

National Agriculture and Food Research Organization

Central Region Agricultural Research Center



The National Agriculture and Food Research Organization (NARO) embarked on the 4th Medium-Term Plan from April 2016. As one of the regional research centers of NARO, the Central Region Agricultural Research Center (CARC) has been designated as the frontline in pursuing research towards the sustainable development of agriculture and dissemination of results, particularly in the central area of Japan encompassing the Kanto, Tokai, and Hokuriku regions.

In recent years, agricultural systems in the Kanto, Tokai, and Hokuriku regions have undergone major changes due to the expansion of various agricultural activities and diversification of management practices. Amidst this scenario, we have developed many advanced agricultural technologies and strategies that are currently used in these regions, and provide the platform for further technological innovations. Our mission is to promote the development of useful technologies, new crop cultivars, and practical knowledge that will contribute to the needs and expectations of farmers and consumers.

To achieve this goal, we are pursuing research initiatives targeting urgent issues facing the agricultural sector and providing technical assistance and on-site demonstrations, in cooperation with researchers involved in farm management, crop production, weed control, farming mechanization, soil diagnosis and improvement, pest and disease control, mitigation of damage caused by wildlife, crop breeding etc. We will promote the effective management of agricultural productivity and the advancement of agriculture in local communities through comprehensive research towards a sustainable food and agriculture for the future.



DIVISION OF FARM MANAGEMENT RESEARCH

With the aim to contribute in strengthening the production site and management efficiency of Japanese farmers, we are conducting research on the development of regional farming systems and corporate management planning methods, evaluation of new technologies developed by NARO, and implementation of efficient business management systems.

Farming Systems Research Group

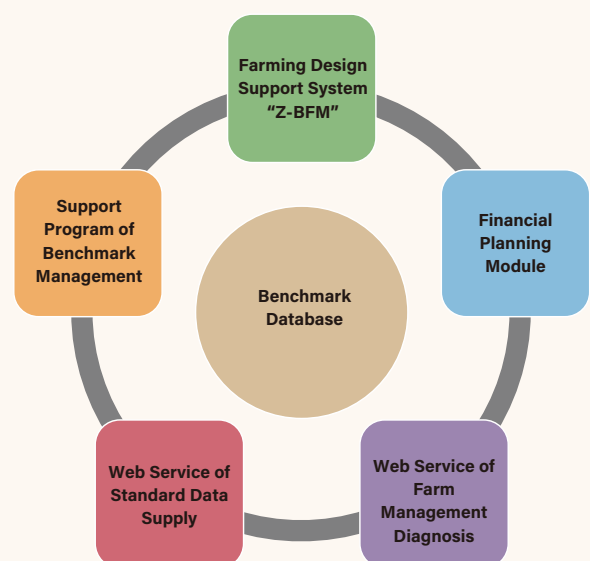
We conduct research on the evaluation of the impact of new technologies on the economy, farm consolidation, and the establishment of relationship with regional stakeholders.

Farm Business Planning Group

We develop the technologies for farm business planning such as regional planning by spatial analysis using the Geographical Information Systems (GIS), prediction models of domestic food supply capacity, and financial management systems for diversified business development in large scale agricultural corporations.

Organization Management Group

We conduct research on labor management of agricultural corporations that hire employees including management strategies such as improving the motivation of employees, management succession policy etc.



The Check-Act-Plan Support System (CAPSS) helps agricultural corporations in evaluation of business performance and improvement in business planning.

DIVISION OF CROP PRODUCTION SYSTEMS

With the growing global competition in the agricultural industry, our research target is to develop sustainable technologies for crop production that will help farmers to produce highly profitable products at low cost, and to demonstrate the utilization of these technologies in the field.

Weed Management Group

We develop weed control methods and strategies to prevent noxious weeds from invading and spreading in farmlands.

Plant Production Group

We develop crop production management systems suitable for cultivation of rice, soybean and green manure crops.

Crop Rotation System Group

To achieve a highly productive crop rotation system in the Kanto region, we conduct studies to increase the productivity of rice, wheat, soybean and other crops. We also evaluate new crop rotation systems for that purpose.



Rice-soybean crop rotation system with organic farming



Reversing windrow for drying using a swath conditioner

Agricultural Machinery Group

We develop agricultural machineries to increase work efficiency and decrease labor cost for paddy field crop rotation system in the Kanto region.

Biomass Utilization Group

We develop thermal energy utilization technology using agricultural waste, and a low-labor and low-cost technology for collecting rice straw or plants.

Crop Rotation System Group for Tokai Region

We develop a stable and high-yielding rice-wheat-soybean crop rotation system suitable for paddy fields in the Tokai region encompassing Shizuoka, Aichi, Gifu and Mie Prefectures.

