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# Framework report on the use of plant genetic resources within ECPGR

ECPGR Secretariat  
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## Introduction

The use of plant genetic resources (PGR) is regarded as one of the most important reasons of conserving the material. The need to facilitate the use of the germplasm through strengthening the relationship between genebanks and users is clearly addressed in ECPGR Objective 5, 'Relations with users of germplasm are strengthened'. While reflecting on the alleged limited use of germplasm in Europe, the ECPGR Steering Committee (SC) decided to further explore possibilities on how to improve this situation.

The above-mentioned decision, made during the 13th SC Meeting in Vienna in 2012, consists in a Recommendation (number 8) that a small working group should prepare the terms of reference for a Task Force (TF) on how to enhance the engagement of users in ECPGR activities. Based on the report of that small working group, the National Coordinators were invited to propose names of potential members for the TF on "Engagement of users in ECPGR activities". This resulted in the nomination of three members, representing the following areas: plant breeding, fodder crop breeding, farmers as users of germplasm, and the TF was established.

## Summary of the current situation

The above-mentioned TF undertook work as per the agreed terms of reference that had been elaborated by the small working group. However, due to their limited familiarity with ECPGR and their restricted representation of the overall users' community in Europe, the TF had difficulties in getting started. In close consultation with the Secretariat, the members prepared three individual perspectives on how they would see a better engagement of users in ECPGR activities. Summaries of these drafts (*Establishing a European network for the evaluation of specific traits – partnership genebanks/breeders*; *Establishing a European network for direct use by farmers – partnership genebanks/farmers-NGOs*; and *Making genebanks more attractive for the user*) are included in Appendix I and were taken into account in the preparation of this document.

The ongoing activities of the PGR Secure project, funded under the EU Seventh Framework Programme, are somewhat independent from, but certainly relevant to ECPGR. One of the project's Work Packages (WPs) deals with 'Engaging the user community'. The WP intends to promote the sustainable access to and use of crop wild relatives and landraces in Europe through an analysis of the relationships of the main stakeholder groups (i.e. conservationists, breeders, Agro-NGOs, scientists and governments) through questionnaires, interviews and a SWOT analysis. It is foreseen to facilitate the development of new partnerships. A second approach addresses the promotion and facilitation of the flow of pre-breeding material and accession information obtained through research conducted within the framework of projects, by looking at fundamental approaches (i.e. using genomics, phenomics and transcriptomics) as well as applied pre-breeding approaches. These pre-breeding activities are expected to facilitate the transfer of germplasm into commercial breeding. The report from a workshop organized by the aforementioned WP in November 2013 in Wageningen is awaited.

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Another relevant development with respect to the use of conserved germplasm should be mentioned. The European Commission's DG AGRI launched a call for Tender N°AGRI-2013-EVAL-07 "Preparatory action – EU plant and animal genetic resources in agriculture".<sup>1</sup> One of the key activities to be undertaken by this preparatory action for an EU programme for conservation and sustainable use of plant and animal genetic resources in agriculture (including forest, animal and microbial genetic resources) includes a European-wide survey on the status of the conservation and sustainable use of plant (and animal) genetic resources and about four of the seven themes address aspects related to sustainable use.

Another European Commission-funded project includes the establishment and operation of an EIP-AGRI Focus Group on Genetic Resources. The main task is to analyse existing cooperation models, to identify bottlenecks that limit this cooperation as well as the (available) means and factors that would make the cooperation successful. It is assumed that effective cooperation would allow enlarging the genetic basis of crops (and breeds) present in the agricultural landscape via newly developed varieties (and breeds). A number of priority topics for cooperation were identified, including the search for new traits for biotic and abiotic stresses for climate change adaptation, defining cooperative programmes and inter-disciplinary approaches for conservation and use of genetic resources, participatory plant breeding and facilitating the use of neglected and under-utilized species, local varieties and crop wild relatives.

ECPGR Task Forces are requested to complete the ECPGR objectives and activities logframe table. Regarding Objective 5 ('Relations with users of germplasm are strengthened'), the approved document includes the following proposed activities for Phase IX:

- 5.1.1. Survey of user needs performed and results analysed
- 5.2.1. Effective services to users are established
- 5.3.1. Closer links with conservationists and breeders realized
- 5.4.1. Research partnerships established between genebanks and researchers, including through EU projects

However, the logframe could not be finalized yet as some of the objectives are awaiting the agreement on ECPGR *in situ* concepts. In the case of Objective 5, the report of the above-mentioned 'Task Force on users' was being awaited.

