



CROATIA:

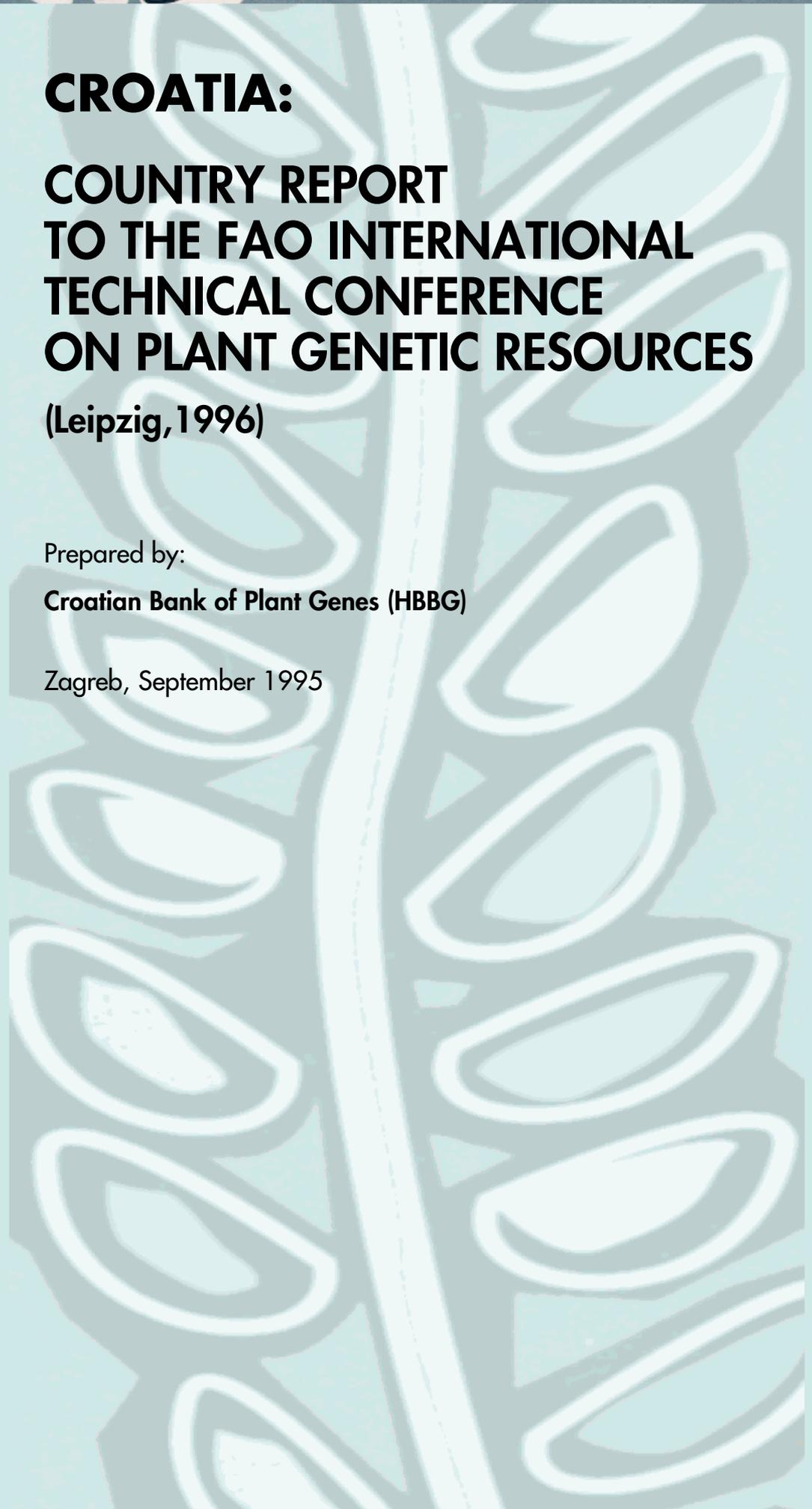
**COUNTRY REPORT
TO THE FAO INTERNATIONAL
TECHNICAL CONFERENCE
ON PLANT GENETIC RESOURCES**

(Leipzig, 1996)

Prepared by:

Croatian Bank of Plant Genes (HBBG)

Zagreb, September 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 opinion 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 INTRODUCTION TO CROATIA AND ITS AGRICULTURAL SECTOR	4
CHAPTER 2 INDIGENOUS PLANT GENETIC RESOURCES	5
CHAPTER 3 NATIONAL CONSERVATION ACTIVITIES	8
CHAPTER 4 IN-COUNTRY USES OF PLANT GENETIC RESOURCES	10
CHAPTER 5 NATIONAL GOALS, POLICIES, PROGRAMMES AND LEGISLATION	11
CHAPTER 6 INTERNATIONAL COLLABORATION	12
CHAPTER 7 NATIONAL NEEDS AND OPPORTUNITIES	13
CHAPTER 8 PROPOSALS FOR A GLOBAL PLAN OF ACTION	14



CHAPTER 1

Introduction to Croatia and Its Agricultural Sector

Republic of Croatia is a Mediterranean and a continental state with the surface area of 56,538 km² and population of 4,760,344 (the 1991 census). The capital of Croatia is Zagreb (960,000 inhabitants).

