



Center for Seeds and Seedlings, NARO (NCSS/NARO)



National Agriculture and Food Research Organization

Center for seeds and seedlings, NARO

◆ Seed is important

Good seed makes good crop. New variety would bring profit to its breeder and society. Center for Seeds and Seedlings, NARO (NCSS) has following main missions for the protection of new plant variety and the distribution of good quality seeds.

➤ **DUS Growing test for new plant variety and protection of Plant Breeder's Right (PBR)**

PBR is granted to a breeder of a new plant variety. If you propagate a variety which PBR is granted for commercial use, authorization of its breeder is required. NCSS conducts DUS (Distinctness, Uniformity and Stability) growing test for a candidate variety to provide data for examination. NCSS also provides services for dealing with infringement of PBR.



➤ **Seed Inspection and production of foundation seeds (potato tubers and sugarcane seedlings)**

● **Seed Inspection**

It is difficult to know quality of seeds (for example, germination rate, disease free or not) by its appearance. NCSS checks the quality of seeds in laboratory/field and issues certificates. NCSS received the accreditation for seed testing from the International Seed Testing Association.



● **Production of Foundation Seeds (potato tubers and sugarcane seedlings)**

Potato is easily damaged by diseases. NCSS produces disease free and healthy foundation seeds using various methods including tissue culture technology in laboratory and plant netting in field. Local governments propagate stock seeds from foundation seeds, then farmers' associations propagate commercial seeds from stock seeds which is planted by farmers (3 steps propagation system). All potatoes grown in Japan originate from the foundation seeds of NCSS. Farms for producing foundation seeds are located in rural areas to avoid invasion of diseases from outside.

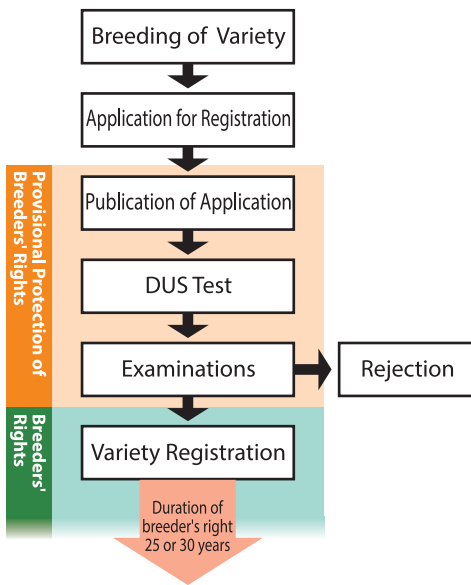


NCSS headquarters is located in Tsukuba and there are 11 stations nationwide from Hokkaido to Okinawa. NCSS was established in December, 1986 and became a member of NARO (National Agriculture and Food Research Organization) in April, 2016.

DUS Growing Test

The Plant Variety Protection and Seed Act provides the plant variety registration system for protection of plant breeders' rights to promote breeding new varieties. NCSS conducts DUS (Distinctness, Uniformity and Stability) growing test to provide data for examination to clarify whether candidate varieties are new ones or not. Japan is a member state of the International Union for the Protection of New Varieties of Plants (UPOV), an international organization aiming to protect new plant varieties, and operates its plant variety protection system in harmonization with other member states.

Outline of plant variety registration



Trend of the number of applications for plant variety registration



In DUS growing test, candidate varieties are cultivated on fields or in greenhouses and compared with similar varieties (reference varieties) and are evaluated morphological characteristics (colors, shapes, size, etc.) and physiological characteristics (tolerance to diseases, etc.)

DUS Growing Test chrysanthemum

Evaluation of morphological Characteristics
Color, shape, size, etc.

DUS Growing Test Lettuce

Evaluation of Disease Resistance Lettuce

Susceptible variety Resistant variety

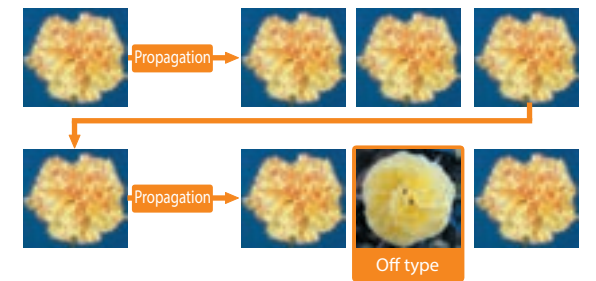
Distinctness
New varieties must be clearly distinguishable from any other varieties.



