer needs. We also develop technologies to support the production of value-added products through the cooperation of agriculture and the food industry, etc.



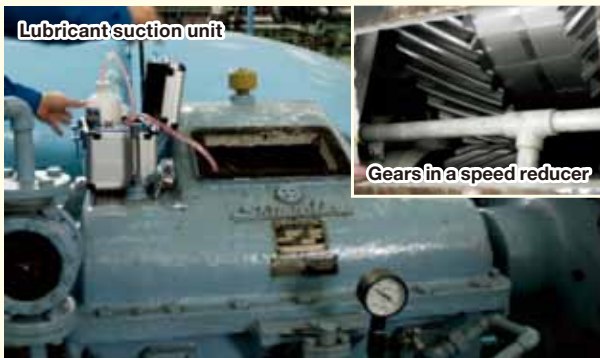
Development of transportation and packaging technologies for high-quality, low-cost and low environmental load using a three dimensional transport simulator

4

Rural Resources

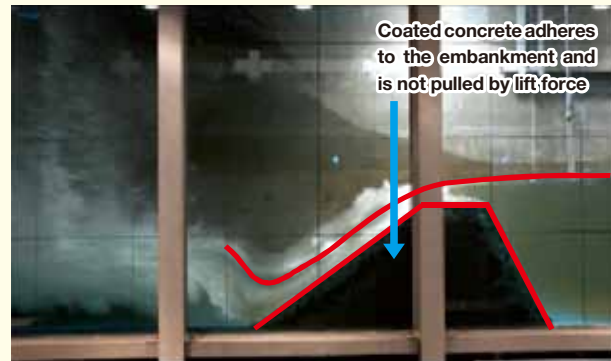
We develop technology to maintain and manage agricultural facilities such as irrigation facilities and farm roads and technology for the conservation of rural resources related to agricultural production in order to help with the recovery of agriculture and rural communities in areas affected by the 2011 earthquake as well as the conservation of national land and resources.

In order to reduce the life-cycle costs and prolong the durability of irrigation facilities, etc., we develop strategic revitalization and conservation technology through asset management. We also develop diagnosis methods of functionality, design and management methods for reinforcing, repairing and upgrading and methods for evaluating and checking reference performance in order to maintain the functionality of irrigation systems.



Technology that conducts functionality diagnosis for irrigation facilities (pump facilities) through the analysis of metal wear particles included in lubricant

We develop damage mitigation technology and technology that evaluates and checks disaster-resistant performance exhibited by irrigation facilities, etc. in order to minimize the damage caused by natural disasters on rural areas. We also develop technology to evaluate the disaster risks for overall facilities that are spread over rural areas in order to reduce the risks when natural disasters occur.



Hydraulic test with model for developing tolerant coastal banks against the threat of tsunami (Observation of the behaviour of embankment model when an artificial tsunami is applied from the right)

Emergency Response to Disasters, etc.

NARO conducts staff dispatch, surveys and research on request from the government in order to respond to disasters according to the Basic Act on Disaster Control Measures and to respond to emergencies according to the Food Safety Basic Act.



Diagnosis of degree of hazards in storage reservoir affected by the Great East Japan Earthquake

In order to effectively use, conserve and manage basic regional resources in rural areas, we develop technology to improve the reliability of water for agricultural use, to effectively use, conserve and manage agricultural land and grassland giving consideration to the environment, techniques for operating irrigation and drainage for paddy rice crop rotation, technology for the efficient use of regional resources such as natural energy and technology for the prevention of crop damage by wild birds and animals.



A water wheel for micro hydro power generation installed in irrigation channel

5

Responding to Nuclear Accidents

In order to repatriate residents, re-open farms and provide safe agricultural produce for the people in the areas affected by the nuclear accident, we develop technology to decontaminate agricultural soil and to control the transfer of radioactive materials to agricultural crops.

We develop and systemize decontamination technology for areas that have received a high dose of contamination or agricultural land that has been difficult to decontaminate with conventional technology and technology to reduce the volume of and process contaminated soil, plant residue and compost. We also develop efficient decontamination for facilities surrounding agricultural land such as the ridges between rice fields and drainage channels. In addition, we identify underground seepage of radioactive materials from agricultural soil and the current status of outflow to non-agricultural land.



<http://www.s.affrc.go.jp/docs/press/110914.htm>

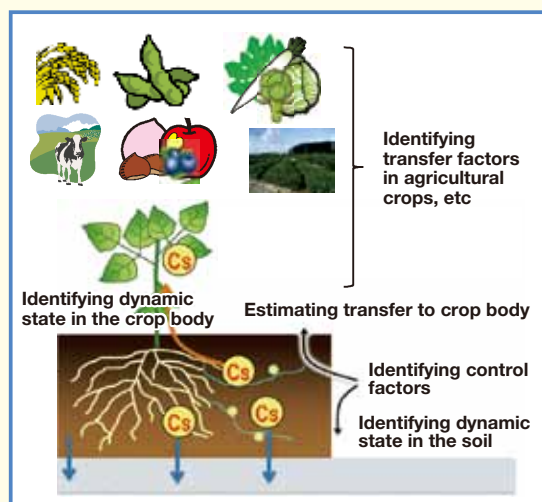


Equipment to stabilize and reduce volume of biomass contaminated with radioactive cesium by pelletizing