The land surface structure comprises 57,5% of agricultural land and 34,6% of forest land. Croatia has three clearly distinguishable geographical regions: Mediterranean, Mountainous and Panonian. Panonian region is the main agricultural area.

Under the communist regime the agricultural activity was categorised into the collectively farmed social sector (Kombinats) and the private sector. Kombinats represented 25% of the cultivated area. Within last four years the privatisation of former Kombinats has been carried out.

The plant breeding and research is organised at the faculties of agriculture (in Zagreb and Osijek), at the state research institutes and at the private breeding and seed producing companies.

The existing cultivar and seed laws cover the testing of new varieties and the maintenance of a National List, the production and certification of seed and the control of seed quality.

Direct and indirect consequences of war-destruction in agriculture and agriculture products processing in Croatia are catastrophic. It has been estimated that the whole agriculture production due to the war damages is decreased for over 35%.



CHAPTER 2

Indigenous Plant Genetic Resources

Croatia forms a part of the Mediterranean centre of diversity. The most valuable indigenous plant genetic resources are olives, grain legumes and many wild relatives of crop plants (*Triticum spp.*, *Hordeum spp.*) as well as a wide range of aromatic, medicinal and flower plants.

The great value of Croatian plant genetic resources lies in a number of old, primitive varieties of wheat, barley, oat, rye, millet, maize, buckwheat, kidney bean, soybean etc., bewildered populations of millet, buckwheat etc.

Under the previous regime 75% of the cultivated area was owned by the private sector. Land ownership was limited to 10 ha and many small farmers did not have access to modern agricultural technology. Thus, some of the landraces and old cultivars are still maintained in the production. However, there is a danger of genetic erosion of these resources caused by gradual introduction of modern high-yielding cultivars. A significant percent of arable land (mainly marginal area such as: underwood, near roads and railway tracks) is not used for agricultural production so there is where many wild relatives of crop plants, bewildered landraces and old cultivars can be found.

Wheat (*Triticum aestivum* L.):

In the main production area certified seed (30-50%) and the seed multiplied by the farmers of a wide range of recognized cultivars is used. In the mountainous region (Lika, Banovina etc.) as well as in Dalmatia (especially on islands) mainly farmers' seed of primitive cultivars and cultivar mixtures are sown. Local populations of *Triticum durum* and *Triticum turgidum* can also be found.

Barley (*Hordeum sativum/vulgare/Jessen.*):

On 30-50% of production area certified seed of modern cultivars is used. On more than 50% of production area mixture of various introduced cultivars (ex East German, France, Czech Republic) are sown.

Rye (*Secale cereale* L.):

On the greater part of production area local populations (GospiΔka, Petru iΔka, Udbinska etc.) are sown. These population are often crossed by introduced plant material.

**Oat** (*Avena sativa* L.):

In the last few years modern, domestic cultivars are increasingly sown, but also may interesting populations of domestic and foreign origin can be found.

Maize (*Zea mays*. L.):

On *circa* 95% of production area hybrid seed is sown. On 5% (up to 10% because of war) local primitive varieties and populations (Hrvatica, Vukovarski zuban, Beljski zuban etc.) are used.

Sorghum (*Sorghum vulgare* Pers.):

On more than 50% of production area local populations are sown.

Millet (*Panicum miliaceum* L.):

On more than 80% of production area local populations are sown.

Grain legumes (*Fabaceae*):

In case of soybean (*Glycine max*/L./Merill.) and peas (*Pisum arvense* L.) mostly modern cultivars are sown, whereas in case of faba bean (*Vicia faba* L.), lentil (*Lens culinaris* L.), chickpea (*Cicer arietinum* L.), vetch (*Vicia sativa* L.) and lupin (*Lupinus albus* L.) primitive varieties and local populations are used in production.

