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COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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SUMMARY ASSESSMENT OF THE IMPLEMENTATION OF THE SECOND GLOBAL PLAN OF ACTION FOR PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE 2012 - 2014

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I. INTRODUCTION

1. The FAO Council, in adopting the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture (Second GPA), agreed that progress in its implementation and the related follow-up processes would be monitored and guided by governments and other FAO Members through the Commission on Genetic Resources for Food and Agriculture (Commission). In order to discharge this function, the Commission adopted a set of indicators for monitoring the implementation of the Second GPA. At its Fifteenth Regular Session, the Commission endorsed a timeline both for the monitoring of the implementation of the Second GPA and for the preparation of *The Third Report on the State of the World's Plant Genetic Resources for Food and Agriculture*.[1] According to the timeline adopted by the Commission, an assessment of the implementation of the Second GPA should be presented to this session of the Commission.

2. This document summarizes the process undertaken to prepare the assessment of the implementation of the Second GPA and the key results of the assessment. These results are based on information received from countries and international organizations for the reporting period January 2012 to June 2014. A more detailed assessment of the implementation of the Second GPA is provided in the document *Assessment of the implementation of the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture 2012−2014*.[2]

II. PREPARATION OF THE ASSESSMENT

3. On 1 October 2015, officially appointed National Focal Points (NFPs) were invited to report through the WIEWS Reporting System, using the Reporting Format,[3] which is based on the 63 indicators agreed by the Commission,[4] on the activities undertaken by their countries to implement the Second GPA between 1 January 2012 and 30 June 2014. In addition, information was sought with regard to various matters relevant to the status of conservation and sustainable use of plant genetic resources for food and agriculture (PGRFA) at the end of June 2014.

4. As agreed by the Commission, NFPs were also asked to provide a qualitative expert judgement on the level of achievement for each of the 63 indicators adopted by the Commission. These NFP expert judgements were used to elaborate the Higher-order Composite Indices (HCIs) for each of the three PGRFA targets adopted by the Commission:

Target 1 - PGRFA Conservation

By 2020, an increasing proportion of the genetic diversity of cultivated plants and their wild relatives, as well as of wild food plant species is maintained *in situ*, on farm and *ex situ* in a complementary manner;

Target 2 - PGRFA Sustainable Use

By 2020, there has been an increased use of plant genetic resources for food and agriculture to improve sustainable crop production intensification and livelihoods while reducing genetic vulnerability of crops and cropping systems; and

Target 3 - PGRFA Institutional and Human Capacities

By 2020, many more people are aware of the values of plant genetic resources for food and agriculture and institutional and human capacities are strengthened to conserve and use them sustainably while minimizing genetic erosion and safeguarding their genetic diversity.

[1] CGRFA-15/15/Report, paragraph 56.
[2] CGRFA-16/17/Inf.17.2.
[3] CGRFA-15/15/Inf.9
[4] CGRFA-14/13/Report, Appendix C.

5. The WIEWS Reporting System was made available on the FAO web site in five official languages to facilitate country reporting and data analysis.[5] NFPs were provided with credentials for accessing the Reporting System together with sign-in instructions and a user manual in three official languages.

6. FAO also invited regional and international agricultural research centres holding PGRFA *ex situ* collections to provide information, mainly on those collections. The CGIAR centres, AfricaRice, Bioversity International, the International Center for Tropical Agriculture (CIAT), the International Maize and Wheat Improvement Center (CIMMYT), the International Potato Center (CIP), the International Center for Agricultural Research in the Dry Area (ICARDA), the World Agroforestry Centre ICRAF, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the International Institute of Tropical Agriculture (IITA), the International Livestock Research Institute (ILRI) and the International Rice Research Institute (IRRI), and the World Vegetable Center provided information to FAO on the basis of an adapted version of the Reporting Format used by countries.

7. As of March 2016, 43 countries had completed the online Reporting Format (answering on average 58 percent of the questions). For one specific question and its three indicators associated with *ex situ* collection holdings, data on about 3.6 million accessions were gathered from 71 countries and 12 international centres. Countries reported directly to FAO on 1.17 million accessions, while data on the other accessions were sourced from EURISCO and Genesys.

