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The International Treaty
ON PLANT GENETIC RESOURCES
FOR FOOD AND AGRICULTURE

**INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES
FOR FOOD AND AGRICULTURE**

**FOURTH MEETING OF THE SCIENTIFIC ADVISORY COMMITTEE ON THE
GLOBAL INFORMATION SYSTEM**

20–21 April 2021

**REVIEW AND DEVELOPMENT OF DESCRIPTORS LISTS FOR
SPECIFIC CROPS**

I. INTRODUCTION

1. The Governing Body, through Resolution 3/2015, included in the Programme of Work for the Global Information System the development, implementation and promotion of standards for documentation of plant genetic resources for food and agriculture (PGRFA) to facilitate interoperability among existing systems in the context of Article 17 of the International Treaty.
2. By Resolution 4/2019, the Eighth Session of the Governing Body took note of the usefulness of controlled vocabularies and crop ontologies and requested the Secretary, subject to the availability of resources, to support the conversion of existing crop descriptors into ontologies and to further explore the use of stable ontologies¹ through the Global Information System.
3. Crop documentation descriptors, which are the data sources for the development of crop ontologies, are one of the recurrent needs highlighted by users of PGRFA. They are essential for improving the quality of the documentation and a key tool to remove barriers to the data exchange in this domain.
4. The document, IT/GB-8/SAC-3/18/4, *Development and Promotion of Standards as Outlined in Objective 3 of the Programme of Work on the Global Information System*,² provided an overview of descriptors developed for specific crops and helped to gather inputs and advice from the Committee.
5. Section II of this document provides background information on the previous work undertaken by the Scientific Advisory Committee on the consideration of crop descriptors. Section III provides a list of crops for which the development and update of the descriptors could be considered a priority. Finally, Section IV presents additional information the Committee can take into consideration for the provision of advice on the next steps.

¹ The objective of the crop ontology is to compile validated concepts, such as crop descriptors lists along with their inter-relationships on anatomy, structure and phenotype of Crops, on trait measurement and methods, as well as on germplasm with the multi-crop passport terms.

² Available at <http://www.fao.org/3/CA0088EN/ca0088en.pdf>

II. BACKGROUND

6. Following the advice provided by the third meeting of the Scientific Advisory Committee, the Secretariat undertook an initial review of the available crop descriptors lists (see *Annex I*). The Committee members were invited to provide practical elements to determine the level of priority to be assigned to each crop descriptor list in October 2019.

7. The criteria used for the initial assessment included the number of accessions conserved in long-term *ex situ* collections for each crop, the availability of a descriptor, its year of publication, and the reference to the descriptors in the crop strategies. The review also took into account the following criteria:

- Develop a descriptor list for each crop or group of crops included in *Annex I* of the International Treaty;
- Review those descriptors with a high demand that were more than 25 years old, building upon the outputs of previous projects; and
- Consider other crops not included in *Annex I* of the International Treaty, according to their importance for plant breeding, food security, nutrition, and climate change challenges.

8. In principle, five levels of priority were assigned to the crop lists, from 1 to 5 (high to low priority). For ease of reference, the table resulting from the analysis of the crop descriptors list, with their initial assignment of priority, is reproduced in *Annex II* to this document.

9. The inputs received from the members of the Committee indicated that the prioritization criteria for the revision or development of descriptors were “*appropriate and good preliminary analysis and a meaningful way of prioritization*”.

10. In reviewing the descriptor lists, the experts stressed the following:

- To consider the crop strategies of the Crop Trust for a final selection of crops for descriptor development;
- To take into account the descriptors developed by the International Union for the Protection of New Varieties of Plants (UPOV) when developing and revising the crop descriptors;
- To consider the work undertaken by the working group of the European Cooperative Programme for Plant Genetic Resources and the N.I.Vavilov Research Institute of Plant Industry on crop descriptors and explore further collaboration.

11. Section III below presents some comments on the inputs and information received that may help the Committee in advising on the next steps.

III. PRIORITIZED CROP DESCRIPTOR LISTS

12. The outcome of the consultation and the review is presented in Table 1 below, which groups in two categories the top candidates for the development and review of the crop descriptors lists.³

³ It should be noted that the priority list slightly differs from the table presented at the Virtual Briefing in November 2020 (see *Annex II* of this document, Table 3) because further research was undertaken and additional information collected.

