

# Some guidelines for Plans of Action of National Plant Genetic Resources Centres

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## 1. Introduction

The SADCC Regional Gene Bank for Plant Genetic Resources (SRGB) is an autonomous regional scientific organization under the aegis of the Southern African Development Coordination Conference (SADCC). SRGB, which was established by SADCC in 1988, is governed by a Board which is made up of a Chairman and ten members representing each SADCC member country. SRGB is stationed in Zambia, at Chalimbana Research Station, 20 km east of Lusaka. SRGB was set up as a network activity to promote and coordinate a regional network of Plant Genetic Resources Centres (NPGRCs). The activities of the network are the collection, conservation, documentation, evaluation and utilization of regional plant germplasm. The first formative years were devoted largely to laying the groundwork for efficient management and administration, purchasing equipment and supplies needed for effective future operations, rehabilitating SRGB's temporary accommodation at Chalimbana and planning the construction and development of the permanent institutional complex.

With all regionally and internationally recruited staff now in place, it is time to initiate Plant Genetic Resources (PGR) activities in all the SADCC states. Before this can be done, however, national strategies and plans of action should be developed.

For practical and scientific reasons, it is necessary to have a good working definition of the kind of plant material to be preserved in a PGR conservation programme. The following five categories of plant material are usually distinguished:

- i) Genebank material (germplasm, genetic resource material);
- ii) Plant breeding material;
- iii) Plant introduction material;
- iv) Plant production material;
- v) Food or industrial plant products.

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Genebanks should **not** spend scarce financial and personnel resources doing work that can be done by other institutions. With regard to plant breeding material, for example, the number of combinations is indefinite. Taking care of such material would consequently cause unlimited costs of genebanks as well. If a trial including 3,500 bean accessions for plant introduction purpose requires 5 kg of seed per accession, 17,5 tonnes of seed will have to be harvested and stored to meet the demand of just one experiment per year. It is obviously **not** the responsibility of a genebank to produce these quantities of seeds. Genebanks take care of and provide material that need to be preserved without genetic loss or change and is not guaranteed survival outside a collection or reservoir, such as obsolete varieties, landraces of crop plants and their wild relatives, etc.

The material within a genebank is normally classified in the following types: Safety Base Collection, Base Collection and Active Collection.

## **2. Establishment of NPGRComs and NPGRCs**

National Plant Genetic Resources Committees (NPGRComs) have been officially formed in all SADCC countries, and NPGRCs identified and established.

The Chairmen of the NPGRComs are members of the Board of SRGB, which meets in April and October each year. The Chairmen of the NPGRComs *must* be appointed by their government, to be able to speak for their countries at the SRGB Board Meetings, where the SRGB resources are allocated to the NPGRCs. The agreed conditions for SRGB to release equipment, consumable materials and funds to the NPGRCs are that NPGRComs are formed, at least one NPGRC staff (preferably the Curator) is employed, to take care of the property of the NPGRC, and that a building (or room in an existing building) is available where PGR work can be initiated.

It is the duty of the NPGRCom Chairman to present a short Country Progress Report to the SRGB Board Meetings.

## **3. National Plan Of Action**

Each NPGRCom should develop a detailed *National Plan of Action*. The plan should preferably be developed as a result of a National Workshop, which could be partly or fully sponsored by SRGB. In order to come up with a good Plan of Action, it is important that policy makers, users of plant genetic resources such as plant breeders, taxonomists, foresters, NGOs, and other organizations involved in conservation of Nature participate in such a workshop.