Uniformity
Individual plants of new variety must be sufficiently uniform at the same propagation stage.



Stability
Characteristics of new variety must be stable through repeated propagation.

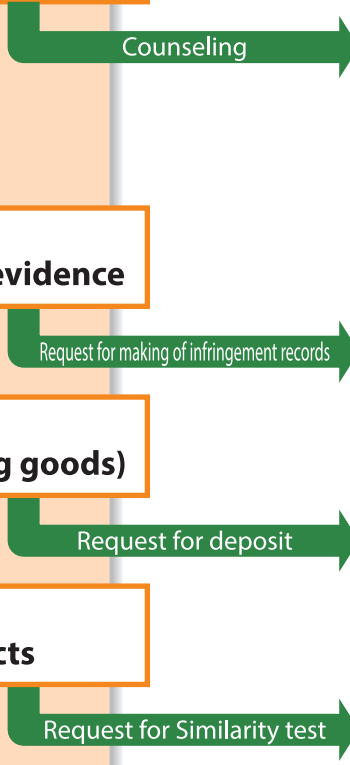
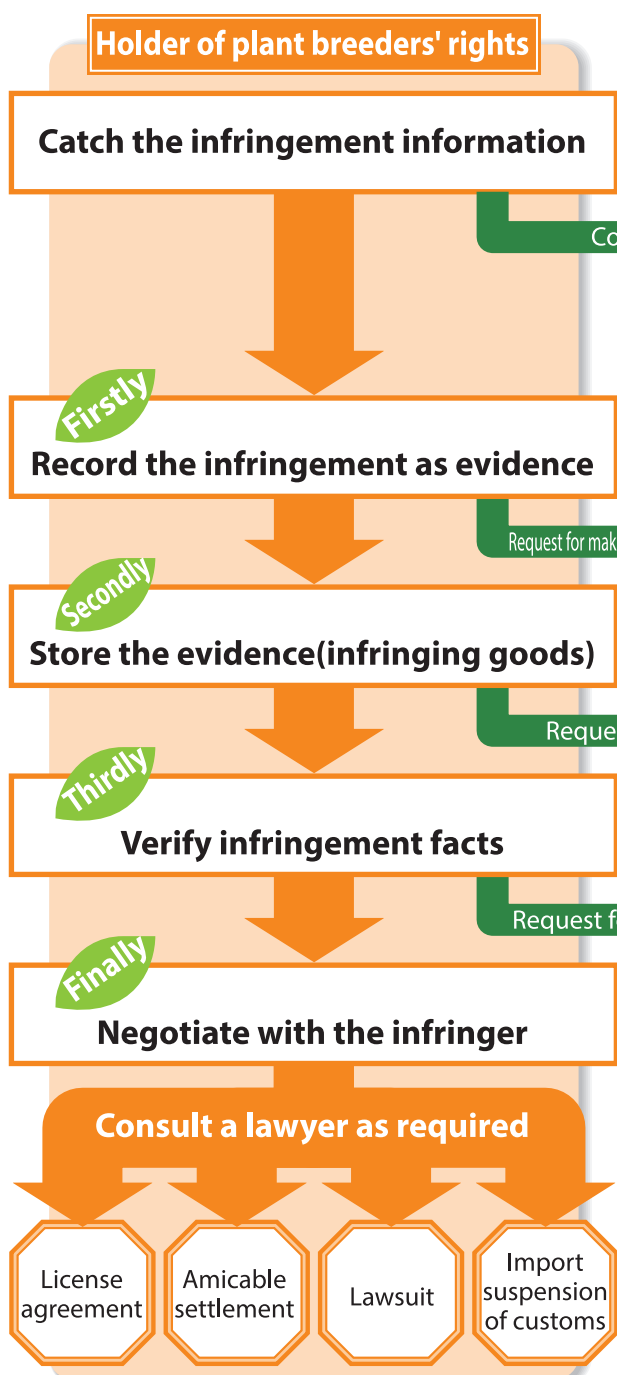


Plant Variety Protection G-men

New varieties of plants are considered as an important intellectual property in the field of agriculture, forestry and fisheries. Protection and utilization of Plant Breeder's Right(PBR) of new plant variety is an important for the improvement of food self-sufficiency rate by production of agricultural products with high added value.