## Challenges and constraints

This section summarizes a draft paper providing a good overview of perceived bottlenecks in using germplasm from genebanks, prepared by the Secretariat in the attempt to answer the following question proposed by the European Commission to the Focus Group on "Genetic Resources – cooperation models between seed- and cryo-banks research institutes and private seed companies and breeding firms":

*"What are the bottlenecks that limit co-operation between the different types of stakeholders? How can co-operation between the different types of stakeholders be promoted?"*

The underlying question and motivation to create this Focus Group is probably based on the assumption that insufficient cooperation is going on between in particular genebanks and various stakeholders and that lack of cooperation is a limiting factor to improve agricultural

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<sup>1</sup> The tender was launched in August 2013 with deadline October 2013.

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productivity and sustainability. Insufficient cooperation among stakeholders is effectively a common perception among the PGR community and is one of the elements that are often quoted as requiring support in order to enhance the use of PGR in genebanks. Such aim is proposed by the FAO Second Global Plan of Action on PGRFA and is also one of the objectives of ECPGR for its Phase IX (2014-2018).

It is also a common perception that use of *ex situ* PGR is limited, but this concept needs to be reviewed in more detail, since surveys about the use of genetic resources from *ex situ* genebanks tend to show that considerable requests for germplasm are being made and that the use of this material takes place. The purpose of use is variable in time and breeding *per se* seems to be decreasing in the ranking of uses, at least if measured by number of research publications documenting the use of *ex situ* germplasm.<sup>2</sup>

Based on personal communications from the Secretariat, it has been possible to verify that the use of *ex situ* material from European genebanks is variable from genebank to genebank, but an average rate of distribution of 10% of genebank accessions per year, with peaks up to 25%, has been calculated. This is a considerable level of activity for public institutions that so far have been serving any type of stakeholder, acting as a public (often global) service, which is entirely dependent on the vagaries of national funding.

Considering the above, it could be concluded that the issue of limited cooperation with stakeholders needs to be better contextualized, before looking for remedies. As indicated above, genebanks (even if at very variable degree in Europe) are already making their material useful and accessible to a large extent. Probably the intensity of exchange and use, and especially the beneficial return of this use as a public good to the society, is not sufficiently documented and made visible. In particular, a more thorough analysis of the range of recipients deserves to be carried out<sup>3</sup>. This is perhaps the **first bottleneck** of the insufficient cooperation, i.e. **limited awareness of the existing cooperation and use of PGR**.

Additionally, the perception of insufficient collaboration with various stakeholders should be verified against the expectations of each stakeholder, the mandate and resources of the genebanks and the usefulness of an increased collaboration for the given purpose. This verification step might be necessary in order to pinpoint which specific collaborations could be made more effective and would deserve to be promoted, to the exclusion of others that might not be possible or appropriate to pursue. For example, a genebank might need to focus on improving the service for public breeders of specific crops, as no demand might exist from private breeders who are using different channels for procurement of germplasm (including having built up their own germplasm collections!). Another example might indicate that individual farmers should not expect genebanks to become seed suppliers for immediate direct use, but rather consider entering agreements aiming at increasing seed volumes of heritage or redundant varieties. The EU Rural Development Programme, in combination with the Directive for Conservation Varieties, has indeed opened up exploratory opportunities for niche production.

**Absence of a clear reciprocal understanding of roles, expectations and possibilities** is **another bottleneck** to increased collaboration among stakeholders. A forum enabling such type of dialogue between genebanks and users is a possible solution. Considering that the PGR Secure project is specifically working in this direction, it will be useful to take note of the ideas that will emerge from its experience.

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<sup>2</sup> Dulloo et al. 2013. Trends in research using PGR from germplasm collections from 1996 to 2006. *Crop Science* 53:1-11

<sup>3</sup> According to statistics from NordGen (Alnarp, Sweden), during 2013 54% of all accessions were distributed with a 'hobby-MTA', indicating non-professionals.

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A dialogue between stakeholders should be able to generate awareness of what the genebanks could do to better empower the users' efforts to improve productivity and sustainability. It can be argued that such a dialogue should certainly take place at the national level. Building on these experiences Europe-wide, one could foresee how a regional dialogue facilitated by ECPGR can contribute to strengthening regional efforts to improve productivity and sustainability.

