



DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA:

COUNTRY REPORT TO THE FAO INTERNATIONAL TECHNICAL CONFERENCE ON PLANT GENETIC RESOURCES

(Leipzig, 1996)

Prepared by:

Ju Yong Bong

Pyongyang, June 1995



Note by FAO

This Country Report has been prepared by the national authorities in the context of the preparatory process for the FAO International Technical Conference on Plant Genetic Resources, Leipzig, Germany, 17-23 June 1996.

The Report is being made available by FAO as requested by the International Technical Conference. However, the report is solely the responsibility of the national authorities. The information in this report has not been verified by FAO, and the opinions expressed do not necessarily represent the views or policy of FAO.

The designations employed and the presentation of the material and maps in this document do not imply the expression of any option whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.



Table of contents

CHAPTER 1 DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA AND ITS AGRICULTURE	4
CHAPTER 2 INDIGENOUS PLANT GERMPLASM	6
CHAPTER 3 NATIONAL PLANT GERMPLASM CONSERVATION ACTIVITIES	8
3.1 <i>IN SITU</i> CONSERVATION	8
3.2 <i>EX SITU</i> CONSERVATION	8
3.3 GERMPLASM STORAGE FACILITIES	9
3.4 DOCUMENTATION ON GENETIC RESOURCES	9
3.5 EVALUATION AND CHARACTERIZATION OF GERMPLASM	10
3.6 REGENERATION	10
CHAPTER 4 IN-COUNTRY USES OF PLANT GENETIC RESOURCES	11
4.1 UTILIZATION OF PLANT GERMPLASM COLLECTION	11
4.2 CROP BREEDING PROGRAMME AND SEED DISTRIBUTION	11
CHAPTER 5 NATIONAL GOALS, POLICIES, PROGRAMMES AND LEGISLATION	12
5.1 NATIONAL PROGRAMME	12
5.2 TRAINING	12
5.3 GOVERNMENT REGULATION	12
CHAPTER 6 INTERNATIONAL COLLABORATION	13
CHAPTER 7 NATIONAL NEED AND POSSIBILITY	14
CHAPTER 8 PROPOSALS FOR A GLOBAL PLAN OF ACTION	15



CHAPTER 1

Democratic People's Republic of Korea and its Agriculture

The Democratic People's Republic of Korea is located in east Asia, with latitude of 33 - 43 degrees and longitude of 124-131, composed of Korean Peninsula and numerous islands surrounding it. Mountains account for 80 percent of the whole territory and sloping land with over 15 degrees account for 15 percent.

The climate is temperate one characterized by distinguished 4 seasons with an annual precipitation of 1,000-1,200 mm on average. The average temperature in July records 22/C - 25/C, during which the most vigorous growth for plants are found. Winter has 15 percent of annual precipitation, while summer has 50-60 percent.

The territory is not so large, but owing to the facts that a long peninsula is faced with seas on three sides and yet influenced by a continental climate, it has a great diversity of plant species.

The D.P.R. of Korea, 38 degree N., has a population of 21 million and arable land of about 2 million hectares.

Agriculture in our country is rapidly developing at high standard, thanks to the Juche-oriented farming methods created by the Great Leader Comrade Kim Il Sung and illumined by Great Leader Comrade Kim Jong Il. Agricultural production is practiced by both large scale socialist state farms and cooperative farms. In accordance with the correct agricultural policy of the government of the republic, the state is responsible for production and supply of fertilizers and chemicals, farm machineries including tractors and trucks, seeds, and construction of irrigation systems.

Our party and government, with deep insight into the importance of seeds in agricultural production, is directing great efforts to the crop genetic resources activity, one of the fundamental challenges in undertaking green revolution.



Our breeders have developed a lot of new improved varieties from crosses between landraces adapted to the climate and soil of our country and germplasm with special characteristics collected from abroad, as a result of which, national demand for all crop seeds are met locally.

For rice and maize, the two major crops in this country, varieties with yielding capacities of 13-15 tons/ha were developed and grown in majority of arable land.



CHAPTER 2

Indigenous Plant Germplasm

When species constitute of plant in our country are considered, there are 4,200 species of higher plants in 235 families, out of which 450, 200, 80, 60, 200 and 370 are industrial, medical, dye, aromatic, edible and fodder plants.