In addition to clarifying the national policies towards plant genetic resources, the National Plan of Action should assist in defining the following requirements:

i) Physical structures

a) The availability of buildings, offices, laboratories, stores, etc.

b) The condition of existing structures to be used for PGR work need to be reported: what should be repaired or rehabilitated. Any new building to be constructed?

c) The condition of drying facilities, processing and cleaning equipment, packaging equipment, etc, should be appraised, as well as availability of facilities for seed viability testing at the national level.

d) Availability and access to experimental fields should be considered and quantified. The growing out of the material will need a lot of land in order to, for example, provide sufficient isolation to maintain the genetic integrity of the material.

e) The national status with regard to documentation facilities, local access to manual, electronic hardware and software, etc, should be assessed.

ii) The NPGRCom, in collaboration with the NPGRC, should develop a budget for national PGR operations. The government should provide the NPGRCom/NPGRC with a "core budget", while funds from SRGB and other sources may be contributed for special projects. These will be financed on their own merits.

iii) What germplasm should be acquired through collection, repatriation or other means, and when? What are the appropriate requirements for vehicles and other relevant equipment?

iv) The proposed basic organization chart for an average NPGRC in the SADCC region, shown in Appendix 1, should be adjusted to local requirements.

v) Training requirements should be defined and SRGB kept informed accordingly. This is a recurrent process, involving all levels of training, i.e. at certificate, diploma and degree levels.

iv) The need for, and composition of, national crop working groups should be considered.

## 4. Activities to be carried out by NPGRCs

NPGRC activities will be coordinated by the NPGRCom, to ensure that the PGR activities are conducted according to the agreed national priorities, as well as to ensure efficient utilization of the plant genetic resources.

### 4.1. Inventory of existing resources

Current conditions of storage and conservation facilities need to be established. To this respect, the report from 1987 by the IBPGR consultant, Dr Roger Smith of Kew, on the current seed storage facilities for PGR conservation in SADCC member states, and recommendations with regard to the upgrading of these facilities, should be useful reading.

The NPGRC should compile a list of available plant genetic resources in the country, and SRGB should be *informed* accordingly. In addition, the present collections should be examined with regard to:

- i) Size and status;
- ii) Available information on the accessions:
  - a) passport data,
  - b) evaluation data,
  - c) existing catalogues;
- iii) Manner of documentation:
  - a) manual,
  - b) *electronic*.

Additional inventories may be required at the national level of:

- i) Crop plants and wild relatives
- ii) Vegetatively propagated species;
- iii) Forage grasses and legumes;
- iv) Fruit trees and other tree species;
- v) Medicinal plants;
- vi) National plant genetic resources material duplicated or maintained in other genebanks in the world **with available passport and evaluation data**, and
- vii) other useful plant genetic resources.

Institutions involved in plant genetic resources conservation in the country need to be identified, for the purpose of close liaison. Responsibilities should be shared among the different institutions at the national level. Their working relationships should be clearly spelled out and coordinated by the NPGRCom.

## 4.2 Collecting

The NPGRC should develop a national master plan for collecting, as well as a national map database. With provision for local preferences, priorities with regard to collecting might be as follows:

- i) Crop plant and their wild relatives;
- ii) Forage plants;
- iii) Tree species;
- iv) Medical plants;
- v) Others.

Lists of particulars of all previous collection missions should be compiled, together with available reports from the missions. These missions should be plotted on a Master Map.

The NPGRCs should coordinate and carry out exploration and collection missions in the different ecological zones of the country, according to the National Master Plan for collecting. Collection missions may, with due permission from the NPGRC, be carried out by others, including SRGB, but the NPGRC should always be involved. Foreign missions should, for example, at any time be accompanied by a NPGRC staff member.

Joint regional PGR collecting missions might be organized for:

- i) Gap filling;
- ii) Wild relatives of crops;
- iii) Landraces;
- iv) Endangered species.

## 4.3 Regeneration, characterisation and multiplication

It is the responsibility of the NPGRC to characterise, evaluate, rejuvenate, maintain, multiply and document all nationally collected and stored PGR material. Such work may be commissioned by SRGB.

Germination tests should be carried out by national seed testing and certification agencies. Plans for rejuvenation and characterisation should be developed. Institutions able to assist on the national, regional and international levels should be identified. Availability of technically qualified personnel (breeders and botanists) able and willing to assist in this work should be determined.