A number of areas often quoted as essential to improve the usefulness of the material conserved in genebanks are well known and it can be easily seen how these **bottlenecks** could be removed to enhance use, with a special reference to the management of collections:

- a. **Accurate documentation and an effective information system.** The material needs to be well described and characterized and this information must be easily available and searchable by the user.
- b. **Accessibility of material.** The terms and conditions for access to the material must be standardized (such as according to the Standard Material Transfer Agreement of the International Treaty) and implemented by the genebanks.
- c. **High-quality germplasm material.** The seed or propagule of a given accession must be provided in good conditions of germinability, true to type and genetically representative of the requested accession.

The above-mentioned 'minimum principles' can become a serious bottleneck if they are not in effect. There is currently a large discrepancy of situations between genebanks in Europe. However, the initiative for *A European Genebank Integrated System (AEGIS)* is in the process of creating a European Collection while responding to these requirements and is thus trying to establish a solid basis for collaboration between stakeholders, starting from the genebanks' point of view. However, the lack of (regional) resources to support this regional initiative has currently been a limiting factor. In fact, if the European genebanks as a whole were not in a condition to rationally and effectively operate within their respective national context, it might be an illusion to believe that strengthening collaboration with stakeholders were the limiting factor to the use of germplasm.

## The proposed way forward

As mentioned above, a number of initiatives and projects currently undertaken in Europe will all contribute to obtaining a clearer picture of the sustainable use of conserved germplasm.

### Thus, it is suggested:

- 1) To **take stock of specific challenges and constraints** reported by these initiatives/projects related to access to specific accessions and to related information, the quality of the conserved material, the state-of-the-art of the characterization and evaluation of the germplasm (both morphological and molecular), the relationships between stakeholders, funding of important activities such as pre-breeding, etc.
- 2) Based on the above-mentioned stock-taking and subsequent analysis it **should be decided** whether a more targeted survey of the main stakeholders in the conservation and sustainable use of PGRFA would be still justified and needed at the regional level or otherwise proceed: i) to prepare a more detailed ECPGR strategy on the strengthening of the relationship between genebanks and users; ii) to propose concrete actions and more suitable structures of cooperation among stakeholders and genebanks; and iii) to consider possible implications for Working Group mandates and/or tentative user fora.

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- 3) It is proposed to **provisionally accept** the formulation of the outputs, as drafted by the ECPGR Task Force on the objectives logframe, which will serve as guidance for Activities that can be proposed as part of the ECPGR funding scheme.
  - 4) It is further proposed that the **three proposals** made by the members of the Task Force on “Engagement of users in ECPGR activities” could be considered and used in the development of Activity proposals as part of the first ECPGR funding scheme.
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## **Appendix I. Summaries of the reports prepared by the three members of the Task Force on “Engagement of users in ECPGR activities”**

### **1. Establishing a European network for the evaluation of specific traits – partnership genebanks/breeders**

Evaluation of germplasm for a certain disease will be more effective if all available and suitable germplasm is evaluated in a multi-location trial. In this case, when there is a wide interest and resources are available, it would largely be sufficient to set up the networking environment, creating the appropriate links and coordinating the process. This type of mechanism exists in some countries, but upscaling the exercise to a regional level would be more meaningful.

### **2. Establishing a European network for direct use by farmers – partnership genebanks/farmers-NGOs**

In the case of farmers’ organizations and NGOs that are keen to promote a wider inter- and intra-specific diversification of crops in use, a dialogue with genebanks through an appropriate forum can help improving access to and use of otherwise unutilized material. The conservation system can benefit of complementary conservation through direct use, as well as of information derived from direct evaluation made by farmers. As genebanks are usually not seed multipliers, this type of network for use should also set up a seed increase component outside of the genebanks’ remit.

### **3. Making genebanks more attractive for the user**

Two basic questions that need answering are: 1) *How can the genebank be made more attractive for the user?* 2) *Through what channels can interaction between the ECPGR and users of the genetic resources be strengthened?*

The answer to the first question is that genetic resources collections can be made more attractive for the user by: a) including additional traits as requested by the user that are not included today; and b) conducting more promotion through various channels of often ignored resources (especially wild ecotypes), as many users today perceive genebanks both as repositories of breeding materials and as potential providers of more information.

The answer to the second question flows from that of the first: that cooperation among genebanks must be founded on reciprocal communication, provision of continuous feedback and sharing of experiences and best practices. Joint projects and programmes among donors, users, and professional non-governmental organizations provide the way for these groups to become closer.