8. Overall, it should be noted that a greater number of country reports is needed to be able to draw conclusions as to the global state of implementation of the Second GPA. It is therefore important to consider how country reporting might be improved. Based on experiences gained during the first assessment, it can be concluded that NFPs and other reporting entities require, at least initially, assistance and guidance in providing data on the implementation of the Second GPA. Subsequent "quality checks" of the information provided require considerable human resources from FAO's side.

III. HIGHER-ORDER COMPOSITE INDICES

9. The purpose of HCIs is to assess progress towards the three PGRFA targets and to facilitate the comparison of performance across time, countries and regions. The implementation of the Second GPA as a whole contributes to the achievement of the adopted PGRFA targets, and each priority activity (PA) covers a particular dimension of, and contributes, to one of the three targets. PAs 1 to 7 of the Second GPA contribute to Target 1, PAs 8 to 12 to Target 2, and PAs 13 to 18 to Target 3. Progress in the implementation of each PA is assessed through a set of indicators adopted by the Commission. More information on the construction of the HCIs is contained in the document *Targets and indicators for plant genetic resources for food and agriculture*.[6]

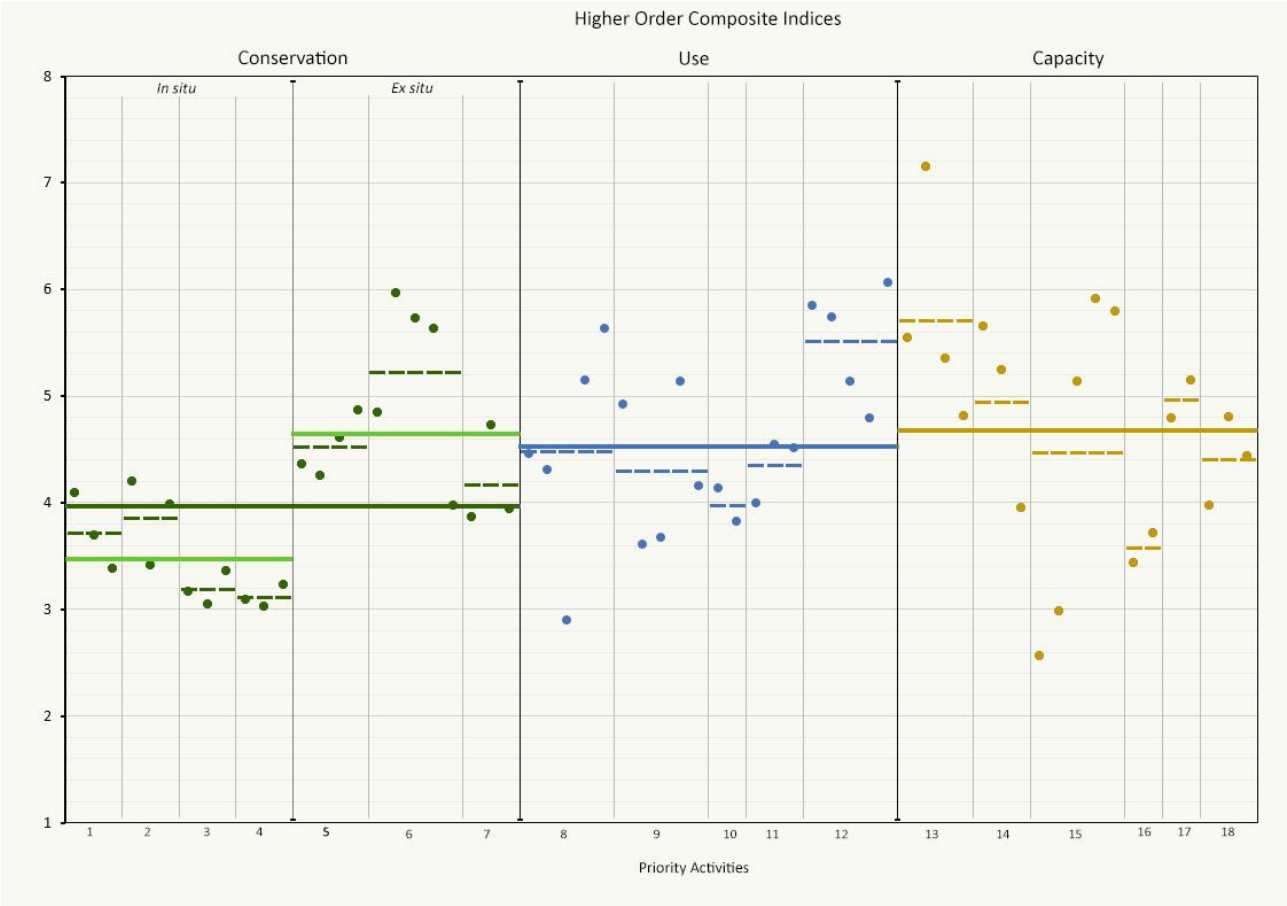
10. For the present assessment, HCIs were calculated based on information provided by NFPs from 33 countries,[7] who rated the level of achievement in their countries for 91 percent of the indicators on average.