Our country has some 300 special plants such as Kim Il Sung flower (Kimilsungwa) and Kim Jong Il flower (Kimjongilwa) developed by famous foreign horticulturists with reverence to the Great Leader Comrade Kim Il Sung and the Great Leader Comrade Kim Jong Il, Koryo Insam, Juniperus koreana, Sasa koreana, Kemgangsania osiaticae.

The forestry area in this country is 9 million hectare, which account for 80 percent of territory. There are 1,100 forestry plants in our country like pine, larch, fir, silver fir and pine-nut tree.

The Great Leader Comrade Kim Il Sung saw to it that state law for reforestation and forestry conservancy were formulated, and organized and led all inclusive mass movement for forestry creation and conservation, as a result of which, tremendous oil bearing tree forest including pine-nut tree and fibre and pulp wood tree forest including larch and silver fir tree were planted.

The area of oil-bearing and wild fruit tree forest is in constant increase with cyclic regeneration at some interval depending on the kind of tree.

As far as fibre and pulp wood tree forests are concerned, they are cut and replanted in circular way in every 15-30 years varying with specified trees.

More than 1,100 forest tree germplasm are in conservation at botanical gardens, 6 environmental protection areas, as well as at specified plant protection areas and flora protection areas located in 50 places set by the government.

Some plants including *Pantacnia*, *Rupicala*, *Sasa koreana*, *Gynostemma pentaphyllum* are distributed within very narrow areas of 10 Km and there are 60 species, i.e. *Uniperus coreana*, *Stewartia Koreana*, *Keumkangsania asiatica*, *Rheum coreanum*, easy to be lost due to their physiological characters.



For some of the cereal crops like Italian millet, millet, barnyard millet and minor vegetables like turnip, costmary, leek, fennel and coriander, traditional local varieties are still in cultivation, for the reasons that above mentioned crops have not been subjected to the breeding work of our breeders, so they have been cultivated in very small areas. Varieties of these crops are conserved in national gene bank of the Pyongyang Crop Genetic Resources Institute.



CHAPTER 3

National Plant Germplasm Conservation Activities

In our country, germplasm of agricultural crops, grass crops, medical plants are in *ex situ* conservation, while germplasm of forestry and lower plants are mainly *in situ* conservation.

3.1 IN SITU CONSERVATION

The state have formulated laws on environment protection including forestry and land. Such laws are strictly observed through administrational bodies like Environment Protection Commission, Environment Protection Union and Ministry of land management.

Most-of the plant germplasm are *in situ* conservation in flora protection areas established in 200 locations and other separated plant protection areas and botanical gardens.

3.2 EX SITU CONSERVATION

The Great Leader Comrade Kim Il Sung, with a deep going understanding of the role played by germplasm in conducting green revolution, established the Pyongyang Crop Genetic Resources Institute, the only institute for crop germplasm research in our country, in 1970.

At present, approximately 30,000 germplasm of 150 crop species are conserved in this institute and available to users.

There are 100,000 germplasm conserved in our country with 70,000 germplasm conserved at breeding institutes and agricultural universities having included.



Majority of germplasm are exotic and number of germplasm collected from home is 6,000. 30,000 germplasm at national genetic storage are being used by all the breeders not only from Academy of Agricultural Science but also from agricultural universities.

3.3 GERMPLASM STORAGE FACILITIES

The modern germplasm storage installed in the Pyongyang Crop Genetic Resources Institute is 4 m, 5 m and 2 m in width, length and height, with temperature can be adjusted down to -40/ C.

As of now, due to limit in storage capacity, about one third out of 30,000 germplasm accessions are under long term conservation.

In view of limitation in arable land for its population, rapid development of light industry, medicine manufacture and animal husbandry, there is urgent need to push forward the green revolution, but breeders who are undertaking the green revolution have been suffering for a long time from lack of genetic resources to be used.

Viewed from this consideration, collection, conservation and use of germplasm in our country attracted due attention.

The government seeks for sources of fund to support programme aimed at increasing the capacity of long term storage of national genebank from 10,000 up to 100,000 accessions, as well as establishing short term and medium term storage capacity to conserve germplasm to be used for genetic resources research, for supply to breeders and international exchanges.

