Composition and gaps in *ex situ* collections

It has been estimated that about 90,000 *Arachis* accessions are conserved *ex situ* worldwide, including extensive redundant duplication. Crop wild relatives (CWRs) are poorly represented *ex situ*. Among cultivated peanut, var. *hirsuta*, *peruviana* and *aequatoriana* are less well represented than the other varieties. Several countries in Central and South America have yet to be systematically explored for indigenous peanut landraces. Gaps were found also in Africa and in Asia. The determination of botanical variety and better data on biological status are needed to have a more precise assessment of gaps.

Routine operations and quality management system

Generally, the germplasm is well conserved. Most institutions have established some form of genebank management system or follow written procedures and protocols for basic germplasm conservation, documentation and quality control processes. The characterization, evaluation and phytosanitary status of the collections vary widely across the genebanks surveyed.

### Key metrics

<table>
<thead>
<tr>
<th>Data source</th>
<th>Value</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated global number of accessions <em>ex situ</em></td>
<td>Genesys, WIEWS, and Survey¹ (2020)</td>
<td>86,195</td>
</tr>
<tr>
<td>Estimated global number of accessions <em>ex situ</em></td>
<td>Survey (2020)</td>
<td>58,223</td>
</tr>
<tr>
<td>Estimated global number of accessions in the MLS</td>
<td>Survey (2020)</td>
<td>26,395 (31%)</td>
</tr>
<tr>
<td>Estimated global number of accessions notified as available in the MLS</td>
<td>GLS portal (2023)</td>
<td>24,665 (29%)</td>
</tr>
<tr>
<td>Accessions with DOI</td>
<td>GLS portal (2023)</td>
<td>27,680 (32%)</td>
</tr>
<tr>
<td>Estimated number of accessions safety duplicated at a different genebank</td>
<td>Survey (2020)</td>
<td>17,058 (33%)</td>
</tr>
<tr>
<td>Number of accessions safety duplicated at Svalbard Global Seed Vault</td>
<td>SGSV web portal (2023)</td>
<td>17,726 (21%)</td>
</tr>
<tr>
<td>Estimated number of accessions needing urgent regeneration</td>
<td>Survey (2020)</td>
<td>8,719 (15%)</td>
</tr>
<tr>
<td>Number of accessions available for distribution</td>
<td>Survey (2020)</td>
<td>29,629 (51%)</td>
</tr>
<tr>
<td>Number of seed samples distributed per year</td>
<td>Survey (2020)</td>
<td>9,863</td>
</tr>
<tr>
<td>Number of seed samples distributed per year</td>
<td>ITPGRFA data store²</td>
<td>3,170</td>
</tr>
<tr>
<td>Passport data completeness index: median value in Genesys (Range 0-10)</td>
<td>Genesys (2023)</td>
<td>6.65</td>
</tr>
</tbody>
</table>

¹Responses to the online survey conducted in 2020 were received from 27 genebanks.
²Annual average of germplasm distributions between 2015 and 2019. Source: The Plants that Feed the World (Khoury et al., 2023).

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Regeneration
There is a great variation among genebanks in terms of regeneration. From 0 to 100% of accessions of surveyed collections require urgent regeneration for a total of 8,719 accessions, i.e. 15% of the accessions held by the surveyed genebanks.

Safety duplication
Half of the genebanks surveyed have a safety duplicate of at least part of their collection. Totally, 33% of the estimated accessions ex situ are safety duplicated in another genebank and 21% are duplicated at the Svalbard Global Seed Vault. More than half of the genebanks surveyed reported restrictions for sending duplicate accessions outside their countries for safety back-up conservation. They cited national and international policy issues, lack of adequate seed stocks and phytosanitary issues as the primary reasons.

Crop descriptors
The use of standardized descriptor lists is widespread, particularly the IBPGR/ICRISAT Descriptors for Groundnut and the USDA Peanut Descriptors, as well as some institution-own descriptors. Updated documentation standards and descriptors for Arachis germplasm characterization need to be developed and universally adopted.

Documentation and information systems
Fifty-six percent of respondents make accession-level information publicly available. Seventy-one percent of the genebanks surveyed use some form of a searchable electronic database to store and retrieve their accession-level data. Passport (90%), taxonomy (76%) and characterization (71%) data is recorded by most of the genebanks, with information on storage conditions (52%), evaluation data (43%), images (33%), genotypic data (24%) and distribution data (24%) being less frequent. Information on the biological status is missing from the passport data of many accessions. The strategy includes a recommendation to retain the original collector's number as a synonym.

Human and financial resources
Financial and staffing constraints are the most frequently reported constraints and threats by the survey's respondents.

Distribution and obstacles to use
Seventy percent of surveyed genebanks distribute material, but less than 40% distribute it internationally. The most reported obstacle to use is insufficient seed quantity. About 30% of the accessions conserved ex situ are estimated to be in the MLS.

Partnerships and networks
There is a paucity of existing regional or global networks. Five genebanks reported participating in at least one network and 19 reported having no network participation.

In situ and on-farm conservation
Natural populations of nearly all wild peanut species are poorly conserved in situ within their host countries' systems of protected areas. Although very few initiatives on on-farm conservation of peanut genetic resources have been reported to FAO and CBD, a few studies conducted in the last 20 years reported the cultivation of landraces by small-scale farmers. There is very limited evidence of any linkages between ex situ and in situ/on-farm conservation activities for peanut genetic resources.

Recommendations and priorities

Ex situ
- Developing and adopting documentation standards and a common information platform.
- Regenerating, characterizing and evaluating "unknown" accessions.
- Filling existing taxonomic gaps and ecogeographic gaps in collections.
- Ensuring safety duplication of unique accessions and collections.
- Training for peanut curators and technicians in developing countries.
- Initiating constructive policy dialogue on peanut ABS to promote and facilitate the addition of peanut and its wild relatives to the Plant Treaty's list of Annex 1 crops.
- Integrating ex situ and in situ approaches.

In situ
- Conducting an inventory of peanut landraces and associated knowledge.
- Conducting capacity building on in situ conservation methods.
- Developing and conducting in situ conservation of wild Arachis diversity.
- Conducting environmental impact assessment in areas with wild Arachis diversity.
- Strengthening public awareness and enabling policies.

Bibliography
Khoury, C.K., Sotelo, S., Amariles, D. & Hawtin, G. 2023. The plants that feed the world – Baseline data and metrics to inform strategies for the conservation and use of plant genetic resources for food and agriculture. Rome, FAO.


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