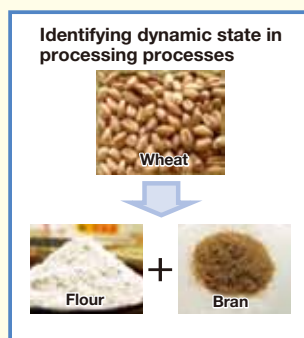
Pellets (diameter: 8mm)

Physical decontamination technology responding to agricultural soil contamination levels

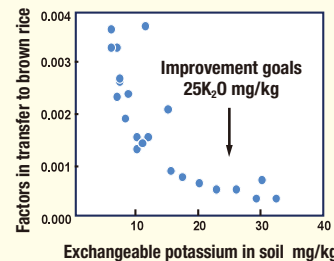
We elucidate the factors which affect the transfer of radioactive materials to crops, and develop transfer reduction technologies for each crop. We elucidate the dynamics of radioactive materials in food processing and we also research plants that easily absorb radioactive materials and those that do not.



Identifying dynamic state of radioactive cesium in cultivation or processing processes



Identifying the risks of radioactive contamination in the production/processing of agricultural products, etc



Reducing transfer of radioactive cesium to brown rice through improving the availability of potassium in soil



Evaluation of radioactive cesium absorption in amaranthus

6

Research and Development for Promoting Agricultural Mechanization

In order to support agriculture, we develop innovative machinery which secures safety and reduces farm work, reduces environmental load and constructs new agricultural production systems.

We develop machinery/devices that contribute to production cost reduction in land utilization-type agriculture and improving productivity in the horticulture and livestock fields.



Compact general purpose combine harvester which is capable of being loaded on a 4t truckload truck and being used on narrow farm roads or farm land with no land readjustments

We upgrade evaluation and testing methods from the viewpoint of environmental load reduction as well as developing agricultural machinery which saves energy, uses alternative energy, boosts consumer trust and produces high quality.



Less-drift orchard sprayer with less noise

We develop agricultural machinery which has safety improvements and which prevents health hazards for workers and reduces work load for elderly and women workers. We also establish techniques in order to evaluate agricultural machinery safety and investigate the causes of farm work accidents.



Physical function measurement for agricultural machinery safety measures

We develop fundamental technologies to support automated straight-line travel systems, robot tractor techniques and automation for protected cultivation and plant factories.



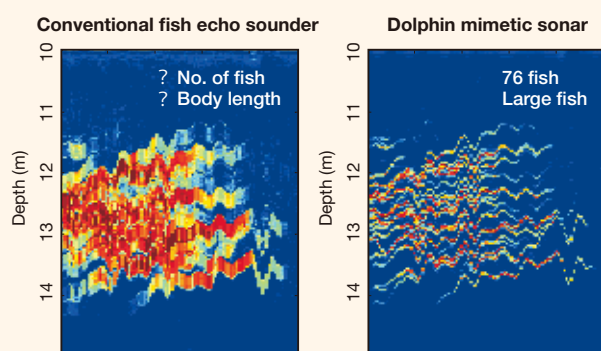
Strawberry harvesting robot which harvests only ripe strawberries by image processing with LED lighting and CCD cameras

Research Funds for Private Companies, Universities and Independent Administrative Agencies, etc.

The Bio-oriented Technology Research Advancement Institution provides research funds through the open recruitment of proposals in order to promote the development of innovative technology or technology that is required for the solution of various issues in the agriculture, forestry, fishing and food industries.

Research for developing seeds of innovative technologies

We conduct commissioned research through open recruitment of proposals targeting university, Independent Administrative Agency and private company, etc. research from the basic to the applied stages (competitive research fund system).



Period that the fish school moved under the boat

Development of a dolphin mimetic sonar that distinguishes species and body size of target fish speedily in the ocean by using ultrasonic sounds (Research institute: Fisheries Research Agency National Research Institute of Fisheries Engineering and others)

Promotion of Private Commercial Viability Research

We provide funds to private companies for R&D in commercial viability testing on a commission basis (Japanese Bayh-Dole system).



A commissioned private company developed technology to powder okara (bean curd waste) for effective utilization in food instead of its original uses as animal feed or as waste products.

Activities for Restoration and Recovery in Areas affected by the Great East Japan Earthquake

The Great East Japan Earthquake caused extensive damage in the agricultural sector. In order to revitalize the affected areas as food production areas, NARO implements research to respond to nuclear accidents and research into countermeasures for tsunami and earthquakes along with maintaining a research base in Fukushima as a base for researching the development of decontamination technology.



Experimental machinery aimed at the decontamination of agricultural land (Iitate, Fukushima)



Large-scale greenhouse horticulture validation research facility set up to exchange technologies for new cultivation systems and method validation, exhibitions and seminars, etc. in areas affected by the earthquake (Yamamoto, Miyagi)

Initiatives in Industry-Academia-Government Cooperation

We promote Industry-Academia-Government Cooperation with private companies, etc. in order to contribute to society with the results of our research in many ways.

