7. Distribution

7. GERMPLASM DISTRIBUTION

What is germplasm distribution?

Germplasm distribution is the supply of representative samples of seed accessions from a genebank in response to requests from germplasm users. In general, seeds are distributed only from active collections (see Flowchart 7.1).

Why is germplasm distributed?

The purpose of conserving germplasm in a genebank is either to improve crop varieties through plant breeding and related research activities or to restore diversity lost on farms and in natural habitats in order to meet the needs of farmers and communities. This contributes directly to improving the livelihoods of poor people and to protecting the environment.

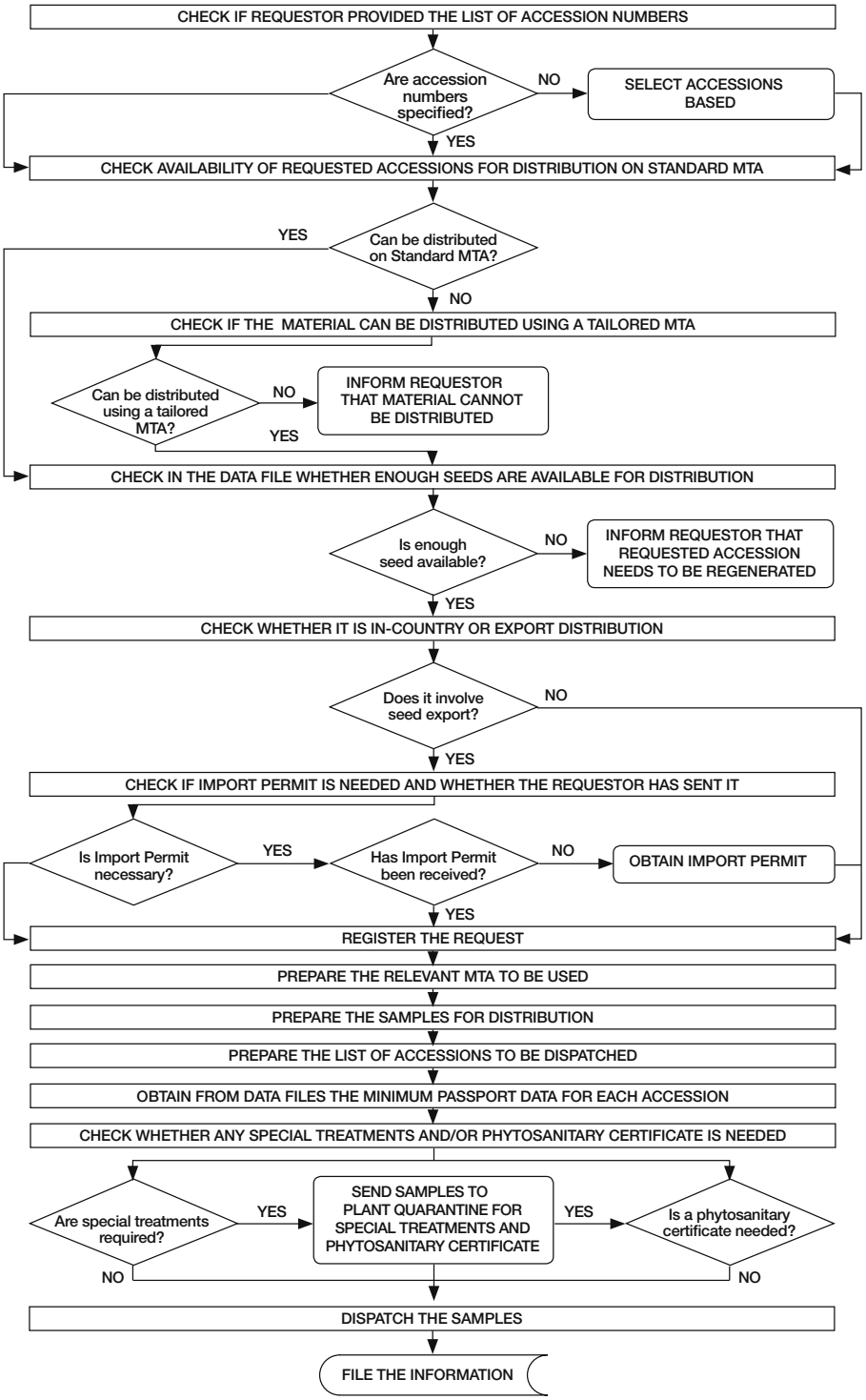
In the past, not enough emphasis was given to germplasm distribution. It is now widely recognized that the utilization of germplasm should drive its conservation. Genebanks must be more proactive in establishing links with germplasm users, breeders, researchers, farmers and other groups.