DIVISION OF SOIL SCIENCE AND PLANT NUTRITION

With the aim to reduce the use of chemical fertilizers and improve the conditions of soil for crop production, we are conducting research on optimization of fertilizer usage by soil testings, utilization of organic resources such as green manure, and developing rational fertilization and soil management technology in paddy field crop rotation system.

Soil Testing Research Group

We develop techniques to measure available nitrogen, phosphorous and exchangeable acidity which can be used as indices of soil fertility. We also develop an evaluation method that covers field-wide distribution of physical properties of soil.

Paddy Field Soil Management Group

We develop techniques for soil management and effective fertilizer use to sustain fertility, and to improve low productivity of wheat and soybean on paddy-upland rotation system which includes high yield feed rice production.

Soil Biology Group

We develop techniques for fertilizer reduction in crop production with green manure application, optimization of fertility management after solar sterilization and showing soil microbial community structure in stable vegetable production.

Plant Nutrition Group

We develop metabolic biomarkers for detecting the nutritional status and environmental stress of plants with metabolome analysis. We also analyze the flavors to evaluate the quality of agricultural products.



Rapid and simple soil testing method for available nitrogen in air-dried paddy soil

DIVISION OF PLANT DISEASE MANAGEMENT

We develop an integrated disease control system which utilize the power of living organisms and nature, a style of agriculture fit for 21st century Japan. We also develop new techniques to control diseases that emerge during agricultural production, and introducing them to farmers and agricultural advisors in Japan in the form of manuals on environment-friendly disease control system.

Ecologically-based Disease Control Group

We analyze and clarify the ecological mechanisms underlying the emergence of diseases in various crops to develop effective strategies for environment-friendly disease control.

Crop Disease Control Group

We develop a system for effective utilization of disease-resistant varieties based on the intrinsic characteristics of the resistance genes and their environmental suitability.

Horticultural Plant Disease Control Group

Based on the cultivation environment of horticultural crops, we are developing an integrated disease management system that effectively utilizes several strategies to protect the crops.

Pest Risk Analysis Group

We analyze the factors affecting the spread of crop diseases and impact on the economy to develop more effective disease management measures.



Panicle infected with rice blast turns white
Inset: Hypha and spore of *Pyricularia oryzae*



High-grafted tomatoes (left) resist bacterial wilt

DIVISION OF APPLIED ENTOMOLOGY AND ZOOLOGY

We develop and systematize the technology to protect crops from damages caused by insects, nematodes, and wildlife pests such as birds and mammals. The target species include root-knot and root-lesion nematodes; spider mites, aphids, whiteflies, thrips and their natural enemies which attack aboveground parts of crops; fruit and flowering tree infesting mealybugs and longicorn beetles; small brown planthoppers and rice skippers that harm rice; bird pests such as crows and sparrows; and mammal pests such as masked palm civets, sika deer and wild boars.

Pest Management Group

We develop integrated pest management methods in field crops to control serious pests such as small brown planthopper which is the most important vector of rice stripe virus, feeding damage-causing rice skippers, and pecky rice-causing true bugs.

Biological Control Research Group

We develop biological control methods for controlling harmful insect pests of horticultural crops, promote the development and dissemination of technology such as the banker plant system in greenhouse vegetable cultivation.

Nematode Management Group

Plant-parasitic nematodes cause replant problems in upland soil to result in nearly 20% reduction of profit. We study the ecological and physiological properties of nematodes, and interactions between nematodes and plants, to develop detection and control techniques.

Wildlife Damage Management Group

We develop low cost and effective management technology based on behavior and ecology of animal pest species to reduce crop damage due to wild animals, and revitalize agricultural production in rural communities.

Chemical Ecology Group

We identify the insect pheromones and other semiochemicals, and develop the techniques for use in crop protection.



Nesidiocoris tenuis, a predatory natural enemy



A carrion crow walking in rice paddy

DIVISION OF LOWLAND FARMING

With the aim of contributing to the development of farmers and agricultural businesses in the Hokuriku region, we develop efficient and profitable rice paddy crop rotation system, farming system, agricultural machinery system, labor-saving and low cost crop production techniques as well as high quality and high yield crop production techniques adapted to the soil and weather conditions of the region.

Hokuriku Crop Cultivation Group

We develop stable, high-yield, high quality, labor-saving and low cost crop cultivation technologies and guidelines to make lowland farming a profitable industry and enable farmers to engage in cultivation of different crops.

Hokuriku Soil Science Group

We develop efficient water and soil management technologies to establish a stable and high-yielding crop rotation system in rice paddy fields with heavy clay soil.

Hokuriku Farm Work Systems Group

We develop suitable technologies to resolve competition of crop production and allotment of work schedule during crop switch over due to expansion of agricultural management.