Industry-Academia-Government Joint Research

Purple sweet potato joint research with private companies and local governments, etc. and aim to create practical research results.



Purple sweet potato products developed by a research consortium with a number of private companies

Matching Events

We introduce our research results through organizing all kinds of matching events and exhibiting at similar events.



Presenting research results at the Agribusiness Creation Fair 2011

Open Laboratory System

In order to promote Industry-Academia-Government Cooperation in each region, we open the doors of our labs that have various kinds of analysis equipment to external researchers from organizations or companies related to production, logistics or processing, and local governments and universities, etc. . External researchers can use our facilities and we actively promote this system for joint research, etc.

Research Institutes	Open Laboratory System	
NARO Agricultural Research Center (NARO/ARC)	Joint Laboratory Building for Development of Environmentally Sound Pest Control Technology	Tsukuba, Ibaraki
	Joint Industry/Academic/Government Research and Development Facility for Biomass-Resource Energy	
	Joint Laboratory Building for the Development of Budding Technologies	
NARO Institute of Crop Science (NICS)	Joint Research Building for Quality Control of Field Crops	Tsukuba, Ibaraki
National Food Research Institute (NFRI)	Instrumental Analysis Center for Food Chemistry	Tsukuba, Ibaraki
	Research Center of Multi-disciplinary Research	
	Laboratory for the Physical Properties of Food	
NARO Hokkaido Agricultural Research Center (NARO/HARC)	Joint Research Laboratory Building for Crop Quality	Sapporo, Hokkaido
	Agrobiological Research Laboratory for Cold Regions	
NARO Tohoku Agricultural Research Center (NARO/TARC)	Functionality Evaluation Laboratory	Morioka, Iwate
	Temperature Gradient Laboratory (The Gradiotron)	
NARO Western Region Agricultural Research Center (NARO/WARC)	Open Research Facility for Analysis of Agricultural Product Components	Fukuyama, Hiroshima
	Open Research Facility for Agriculture on Sloping Land	Zentsuji, Kagawa
	Second Joint Experiment Building	
NARO Kyushu Okinawa Agricultural Research Center(NARO/KARC)	Joint Use Research Building	Koshi, Kumamoto
	Research Exchange Center	
	Wheat Quality Screening Facility	Chikugo, Fukuoka

Sharing Research Results and Communicating with Society

The research results from our activities have been shared with agricultural producers, related companies and government institutions and we promote Public Relations activities through press releases, websites, symposiums and seminars, etc. In addition, we are putting efforts into direct communication such as hosting site visits and opening facilities to the general public.

Education Campaign at Farming Sites

We hold education campaigns about newly-developed cultivars and new technologies at farming sites such as technological guidance and consultations.



Education campaign for Yume Chikara, an extra strong wheat that is expected to reinforce domestic wheat in the bread market

Symposiums/Seminars

We hold all kinds of symposiums, seminars and science cafes, etc. to present the results of our research to people in the agricultural and food industries and consumers.



Food Seminar where researchers directly promote NARO-developed cultivars (Toshima, Tokyo)

Varieties/Patents

We present variety and patent information on the NARO website and we also conduct various activities to promote the introduction and active use of current research results.



NARO website (top page)
URL <http://www.naro.affrc.go.jp/>

Tsukuba Agriculture Research Hall

Tsukuba Agriculture Research Hall presents research results in easy-to-understand format for the general public. We give guided tours for groups on request.



Inside the facility

Crop sample garden

3-1-1 Kannondai, Tsukuba, Ibaraki, 305-8517, Japan
FAX: +81-29-838-8982
E-mail: www@naro.affrc.go.jp
Opening hours: 9:00-16:00 Holiday: year-end holidays
Entrance fee: free <http://trg.affrc.go.jp/>

*Tsukuba Agriculture Research Hall is run with the cooperation of Independent Administrative Agencies that conduct research on agriculture, forestry and fishing industries.

Access to NARO Headquarters



By train & bus

●JR Joban Line, Ushiku Station

Kanto Tetsudo bus from Ushiku station West Exit
Take the bus bound for Tsukuba Daigaku Byoin, Yatabe Shako or Seibutsuken Owashi Campus (approx. 20 minutes) → Alight at Norin Danchi Chuo → 5 minute walk

●Tsukuba Express, Midorino Station

Kanto Tetsudo bus from Midorino station
Take the Norin Danchi Junkan bus (approx. 15 minutes) → Alight at Norin Danchi Chuo → 5 minute walk
*Note: Buses do not run on weekends & holidays

●Tsukuba Express, Tsukuba Station

Tsuku-bus Nanbu Shuttle from Tsukuba station
Take the bus for Kukizaki Madoguchi Center or Kukizaki Rojin Fukushi Center (approx. 16 minutes)
Alight at Norin Danchi Chuo → 5 minute walk

By car

Approx. 5 km from Joban Expressway Yatabe Interchange
Approx. 4 km from Ken-O Expressway Tsukuba Ushiku Interchange



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National Agriculture and Food Research Organization (NARO)**

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