In order to support the holder of PBR, NCSS assigns 20 of Plant Variety Protection Advisers(PVP G-men) nationwide in seven stations, and provides useful services, which are consultation and information collection / provision on infringement of PBR for protected varieties, making of infringement records as evidence, deposit of evidence such as seeds and propagating materials, and similarity test for checking whether it is infringing goods or not.

If your PBR(Plant Breeder's Right)is infringed...



Plant Variety Protection G-men

Advice on countermeasures
Breakdown of infringement consultations (Total number:348, 2005/4/1 - 2017/3/31)

[Plants]

Herbaceous Ornamental Plants	38%
Vegetables	14%
Fruit Trees	14%
Ornamental Trees	11%
Food Crops	9%
Industrial Crops	7%
Mushrooms	7%

[Places]

Infringement Consultation (domestics)	82%
Infringement Consultation (overseas)	18%

Making of infringement records

Deposition of evidence
Regenerate plants when the deposited goods are cut flowers.
(Production of young plants)

Similarity test

Comparison of characteristics

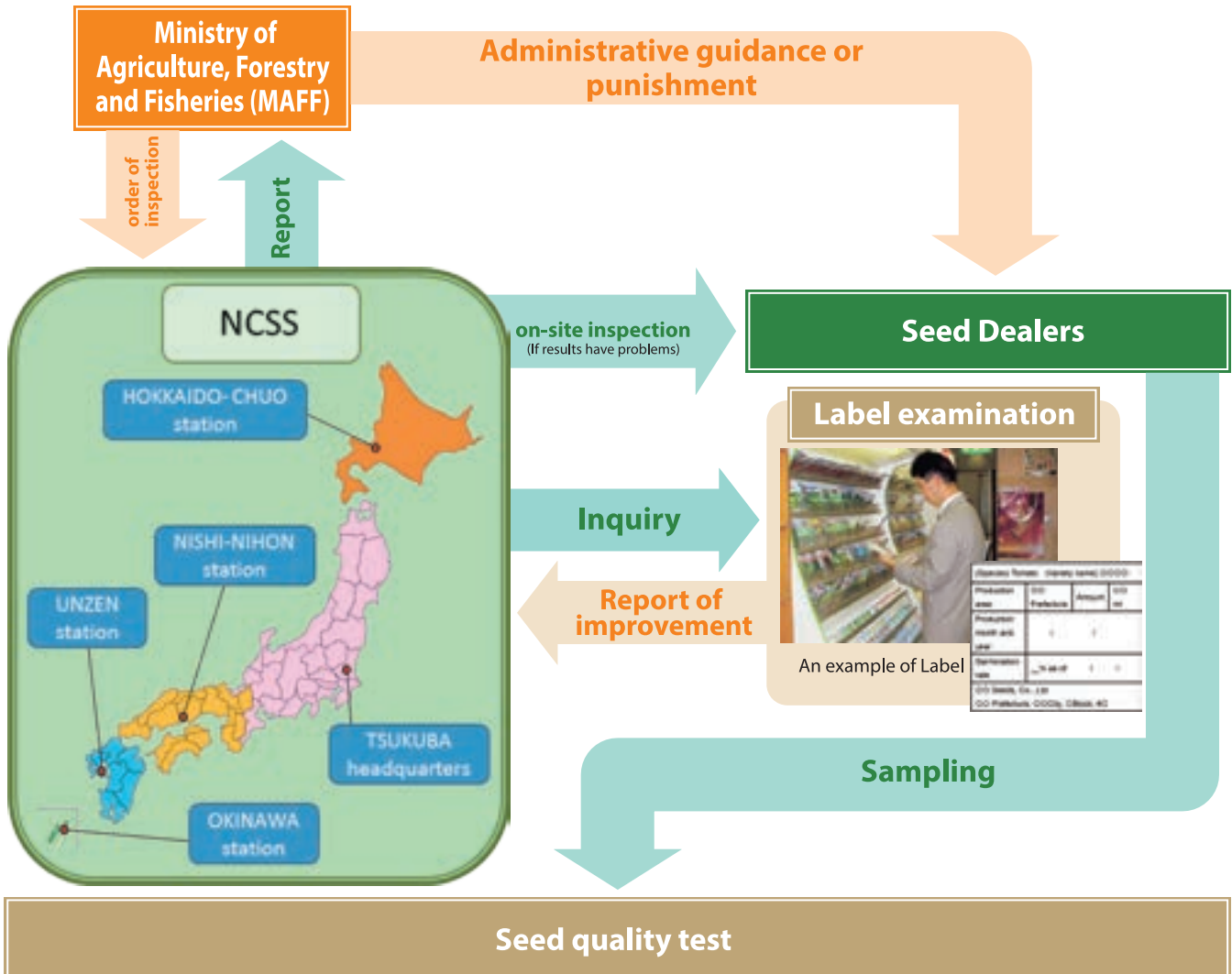
Growing test

DNA analysis

INFORMATION
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Seed Inspection