Table 1. Top candidate crops for the development and update of the descriptor lists

Annex I crops	Priority
Oat	1
Pea	1
Sunflower	1
Eggplant	2
Grass forages	2
Legume forages (Lupinus or Medicago)	2
Non-Annex I crops	
Soyabean	1
Flax	2
Cucurbits (cucumbers, watermelons, squashes, pumpkins)	2

13. Six of the *Annex I* crops resulting from the prioritization list contained in *Annex III* of this document, Table 4 were: beans, lentil, potato, sorghum yam and cowpea *et al.* All of them have a relatively recent key strategic set of characterization and evaluation descriptors (except for groundnut), although for four of them a crop strategy is being updated. Accordingly, they are not included in the priority list above.

14. Another group of six crops and forages from the *Annex I* of the International Treaty, for which new crop strategies are being developed, included sunflower, citrus, eggplant, and grass and legume forages.

15. It is to be noted that a new strategy is being prepared for *Pisum* for which an international descriptor does not exist, although some preparatory work is currently being done. Sunflower has been prioritized in a crop strategy, and its descriptor list was published 25 years ago. Both have been included in Table 1.

16. Attention should also be drawn to grass forages because the general descriptors were published in 1985, and there is a new crop strategy under development. The same could be applied to legume forages because descriptors were only developed for four species. *Lupinus* and *Medicago* were included in the priority list, and they deserve particular attention because they are now outdated.

17. Additionally, four non-*Annex I* crops were also included in the priority list of *Annex II* of this document. A new crop strategy is being developed for two of them, groundnut and cucurbits. After applying the selection criteria, groundnut was not included in the priority list. Instead, another two crops were highly prioritized. One of them was soyabean which has a descriptor published in 1984, and flax, which does not have one yet. They do not have a crop strategy yet.

18. Finally, some other crops got a low score and have been eliminated from Table 1 like asparagus, strawberry, cocoa and rye.

19. A reasonable target could be to publish two or three crop descriptors per year. It is to be taken into consideration the various steps needed for their development and review, which include preliminary research, close collaboration with existing networks or the identification of experts in various regions, the main consultation, several rounds of reviews with a core advisory group, validation and publication. The start of the activities will be subject to the availability of extra-budgetary resources.

20. The outcome of the review or update of each descriptor would be presented to the Scientific Advisory Committee for possible further advice and to the Governing Body for its endorsement.

IV. ADDITIONAL CONSIDERATIONS

21. The availability of a crop strategy was one of the criteria used in the prioritization process. In fact, the project, “Breathing New Life into the Global Crop Conservation Strategies”, coordinated by the Crop Trust had selected ten crops for which strategies are being developed or updated. As some of the strategies will be updated, further information on gaps and demand for crop descriptors list could be obtained in the near future.

22. With regards to the requested harmonization with UPOV, it is worth noting that the varieties for testing are evaluated in terms of Distinctness, Uniformity and Stability (DUS) traits which form the basis for deciding whether breeders can obtain legal protection for a variety. The internationally agreed descriptors should facilitate the characterization and evaluation of PGRFA that are expected to have considerable genetic variability and therefore not satisfy the DUS criteria, thus requiring a different description system.

23. Joint efforts with the Oats Working Group of the ECPGR could be explored because *Avena* is one of the candidate crops, a crop strategy is being developed and is included in *Annex I* of the International Treaty. It is equally important to mention that a collaboration with the ECPGR *Avena* Working Group has been proposed to update the descriptor for oats, published 35 years ago. Additionally, collaboration could be explored with experts currently working on the development of *Pisum* descriptors.

24. The Secretariat has prepared a section on crop descriptors in the GLIS Portal to facilitate access to all the international crop descriptors lists available and other helpful documentation. The information is organized by crop, genus and year of the latest publication or update.

25. Assistance is also provided on a regular basis on the development and status of the descriptors to national focal points, project managers, research groups of the CGIAR, universities, PGRFA experts and stakeholders. It is currently collaborating with the World Agroforestry Centre (ICRAF) in the development of African native fruit trees and with the University of Philippines on the development of specific descriptors.