How should germplasm be distributed?

Germplasm should be distributed in a way that ensures it reaches its destination in good condition. Environmental conditions during transport can be detrimental to seed quality, so seeds should be carefully packed and distributed in sealed moisture-resistant envelopes for protection during transit (see below).

The scope and extent of distribution varies with each genebank. Germplasm may be distributed within or outside the country, depending on the genebank's mandate and whether its collection is national, regional or global.

Flowchart 7.1. Germplasm distribution.



Procedures for in-country seed distribution

Step 1: Decide whether the accession can be distributed

- Check the inventory database to see if the seed quantity in the genebank is sufficient for distribution.
- Distribute only if a minimum of four to six times the number of seeds required for one regeneration cycle remain in store after meeting the request. Some flexibility may be allowed in cases where the accession is rarely requested.
- When seed quantity is inadequate for distribution, inform the requester that the accessions cannot be supplied until after regeneration, and prepare the accessions for regeneration.
- Check the passport data to determine the material's status in relation to access and benefit-sharing under the International Treaty on PGRFA and other international agreements. If there are restrictions on distribution under the germplasm acquisition agreement (GAA) with the donor (see Annex I), inform the requester accordingly.

Step 2: Prepare the sample for distribution

If seeds are available for distribution:

1. Register the request by assigning a request number.
2. Prepare the list of accessions available for distribution.
3. Check the requirements for a material transfer agreement (MTA); if the material cannot be distributed under the SMTA, use a tailored MTA for the selected accessions (see Annex I for more information).
4. Prepare two sets of labels for the selected accessions and paste one of them on the envelopes (preferably of laminated aluminium foil) that will be used for distributing seeds to the requester.
5. Check the inventory file and note the location of the containers in the genebank.
6. Move the containers from the genebank into a dehumidified room the evening before distribution to allow them to warm to room temperature before opening. Ensure absolute accuracy in identification of accessions while drawing the seeds from the genebank.
7. Open the container and quickly draw the required amount of seeds into the labelled envelopes. Use random sampling so that a good representation of the accession is provided. It is suggested that 50–100 viable seeds should be distributed to fill each request, depending on the breeding system of the species (more for cross-pollinating and less for self-pollinating species).
8. Close the container immediately after removing the seeds for distribution to prevent uptake of moisture from ambient air.
9. For extra security, a second label may be placed inside the envelopes before packets are sealed.

10. Compare the list of accessions drawn from the genebank with the labels on the envelopes.

Step 3: Prepare the information list to accompany the seeds

1. Print the final list, including passport details such as accession number, alternate identity, source country, location and biological status, as well as characterization data used to verify accessions and any information solicited by the requester.
2. Prepare a cover letter.

Step 4: Dispatch the seeds

1. Pack the seed envelopes, cover letter, MTA and the seed list in a plastic bag and then in a strong envelope (if there are few samples) or a cardboard box (use filling material to avoid damage to seeds during transit). Label the envelope or box with the complete address of the requester. The MTA may be pasted on the outside of the envelope in cases where opening the container and using the seeds signifies agreement with the terms and conditions of access.
2. Include a reply form for the requester to complete and return to the genebank to acknowledge that seed samples have been received in good condition.
3. Send the seed parcels by the fastest means, such as by courier, to avoid delays and deterioration of seed quality during transit. If there is any concern that the materials could be lost during shipment, use registered mail or carry by hand if possible.
4. Record the shipment details in the distribution data file.
5. Update the seed inventory by deducting the weight or number of seeds supplied.

Germplasm seeds are valuable and should be packed carefully for dispatch. Packing should ensure safety of the seeds and prevent contamination by insects or pathogens during transit.

Distribution of germplasm outside the country

Follow the same procedure for selecting accessions and fulfilling the MTA requirement as described in steps 1 and 2 above. Additional requirements may be needed for distribution of germplasm across borders before moving to steps 3 and 4. These relate to compliance with phytosanitary regulations (see below) to avoid the danger of introducing pests and diseases into new areas.

How phytosanitary measures affect seed movement

Movement of any seeds can potentially spread pests.[12] There are many places around the world where this has already occurred with devastating effects. Recognizing this danger, all countries have

Consignments of germplasm infested with pests or without proper documentation will be refused entry or destroyed. Genebank staff need to be aware of the phytosanitary regulations governing trans-boundary germplasm movement.

[12] The International Plant Protection Convention (IPPC) defines pests as all harmful and potentially harmful biotic agents, from viroids to weeds.

phytosanitary measures to regulate the entry of plants, plant parts and their products. It is therefore essential to meet the national requirements of the importing country when moving seeds across international boundaries.