The Plant Variety Protection and Seed Act designates important agricultural crops and obligates labeling of variety name, production place, and quantity of seed etc., in packages for sale. In addition, the Act sets forth the criteria to be met for the production of designated seeds. NCSS implements seed inspection according to the Act. Furthermore, NCSS issues the seed quality certificates under the rules of International Seed Testing Association (ISTA) in response to the request. NCSS also checks the distribution of genetically modified (GM) seed according to the Act on the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms.



Germination test

Variety test

Purity analysis

Seed health test

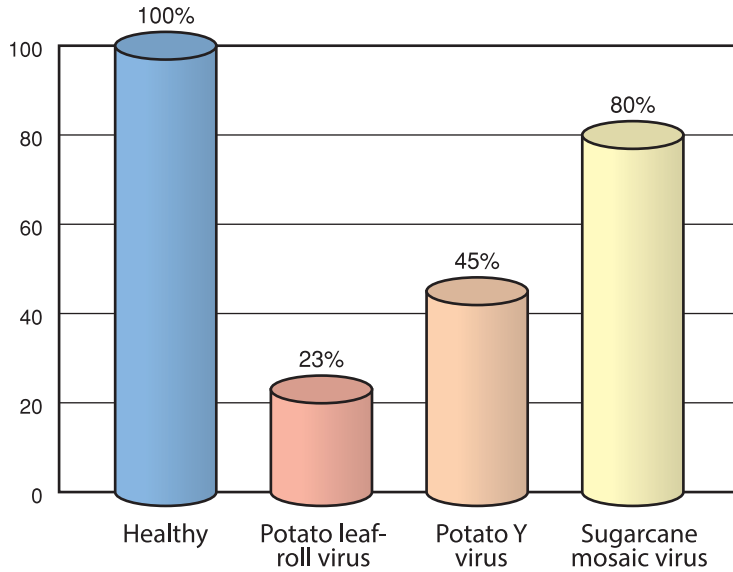
GMO test

ISTA International Seed Certificates

Production of Foundation Seeds

Potato and sugarcane, which are the important crops in Japan, are highly vulnerable to the infection with viruses, bacteria etc. Significant damage and decrease in production will occur when infected seeds are distributed. In addition, their propagation ratio of seeds is lower than other crops. NCSS produces and distributes disease-free and high-quality foundation seeds of potato and sugarcane to prevent the spread of disease.

Reduction in yield by virus infection



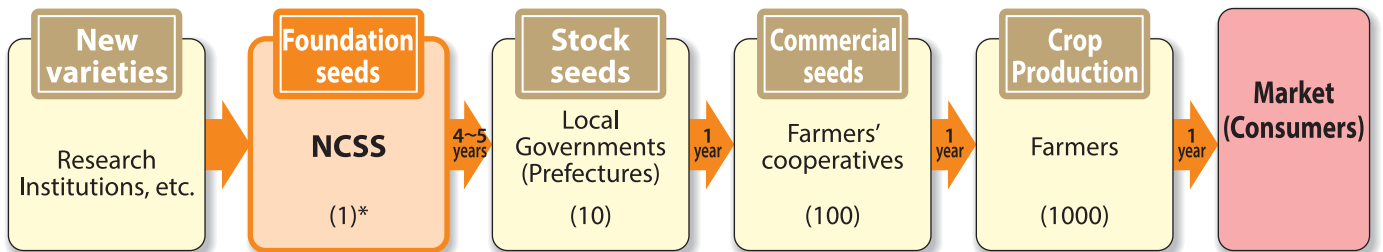
Comparison of growth between healthy and diseased plant



