



(16) Research on maintenance and management of agricultural infrastructure in the snowy cold regions contributing to improving food supply

Research Summary

Research period: FY 2016-2021
Program leader: Director of Cold-Region Agricultural Development Research Group

(1) Development of technology for maintenance and management of large-sized paddy fields



Example of large-sized paddy field after improvement: the size of 1 paddy field is about 8 times that of the traditional field.



Water is brought up to topsoil from underdrain.



Construction of large-sized paddy field: Decision on selection of machinery and construction timeframe based on the soil diagnosis is required.



Mechanism of groundwater level control system

(2) Development of maintenance and renewal technology for irrigation facilities



Example of deterioration of irrigation facilities: pier of the headworks with wear and frost damage, and gate with wear and corrosion



Example of waterway repair

(3) Development of irrigation and drainage technology balanced with surrounding environment



Storage facilities of adjusted dairy cattle manure slurry



Scattering dairy cattle manure slurry on pasture



Large-scale dairyland: appropriate circulation of organic resources and preservation of water environment are required.

The target of the self-sufficient rate was set a 45% with the calorie-base in the "Food, Agriculture and rural basic plan (March 2015)" of Japan while the relationship between food supply and demand has become tight. The importance of the agriculture in Hokkaido, with the large food supply capacity, is increasing to achieving this. The urgent need of the development of food production infrastructure using the new technology is required. For this reason, we develop technology for the following topic related to implementation and maintenance of the agricultural infrastructure.

(1) Development of technology for maintenance and management techniques for large-sized paddy field

Accommodating with decline of workforce/aging population and expansion of the farming scale, we propose the following technologies; improvement of large-sized paddy field in accordance with the soil properties, advanced utilization technology of groundwater level control system in large-sized paddy field, irrigation and drainage technology harmonized with the surrounding hydrological environment in the maintenance section

of large-sized paddy field.

(2) Development of maintenance and renewal technology of irrigation facilities

Deterioration of irrigation facilities have been progressing and now appropriate maintenance for these facilities are required. We develop methods of diagnosis and evaluation for deterioration by combined effect of freezing damages and wear occurred in the irrigation facilities in the snowy and cold regions. We also develop methods of repair and reinforcement appropriate for these problems, and planning technology for disaster response to risks needed for large-scale disasters.

(3) Development of technology for irrigation considering harmony with the environment

With requirement of agriculture in harmony with the environment, we propose the energy-saving type of treatment technique for dairy cattle manure slurry in slurry irrigation facilities, and evaluation technology and measures of water quality environment in dairy farming area.