26. Several workshops and meetings organized by the Secretariat, or in collaboration with partners, have included a dedicated section on crop descriptors, and this practice could continue. These capacity-building activities, which had a focus on the improvement of characterization and evaluation of PGRFA, facilitated their adoption and had an impact on the quality of the information captured and exchanged.

IV. ADVICE SOUGHT

27. The Committee is invited to:

- i. **Review and support** the candidate crops lists contained in Table 1 for the development of descriptor lists and advise on a preliminary target for this activity in the context of Objective 3 of the Programme of Work on GLIS, subject to the availability of resources; and
- ii. **Provide advice** on any additional elements or suggestions related to this work track that could be brought to the consideration of the Governing Body at its Ninth Session.

Annex I

Table 2. Initial review of the available crop descriptor lists

Table 2. List of candidate crops					
	Annex I Crops	Genera	Year of publication	Type of action	Priority in the workplan (1=High;3=Medium;5=Low)
Food crops					
	Asparagus	<i>Asparagus</i>	none	Develop	5
	Pea	<i>Pisum</i>	none	Develop	1
	Oat	<i>Avena</i>	1985	Review	1
	Brassica complex	<i>Brassica and Raphanus</i>	1990	Review	2
	Strawberry	<i>Fragaria</i>	1986	Review	4
	Sunflower	<i>Helianthus</i>	1985	Review	2
	Major aroids	<i>Xanthosoma</i>	1989	Review	2
	Rye	<i>Secale</i>	1985	Review	3
	Triticale	<i>Tritico secale</i>	1985	Review	1
		<i>Lupinus</i>	1981	Review	2
Other crops	Cocoa	<i>Theobroma cacao</i>		Develop	3
	Amaranth	<i>Amaranthus</i>		Develop	2

*Annex II***Table 3. Preliminary list of priorities presented at the virtual briefing in November 2020**

Available A_I Crops	Requested A_I Crops	Requested Non-A_I Crops
Banana	Oat	Soyabean
Barley	Sunflower	Flax
Beans	Citrus	Groundnut
Breadfruit	Eggplant	Cucurbits (cucumbers, watermelons, squashes, pumpkins)
Cassava	Grass forages	
Chickpea	Legume forages	
Coconut	Bambara groundnut	
Cowpea et al.		
Potato		
Faba bean		
Finger millet		
Grass pea		
Lentil		
Maize		
Pearl millet		
Pigeonpea		
Rice		
Sorghum		
Sweet potato		
Taro		
Wheat		
Yam		

*Annex III***Table 4. Comparison table assessing descriptors availability regarding crop strategies and feedback received**

Annex I Crops	Crop strategies	Available descriptors	Inputs collected
Beans	Beans (2014)	Y (2009)	Phaseolus
Lentil	Lentil (2008)	Y (2010)	Lens
Potato	Potato (Updt)	Y (2009)	Y
<i>Sorghum</i>	Sorghum (Updt)	Y (2010)	Y
Yam	Yams (Updt)	Y (2009)	Y
Cowpea et al.	Vigna (Updt) (Cowpea and Bambara groundnut	Y Bambara groundnut (2000) Cowpea (2010)	Y
Pea	Pea (New)	N	Pea: Experts working on it
Sunflower	Sunflower (New)	Y (1985)	Y
Citrus	Citrus (several) (New)	Y (1999)	Y
Eggplant	Eggplant (New)	Y (1990)	Y
Grass forages	Temperate forages (grass and legume) (New)	Y (1985) One general Bioversity publication for all Forage grasses	Y
Legume forages		Lathyrus (2000), Lupinus (1981) and Medicago (1991) and Trifolium repens (1992)	Y
Oat	Oats (2008)	Y (1985)	Oat: ECPGR Avena WG joint collaboration
Non-Annex_I Crops			
Groundnut	Groundnut (New)	Y (1992)	Y
GR Cucurbits (several) (1982)	Cucurbits (several) (New)	Melon (2003)	Y
Soyabean		Y (1984)	Glycine
Flax		N	Flax