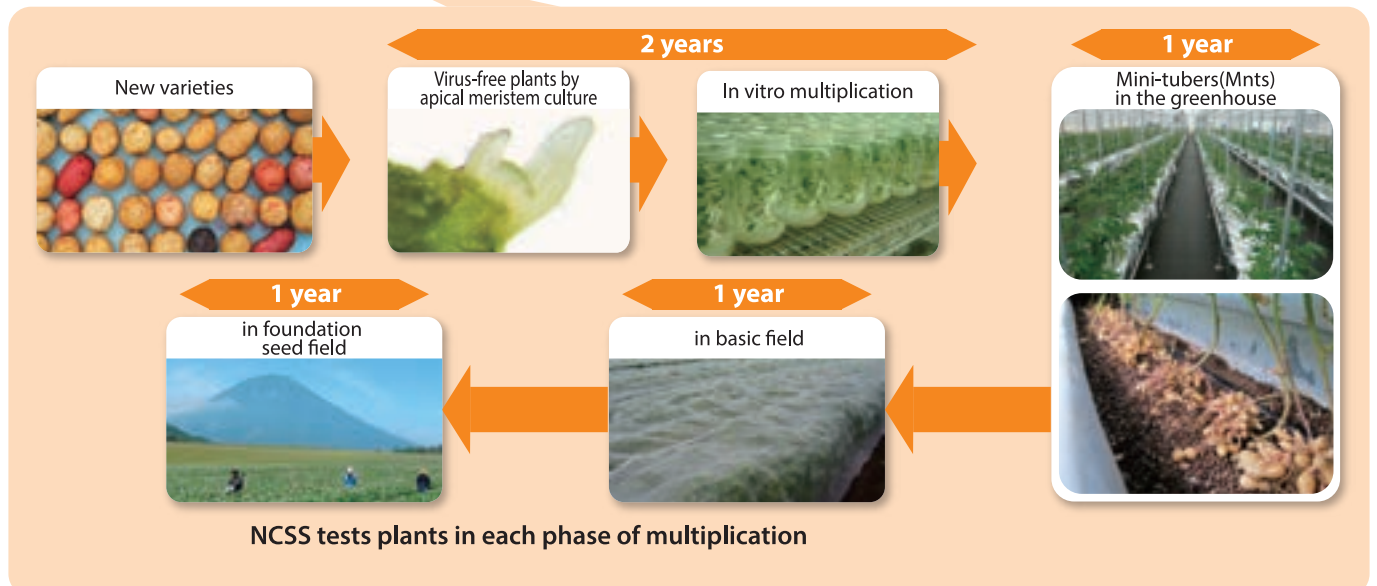
Healthy plant (Left)

plant with virus (Right)

Flow of potato seeds and potato production



*() indicates multiplication ratio



Conservation of Genetic Resources

As a sub-bank of "Gene Bank Project" operated by NARO, aimed at conserving and propagating seeds and plants which are materials for breeding new plant varieties, NCSS conserves plants such as potato, fruit tree, etc. which can not be conserved by seeds. NCSS also investigates varietal characteristics of the plants with the purpose of collecting necessary data for utilizing them as genetic resources. NCSS further multiplies the seeds which are conserved at the Center Bank to renew and replenish them in the "Gene Bank Project".

Conservation of vegetatively propagated plants



Potato



Carnation



Apple tree



Azalea

Characteristics investigation



Potato

Re-multiplication of preserved seeds



Wheat

Collaboration with Research Institutes in NARO

➤ Propagation of new varieties

NCSS propagates seeds and plants of new varieties bred by NARO (such as rice and citrus) to facilitate the marketing.

Collecting scion from citrus mother tree



➤ Development of seed health testing methods

Phytopathological researchers in NARO and NCSS established Network for seed-borne/seed transmitted diseases, and work together to develop seed health testing methods.

Symptom of Bacterial Fruit Blotch



◆ History of NCSS

1947: Ministry of Agriculture and Forestry established seven Potato foundation seeds farm