Hokuriku Plant Protection Group

We develop plant protection techniques and strategies to control important insect pests and diseases of crops in the Hokuriku region.



A high-speed rotary-tilling and ridge-making seeder

DIVISION OF CROP DEVELOPMENT

We conduct research on developing new cultivars of rice, barley and soybean adapted to the needs of farmers, manufacturers and consumers. We also develop new breeding stocks that can adapt to climate change and other environmental factors.

Rice Breeding Group

We breed rice cultivars suitable for cultivation in cold regions, high-eating quality and high-yielding cultivars for home and restaurant consumption, and cultivars suitable for livestock feed. The new cultivars we have developed include the early maturing, high-yield and good-tasting "Tsukiakari", late maturing and high-eating quality "Mizuhonokagayaki", and high biomass "Hokuriku 193" for livestock feed. We have also developed cultivars suitable for specific dishes such "Kareimai" for rice curry, "Eminokizuna" for sushi, "Nagomirisotto" for risotto, and high amylose content "Koshinokaori" for rice noodle.

Barley and Soybean Breeding Group

We breed barley and soybean cultivars suitable for cultivation in the cold regions. We have developed barley cultivar "Yukimirokujo" suitable for making shochu and cookies, glutinous wheat cultivar "Haneumamochi" with good taste and high-glucan content. In soybean, we develop new soybean cultivar suitable for products such as soy bean curd "tofu", that meet the needs of manufacturers, and with disease and insect resistance at the same time.

Rice Functional and Applied Genomics Group

We isolate and analyze the function of the genes responsible for yield and quality of paddy rice. We are investigating genes involved in the grain quality under high-temperature ripening conditions, or in the cold tolerance at an early growth stage particularly in indica type high-yielding cultivars. We also investigate genes relevant to the translocation efficiency of carbohydrate and starch accumulation, genes that control seed protein biosynthesis and accumulation. Eventually, we aim to produce new materials that can be used in breeding high performance cultivars adaptable to various environmental changes including global warming.



Cookies using new barley cultivar "Yukimirokujo"



Risotto made from new rice cultivar "Nagomirisotto"

NARO

National Agriculture and Food Research Organization

President • Senior Vice-President • Vice-Presidents Auditors

NARO Headquarters

Agri-Food Business Innovation Center

Hokkaido Agricultural Research Center

Tohoku Agricultural Research Center

Central Region Agricultural Research Center

Western Region Agricultural Research Center

Kyushu Okinawa Agricultural Research Center

Institute of Fruit Tree and Tea Science

Institute of Vegetable and Floriculture Science

Institute of Livestock and Grassland Science

National Institute of Animal Health

Institute for Rural Engineering

Food Research Institute

Institute of Agrobiological Sciences

Institute of Crop Science

Institute of Agricultural Machinery

Institute for Agro-Environmental Sciences

Advanced Analysis Center

Genetic Resources Center

Center for Seeds and Seedlings

Bio-oriented Technology Research Advancement Institution

Regional
Research Centers

Specialized
Research
Areas

Priority
Research Areas

Fundamental
Research
Areas

Central Region Agricultural Research Center

Director-General

Director of Plant Products Safety Research

Director of Hokuriku Research Station

Department of Planning Planning Section

Promotion Section of Industry-Academia Collaboration

Coordinator for Industry-Academia Collaboration

Communicator for Agricultural Technology

Department of
General
Administration

General Affairs Section

Accounting Section

Hokuriku Planning and General
Administration Section

Office of Risk Management

Technical Support Center Hokuriku Operation Unit

Division of Farm Management Research

Division of Crop Production Systems

Division of Soil Science and Plant Nutrition

Division of Plant Disease Management

Division of Applied Entomology and Zoology

Division of Lowland Farming (Hokuriku)

Division of Crop Development (Hokuriku)

Division of Livestock Feeding and Management (Nasu)

Access

● Tsukuba Headquarters

2-1-18 Kannondai, Tsukuba, Ibaraki 305-8666, Japan

JR East Joban Line Get off at Ushiku Station. From the west exit, take the Kanto Tetsudo bus bound for Yatabe Shako (about 20 min), get off at Norin Danchi Chuo, and walk for 5 min in the direction of CARC

Tsukuba Express, Midorino Station Get off at Midorino Station.