What are phytosanitary measures?

A phytosanitary measure is any legislation, regulation or procedure aimed at preventing the introduction or spread of quarantine pests, or limiting the economic impact of regulated non-quarantine pests. These measures are established by the importing country following a pest risk analysis according to international standards.

Official documentation required for seed export includes a *phytosanitary certificate* issued by the national plant protection organization or officially authorized institute of the exporting country, certifying that the shipment meets the phytosanitary regulations of the importing country. Phytosanitary certificates help to ensure that commodities are free of injurious plant pests following inspection in the country of origin by a member of that country's national plant protection organization. The certifying country usually charges a fee for each certificate.

Phytosanitary information for many countries may be found on the official website of the International Plant Protection Convention (IPPC) at www.ippc.int. National IPPC contact persons should be contacted when:

- determining the phytosanitary requirements for importation of seed; or
- applying for phytosanitary certification for seed export.

When preparing for seed distribution, observe the following guidelines:

- Check the final destination and the latest phytosanitary import requirements for the importing country (in many countries, regulations are changed frequently, so this needs to be completed before each shipment—see also 'post-entry quarantine' in Chapter 2).
- Ensure that the national plant protection organization in the exporting country supplies the appropriate documentation, such as an official phytosanitary certificate, that complies with the requirements of the importing country.
- Determine the procedures for obtaining a phytosanitary certificate in the country of export.
- Knowledge of the appropriate certifying authorities will ensure success at all stages.

Procedure for seed export

1. Prepare a list of accessions that are needed to fulfil the request.
2. Draw the seeds from the genebank as described for in-country distribution.
3. Apply for a phytosanitary certificate, available with the national plant protection organization or designated institute.
4. Send the application to the appropriate phytosanitary authority and arrange the necessary treatments and inspections for the issuance of a phytosanitary certificate.
5. Obtain additional declarations for special treatments as required by the importing country.

6. When the samples are ready for dispatch, prepare a cover letter and final list of accessions along with passport data, characterization data and other information as described in step 3 above. Any accessions detained at quarantine should be removed from the final list.
7. Ship the seeds to the consignee[13] along with the phytosanitary certificate, any other declarations needed, the MTA and the cover letter.
8. Comply with any additional requirements such as obtaining a plant *import permit* or CITES permit for endangered species (see Annex I) before shipping the seeds.
9. Record the shipment details in the distribution data file and update the seed inventory by deducting the weight or number of seeds supplied.

If mandatory treatments are prescribed as a phytosanitary measure, or endorsements are required, they should be provided by a government authority exactly as requested. For example, fumigation may be requested, samples may need to be dipped in an insecticide or fungicide, or a hot-water treatment may be required by the importing country. The treatments should be detailed on the phytosanitary certificate along with any other endorsements requested by the importing country. If no treatments are requested, none should be administered since these treatments can mask symptoms of seed-borne pathogens and interfere with laboratory tests. Pre-treatment prior to entry against the importing country's specifications could seriously jeopardize the shipment. Where germplasm samples are to be sent to more than one country, it is necessary to obtain a phytosanitary certificate for each destination. Two copies of the phytosanitary certificate must be obtained and the original should accompany the consignment. Any uncertified alterations or erasures will render the phytosanitary certificate invalid.

As cultivation of transgenic or genetically modified crops expands, many countries now require a certificate from an independent accredited entity confirming that the consignment is free from GMOs (see also Annex I).

Feedback on germplasm utilization

Obtain feedback on the usefulness of germplasm supplied to users at half-yearly intervals. This will help to identify deficiencies in service and remain informed about any new traits or sources of resistance identified.

[13] Phytosanitary regulations in some countries stipulate that consignments should be addressed directly to phytosanitary authorities and not to the consignee, and shipped through specific ports of entry.

Documentation

It is important that genebanks keep records of germplasm recipients, the number of samples sent, accession details and the purpose for which requests are made in order to track the use and assess the impact of distributed germplasm. It is recommended that the information be maintained in two files with a 'common link' field. Assigning a 'reference number' while registering a seed request can serve as a link field for the two files. Distribution descriptors can also be organized into two files, namely:

- a master file with details of the consignee, number of accessions sent, etc.; and
- an accession-details file containing information about the material.

The following descriptors are suggested for the distribution.

Master file

- Distribution reference number
- Recipient's address
- Date requested
- Date of supply
- Total number of accessions distributed
- Purpose of request
- Phytosanitary certificate (where applicable)
- Export permit number (where applicable)
- Recipient's *import permit* number (where applicable)

Accession details file

- Distribution reference number
- Accession number
- Amount of seeds distributed
- Designation status of materials in trust or under the International Treaty