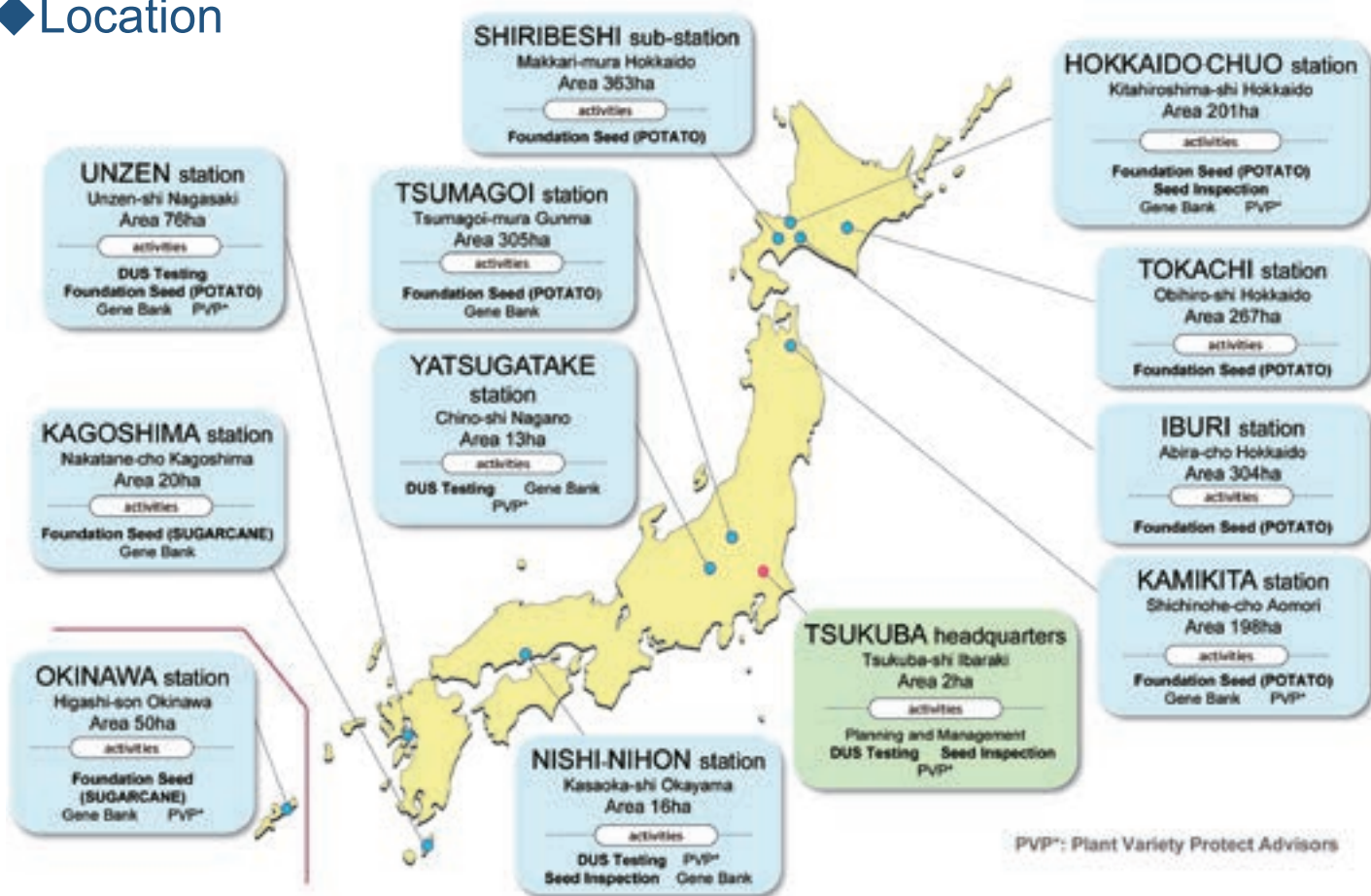
1986: NCSS was established within Ministry of Agriculture, Forestry & Fisheries (MAFF) by integration of

- 13 Foundation Seed Farms (potato, sugarcane, tea)
- 3 Branch Offices of Plant Variety Protection and Seed Division

2001: NCSS was separated from MAFF and reorganized into an Incorporated Administrative Agency.

2016: NCSS was Integrated with NARO, National Institute of Agrobiological Sciences and National Institute for Agro-Environmental Sciences.

◆ Location



- | | | |
|--|---|---|
| 1. Tsukuba headquarters
Tel:029-838-6581 | 5. TOKACHI station
Tel: 0155-64-5234 | 9. NISHI-NIHON station
Tel: 0865-69-6644 |
| 2. HOKKAIDO-CHUO station
Tel: 011-375-3611 | 6. KAMIKITA station
Tel: 0176-68-4311 | 10. UNZEN station
Tel: 0957-77-2100 |
| 3. SHIRIBESHI sub-station
Tel: 0136-45-2200 | 7. TSUMAGOI station
Tel: 0279-98-0024 | 11. KAGOSHIMA station
Tel: 0997-27-0321 |
| 4. IBURI station
Tel: 0145-22-2042 | 8. YATSUGATAKE station
Tel: 0266-74-2005 | 12. OKINAWA station
Tel: 0980-43-2011 |

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