Small legumes (*Fabaceae*):

30% to 40% of production area of alfalfa (*Medicago sativa* L.) are sown with certified seed, whereas on the rest of the areas local populations are sown. In case of red clover (*Trifolium pratense* L.), white clover (*Trifolium repens* L.) and alsike clover (*Trifolium hybridum* L.), as well as in case of birdsfoot trefoil (*Lotus corniculatus* L.) and *Trifolium incarnatum* L. on more than 90% of production area, local populations are used.

Grasses (*Poaceae*):

On *circa* 50% of production area of Italian rye-grass (*Lolium multiflorum* Lam.) and perennial rye-grass (*Lolium perenne* L.) certified seed is sown. On the rest of the production area local populations crossed with introduced material can be found.

Oilseed rape (*Brassica napus* L. var. *oleifera*):

Certified seed of modern cultivars is completely used.

Sunflower (*Helianthus annuus* L.):

Certified seed of modern cultivars is completely used.

Flax (*Linum usitatissimum* L.):

On more than 50% of production area local populations are used.

**Poppy** (*Papaver somniferum* L.):

On more than 90% of production area local populations are used.

Potato (*Solanum tuberosum* L.):

Certified seed of modern cultivars is used only on 3 to 5% of production area. On the rest of the production area local populations and introduced material are used.

Fodder beet (*Beta vulgaris* var. *crasa* Self.):

On 40 to 50% of production area local populations are used.

Tobacco (*Nicotiana tabacum*):

Domestic hybrid cultivars of Virginia and Burley are sown. In Herzegovina local populations of semioriental tobacco are mostly grown.

Sugar beet (*Beta vulgaris* var. *saccharifera*):

Certified seed of modern cultivars is completely used.

Vegetables:

A few domestic cultivars exist. Non-certified seed of introduced cultivars are mostly sown. On 80% of production area of white cabbage (*Brassica oleracea* L. var. *capitata*) local populations are grown (Varaždinski).

Aromatic and medicinal plants:

On more than 90% of production area local populations are used.

Ornamental plants:

on 50% of production area local populations are used.



CHAPTER 3

National Conservation Activities

In situ conservation of wild plants is carried out in National Parks:

National park	Area km ²
Kornati	224
Plitvička lakes	195
Krka	142
Paklenica	36
Mljet	31
Risnjak	30
Brijuni	36

and it is supervised by botanical experts.

In 1994 “The Red Book of Plant Species of the Republic of Croatia” is published based on “The IUCN Plant Red Data Book” published by the International Union for Conservation of Nature (IUCN). The book covers 226 plant taxons categorised as extinct, endangered, vulnerable, rare and indeterminate.

Under the project of Croatian Band of Plant Genes the section for rare, vulnerable and protected plant species is established.

Ex situ conservation in Croatia has a long tradition and many of landraces have been used in breeding programmes. Alojz Tavčar, professor at the Faculty of Agriculture in Zagreb has established a wide collection of traditional varieties of cereal and legume crops in 1921.

The “Yugoslav Bank of Plant Genes” was established in 1987. The work was organised in groups. The programmes concerning cereals, legumes and Brassicas were led by the scientists from the Faculty of Agriculture in Zagreb. A part of collected and processed material has been sent to the “Yugoslav Bank of Plant Genes”. Croatia (within former Yugoslavia) contributed with 35% in financial support of the “Yugoslav Bank of Plant Genes” (circa 500,000 \$/year) in the period from 1987 to 1991 but after the aggression to Croatia the former federal facility, located in Belgrade, is no longer available. Thus, the “Yugoslav Bank of Plant Genes” still has a valuable part of Croatian gene resources which cannot be used by Croatian geneticists and breeders.



In 1991 the Ministry of Science and Technology in co-ordination with the Ministry of Agriculture and Forestry of the Republic of Croatia initiated the project "Croatian Bank of Plant Genes - HBBG". The project leader is Ivan Kolak, Ph.D., professor at the Department for Plant Breeding, Genetics and Biometrics, Faculty of Agriculture, University of Zagreb. The main aim of the project is to collect, characterise and evaluate local landraces as well as related wild species and to make them available to agricultural community.

The storage conditions of the collection maintained at the Department do not comply with internationally recommended standards. There is an urgent need to build up a storage facility. The costs are estimated to 500,000 \$ and the support of international community will be necessary. Nowadays, as a consequence of war-destruction our Government through the Ministry of Science and Technology supports HBBG project with 1,000 \$/month which is not enough even for the minimal maintenance.

A part of the collection maintained at HBBG is documented on the computerised data base including passport, characterisation and evaluation data. Internationally recommended descriptor lists (IBPRG/IPGRI) were followed wherever it was possible. Nevertheless, HBBG do not have enough financial sources to carry on with the characterisation, evaluation and documentation of samples.