3.4 DOCUMENTATION ON GENETIC RESOURCES

Documentation was, so far, made for only 10,000 germplasm conserved in nation genetic storage, and data were fed into a computer. Users receive such information directly or by letter.

Germplasm in *in situ* conservation have not been subjected to the documentation yet.



3.5 EVALUATION AND CHARACTERIZATION OF GERMPLASM

There are researchers specialized on germplasm research for each of different crops concerned in the Pyongyang Crop Genetic Resources Institute who are carrying on evaluation/characterization work for germplasm collected from home and abroad for 1-3 years according to the descriptors published by IPGRI.

3.6 REGENERATION

Researchers at the Pyongyang Crop Genetic Resources Institute determine timing of regeneration taking into account the ages, moisture content, percent germination of the seed and temperature and humidity of storage.

Germplasm are regenerated, when necessary and conserved, with old ones being discarded.



CHAPTER 4

In-Country Uses of Plant Genetic Resources

4.1 UTILIZATION OF PLANT GERMPLASM COLLECTION

In our country, most of the crop breeding institute belong to the Academy of Agricultural Sciences, that is why, the majority of the germplasm users are breeders from the Academy of Agricultural Sciences.

In recent 3 years, about 500 persons annually are using germplasm, mainly cereals and legumes such as rice, maize, soybean, sorghum, peas, beans, barley, wheat, and vegetables like Korean cabbage, turnip, spinach, cabbage, cucumber, tomato, peppers and industrial crops including groundnut, castorbean and sunflower. The number of germplasm used annually totals to 1,500.

4.2 CROP BREEDING PROGRAMME AND SEED DISTRIBUTION

Breeding programmes to develop new varieties are planned for major crops in this country; rice, maize, soybean, sorghum, Korean cabbage, turnip, cucumber, tomato, pumpkin, pepper, while for other crops, introduction (adaptation) breeding is important. Such breeding programmes are established by state and implemented. Crop development objectives are set to increase yield and quality in accordance with utility of crops under study.

Germplasm are mainly used as foundation materials to transfer one or some of the genetic characters to develop new varieties.



CHAPTER 5

National Goals, Policies, Programmes and Legislation

5.1 NATIONAL PROGRAMME

Germplasm conservation, evaluation/characterization, documentation, collection of local germplasm constitute major part of programme to be implemented by crop genetic resources institute with state financial support. Collection of external germplasm is almost done spontaneously.

5.2 TRAINING

Scientist and technical staffs, who are graduates from faculties of biology, agronomy, genetics, breeding, genetic and cell engineering, university of agriculture are involved in the programme.

Pyongyang Crop Genetic Resource Institute has its own retraining system for its staff.

5.3 GOVERNMENT REGULATION

The state set regulations allowing active exchange of germplasm with foreign countries. There are also strict quarantine laws and regulations on seeds and plants being exchanged.



CHAPTER 6

International Collaboration

Our country joined the FAO, and is involved in the activity of IPGRI, assisted by these organization.



CHAPTER 7

National Need and Possibility

As indicated in Chapter 3 "National Germplasm Conservation Activity", it is necessary to meet following needs to enable the Pyongyang Crop Genetic Resources Institute as a national genebank to accomplish its mandate successfully:

- To increase the conservation capacity and provide it with modern equipments (short, medium, long term storage) as quickly as possible.
- To procure up-dated equipments to evaluate biochemical, physiological, pest and disease resistant and nutritional properties and also required to improve computerized documentation system.

In view of such needs, our country has already made project proposal entitled "Modernization of Crop Genetic Resources Conservation in D.P.R. of Korea" estimated to cost 3 million US dollars and the proposed project documents has been officially sent to IPGRI (IBPGR by that time) in 1991, which were sent again to several countries to get donor to finance the proposed project.

Since we have not realized the project, we like to request you to assist us to realize the proposed project as soon as possible.



CHAPTER 8

Proposals for a Global Plan of Action

It is proposed:

- To establish fund for germplasm exploration and collection, and to establish mechanism by which the IPGRI can organize germplasm collection mission in a planned way to the targeted countries and regions according to the demand of developing countries.
- To establish fund for germplasm exchange by means of air, train, and ship transport and to formulate international regulations on the use of this funds to take steps for the unrestricted delivery of germplasm.
- To form computerized network on genetic resources information system for this region on immediate term and for global basis in the next 10 years at the end of the programme.