Take Kanto Tetsudo bus bound for Yatabe Shako (about 20 min), get off at Norin Danchi Chuo, and walk for 5 min in the direction of CARC

Tsukuba Express, Tsukuba Station Get off at Tsukuba station. Take the "Southern shuttle" bus bound for Kukizaki General Services Counter (about 20 min), get off at Norin Danchi Chuo, and walk for 5 min in the direction of CARC

● Hokuriku Research Station

1-2-1 Inada, Jo-etsu, Niigata 943-0193, Japan

Echigo Tokimeki Tetsudo Myoko Haneuma Line

Get off at Takada station, take Kubiki bus bound for the suburbs (about 5 min) and get off at Inada 2-chome



● Nasu Research Station

768 Senbonmatsu, Nasushiobara, Tochigi 329-2793, Japan
Phone: Fax: +81-287-36-6629

Route Bus (JR Bus)

Board from Nishi Nasuno Station (West Exit) Bus Stop

Board bus for "Shiobara hot spa"

Get off at "Senbon Matsu" bus stop.

Express bus (Nasu Resort Express Line)

Place of boarding: New South Exit of Shinjuku Station or at South Yaesu, Tokyo Station. Get off at Horai (Both buses are bound for Shiobara hot spa and Nasu hot spa stop)

By car

Take a right at the end of the road after the Nishi Nasuno Shiobara IC (Tohoku Expressway) and the entrance to the research institute is the second entrance after passing the first turn.

● Crop Rotation System Group for Tokai

360 Kusawa, Anou, Tsu, Mie 514-2392, Japan
NIVFS Anou Vegetable Research Station

Kintetsu Nagoya Line, Tsu-Shinmachi station

Get off at Tsu-shinmachi station, take the Mie Kotsu bus and get off at Araki bus stop (about 25 min walk)



Contact

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The Central Region Agricultural Research Center (CARC) was newly reorganized from July 2018 with the integration of the Division of Livestock Feeding and Management.

Masaki Umemoto, Director general, Central Region Agricultural Research Center, NARO

Dairy farming in Japan is facing many problems such as labor shortage due to aging, steep rise of feed price, high demand for domestic feed, and the negative impact of the agreement on agricultural products in Japan-EU EPA (Economic Partnership Agreement). It is therefore necessary to address these problems by strengthening strategic management for competitive advantage. Active utilization of paddy fields is strongly demanded particularly in the dairy farms in Honshu in order to produce self-sufficient livestock feeds.

Under these circumstances, NARO has decided to transfer Division of Livestock Feeding and Management of Institute of Livestock and Grassland Science to Central Region Agricultural Research Center from July 2018. This reorganization is aimed at strengthening the cooperation between cultivation and livestock research groups and promote dairy farming in Honshu. Division of Livestock Feeding and Management under CARC will pursue research on production of highly nutritious



livestock feed such as corn and forage rice using paddy fields and establish the system of technologies for livestock feed production, feed preparation, feed distribution and cattle management, and the field-testing towards the realization of low cost, labor-saving and sustainable dairy farming.

With this reorganization, the 8 research divisions in 4 campuses (Tsukuba, Hokuriku, Nasu and Tokai) of Central Region Agricultural Research Center will mutually cooperate in pursuing research to invigorate agricultural production in the Kanto, Tokai and Hokuriku regions.

Research on Livestock Feeding and Management Technologies

Division of Livestock Feeding and Management

We conduct research on feeding and management of cattle mainly for dairy farming. We develop and make economic evaluation of technologies that lead to high-profitability animal production such as stable preparation for forage rice, milk productivity improvement, and shortening of the fattening period. In addition, we also develop the technologies for production of high-quality manure, effective utilization of heat generated in manure fermentation, and control of pests inhibiting the stable production of livestock feed.

Farm Engineering Group

To accomplish a recycle-based cattle farming, producers need to manage large amount of agricultural materials such as feed and manure, and extensive fields for forage production. We develop advanced agricultural machineries, facilities and farm work systems for efficient farm management.

Feed Technology Group

We develop high quality and low-cost feed production technologies utilizing feed materials produced on paddy fields, such as rice grain and whole crop rice. We aim to facilitate the wide dissemination of these technologies among livestock farms, contractors and TMR (total mixed ration) centers.

Livestock Feeding Group

We develop livestock feeding and management technologies in order to address issues facing dairy and beef cattle production such as stable supply and cost reduction of livestock feed, alleviation of work labor, reduction of working hours and improving productivity of milk and meat.

Forage Crop Protection Group

We conduct research on pest damage in forage crops and pasture grasses in order to clarify the factors related to occurrence and ecology of pests, to establish cultural control methods such as utilization of resistant cultivars and improvement of cultivation method, and to develop integrated pest management and biological control methods using endophytic fungus.

Forage Crop Protection Group

In order to improve and stabilize profitability of livestock farms management through expansion of production and use of domestically produced feed, we are pursuing research on business analysis, economic evaluation of emerging technologies and collaboration of cultivation and livestock.



Cattle fed TMR (total mixed rations)



Cross section of dressed carcass from a castrated Japanese black bull fattened with mixed diet using forage rice