A large collection of indigenous and introduced clones and cultivars of fruit trees (*Citrus unshiu* Marc., *C. deliciosa* Tonore, *C. sinensis* L., *C. limon* L., *C. paradisi* Macf., *C. Aurentium* L., *C. Myrtifolia* Raf., *C. madurensis laureiro*, *Amygdalus communis* L., *Prunus cerasus* L., *Prunus avium* L.) as well as olives (*Olea europea* L.) and grapevines (*Vitis spp.*) is maintained at the Institute for Mediterranean Crops and amelioration of Karst, Split. In last four years the experimental locations were largely devastated due to the war operations.

Within the framework of the HBBG project the *in situ* and *ex situ* conservation of forest tree germplasm (namely *Populus nigra* L., *Picea abies* L. and *quercus robur* L.) is also planned.



CHAPTER 4

In-Country Uses of Plant Genetic Resources

Many breeding institutes have collections of landraces and primitive varieties and use them for breeding purposes. The national plant breeding programmes include improving of local varieties as well as the adaptation of imported germplasm to local need.

HBBG co-operates with all breeding institutes which also have collections of various crops and there is an agreement concerning maintenance of all the material in HBBG.

There is a need to organise and centralise the national gene bank in order to make all the collections available to all interested institutions.



CHAPTER 5

National Goals, Policies, Programmes and Legislation

All the plant genetic resources activities are organised by HBBG which will be a long-term project supported by the Ministry of Science and Technology as well as the Ministry of Agriculture and Forestry.

The project is supervised by the experts on various scientific fields. However, there is a need for adequately trained personnel concerning evaluation, data management and storage. A specialised training programme in plant genetic resources does not exist in Croatia, so in order to obtain well trained staff it will be necessary to include them in international specialised courses covering these activities.



CHAPTER 6

International Collaboration

HBBG is open to collaboration with international community. Within the project it has been clearly stated that the developing of international arrangements to facilitate the exchange of plant genetic resources is in the interest of our country. Croatia has adopted Agenda 21 about the conservation of biological diversity.

Croatia will participate in Phase V of the European Co-operative Programme for Crop Genetic Resources Networks (IPGRI). The Country Co-ordinator is Ivan Kolak, HBBG. Attending members of three ECP/GR working groups (Barley, Brassicas and Grain legumes) are assigned. Croatia also participate in EUFORGEN. The Country Co-ordinator is Joso Gračan, Ph.D., manager of the Forestry Institute, Jastrebarsko.

There are some bilateral initiatives between Croatia and Slovenia as well as between Croatia and Bosnia and Herzegovina concerning collaboration in collecting and maintaining of the germplasm collections. There is strength co-operation with the scientists and institutes from Bosnia and Herzegovina and Croatia. HBBG maintains the germplasm collection for Bosnia and Herzegovina.



CHAPTER 7

National Needs and Opportunities

HBBG requires international assistance to develop an adequate national programme concerning plant genetic resources.

- Project costs are estimated to 1,500,000 \$ within next 10 years:
 1. Establishment of the long-term storage facility at the HBBG (Faculty of Agriculture University of Zagreb) for the maintenance of the base collection (500,000 \$).
 2. Equipment, further evaluation and maintenance of the existing germplasm collections, data management, training of personnel, collecting activities, organisation of the network (500,000 \$).
 3. Establishment and maintenance of the active collections (co-operating institutions) (500,000 \$):
 - Faculty of Agriculture, Osijek
 - Faculty of Agriculture, Mostar (Bosnia and Herzegovina)
 - Technical school of agriculture, Križevci
 - Institute for Breeding and Production of Field Crops, Zagreb
 - Agricultural Institute, Osijek
 - Agricultural Institute, Križevci
 - Institute for the Mediterranean Crops and Amelioration, Karst, Split
 - Institute for the Mediterranean Plants, Dubrovnik
 - Agricultural Institute, Poreč
 - Agricultural Institute, Mostar (Bosnia and Herzegovina)
- There is an urgent need for financial support. HBBG requires 200,000 \$ urgently for further maintenance of existing collection which is in danger of rapid deterioration. As a consequence of war the financial support provided by Croatian Government is far from sufficient for the maintenance of the collection.



CHAPTER 8

Proposals for a Global Plan of Action

In our opinion strengthening the collaboration among the countries pertaining to the same gene-centre is the most efficient way of protection of genetic resources.

The Republic of Croatia, as a Mediterranean country, is very interested in close collaboration with other Mediterranean countries, its national projects and gene banks.