In order to assist the NPGRCs in maintaining the seed quality of their accessions, the Curator of SRGB is in the process of compiling a field manual for quality control during multiplication, rejuvenation and maintenance of genebank material.

After due clearance by the NPGRCom, the NPGRC could then deliver duplicate samples of its collections to SRGB for long-term storage in the SRGB Base Collection. All material maintained at SRGB is, according to the draft Constitution, freely available to any *bona fide* user.

#### **4.4. Documentation set up**

Descriptor lists may be obtained from IBPGR. SRGB will supply PCs and the software for the PCs. National PGR Data Bases should be created in cooperation with SRGB. Training of documentation officers will be organized and funded by SRGB.

#### **4.5 Handling of germplasm**

SRGB will provide drying cabinets to ensure that the material is stored at very low moisture content. This will enhance the longevity of the seed in storage.

Availability of appropriate, air-tight containers, aluminium foils, *sealing machine*, etc. should be established. If these materials are not available, SRGB will provide a limited amount, in order to facilitate for NPGRCs to start storing the active collections.

The current status with regard to cool and cold storage should be verified. How many deep freezers are available, of which type, where and for what purpose? Are there any cold-rooms? If so, are they operating satisfactorily? How are these facilities distributed throughout the country, and how are they utilized, by whom?

#### **4.6 Distribution**

The NPGRC will maintain the national active collection in collaboration with SRGB. Upon requests by national plant breeding institutions and other *bona fide* users, seeds from the active collection will be distributed by the NPGRC and /or SRGB.

#### **4.7 *In situ* conservation**

Individual NPGRCs will, in collaboration with SRGB, manage the national *in situ* conservation programme, i.e. national field genebanks, National Parks, reserves, etc. A national strategy should be developed by the NPGRCom for implementation by the NPGRC.

For vegetatively propagated species, species with recalcitrant seeds and tree species, special programmes for rehabilitation, or establishment of new plots, may be necessary.

The following categories of field genebanks might be considered for NPGRC inventorying and attention:

- i) Repositories;
- ii) Botanical gardens;

- iii) Arboreta;
- iv) Orchards.

Some major assignments of an *in situ* unit include:

- i) Inventories of plant species in the country/region.
- ii) Classification of diversity in the field so that the knowledge of specific variations of the important plants in the country/region are known. The *In situ* Officer would be working in close collaboration with plant taxonomists.
- iii) Handling field genebanks, natural reserves, orchards, etc.
- iv) Awareness of current, relevant legislation.

It should be noted that it is assumed in Appendix 1 that one officer should be able to act both as collector and *In situ* officer, although, in larger organizations, these functions might be separated.

#### **4.8 Research activities**

A number of national PGR research programmes are anticipated. Such could include, for example, biological diversity, conservation techniques, propagation, insect pests and diseases indexing, quality indexing, collecting methods, tissue culture, recalcitrant seeds storage, field genebank management, etc. They might be commissioned by SRGB as 'Special Programmes', each financed on its own merit, according to guidelines issued by SRGB. The research may be conducted in collaboration with suitably qualified institutions at regional or international levels.

### **5. Summary and conclusions**

The SRGB is a long-term effort to conserve and promote the utilization of PGR in the SADCC region. The progress of the programme will depend heavily on the NPGRCs, possessing the provincial geographical knowledge and local advantage to carry out most of the activities in their countries. In order to develop a strong and sustainable network of NPGRCs, it is important that the individual needs of each NPGRC, mainly in terms of infrastructure, personnel and finance, are spelled out in the Plan of Action. This should be worked out at a national workshop attended by policymakers as well as members of the National Agricultural Research System (NARS).

### **Reference**

A Regional Plant Genetic Resources Centre. SADCC Plan of Operation 1989-1992  
SIDA 1989

**Appendix 1. Tentative NPGRC organization chart.**