(i) Conservation of plant genetic resources for food and agriculture

11. Progress on PGRA conservation was weaker than progress towards the other two targets during the reporting period, as shown by the corresponding HCIs in Figure 1. However, progress on *ex situ* conservation was rated considerably higher than progress on *in situ* conservation, as shown by a comparison of the PA ratings for *in situ* with the PA ratings for *ex situ* conservation. Progress in the area of *ex situ* conservation was rated positively overall; progress in *in situ* conservation and management was rated relatively low by most experts.

[5] English, French, Spanish, Arabic and Russian.
[6] CGRFA-15/15/4.1; cf. also Background Study Paper No. 67.
[7] The number of indicators rated by two countries was not sufficient to include them in the overall analysis.

Figure 1. HCIs, global averages for the priority activities and the 63 indicators of the Second GPA based on NFP ratings



Dots represent the average rating values (ranging from 1 for the lowest achievement to 8 for the highest achievement) for the 63 indicators.
Dashed lines represent the average rating values for the 18 PA.
Continuous lines represent the average rating values for the three HCIs.
Light green lines represent the average rating values for the two sub-HCIs on conservation.

In situ conservation and on-farm management

12. *In situ* conservation and on-farm management appeared to be area of the Second GPA that countries had the most difficulty implementing. This was evidenced by the fact that the average rating for the corresponding 12 indicators and HCI sub-component was lower than for *ex situ* conservation, sustainable use and institutional and human capacities. Notwithstanding this overall picture, some good progress was reported on specific activities, in particular surveying and inventorying of PGRFA and on-farm management of farmers' varieties and landraces. The results of the assessments of the corresponding PAs can be summarized as follows.

> *PA1, Surveying and inventorying PGRFA.* More than 5 200 *in situ* and on-farm surveys and inventories for over 1 800 distinct and predominantly wild taxa were reported. Although representing significant progress with regard to the collection and documentation of data and assessment of these resources, more than 55 percent of the surveyed species and approximately 11 percent of the surveyed varieties were reported to be threatened. This implies that interventions beyond merely inventorying the existence of these PGRFA are required in order to safeguard the materials.
>
> *PA2, Supporting on-farm management and improvement of PGRFA.* Significant efforts to support on-farm management and improvement of PGRFA were reported in countries where

on-farm crop genetic diversity was particularly broad and important for food systems, nutrition and the livelihoods of farming communities. More than 240 on-farm management projects involving over 172 thousand farmers belonging to 677 farming communities were reported in 29 countries across all continents. About 136 of the projects also assessed either local varieties or farmers' knowledge. Furthermore, in specific areas of 15 reporting countries, where crops of traditional importance and of high diversity predominated, farmers' varieties and landraces were reportedly grown on more than 45 percent of the cultivated land. A number of countries also reported the redistribution to farmers or farming communities of local cultivars or landraces, either directly from local gene banks or through community seed banks.

PA3, Assisting farmers in disaster situations to restore crop systems. The distribution of quality seeds and planting materials as part of the emergency aid to restart agricultural production after natural disasters and conflicts was reported frequently in vulnerable countries. Seeds and planting materials of 25 crops, which were in most cases produced locally, were distributed during the reporting period. Eleven countries reported having risk management policies, including seed security assessments and other provisions, for restoring crop systems after significant disruptions.

PA4, Promoting in situ *conservation and management of crop wild relatives and wild food plants.* Increased attention to crop wild relatives (CWRs) in the *in situ* conservation and use of PGRFA was reported. Overall, 14.2 percent of the over 15 000 *in situ* conservation sites that were reported in 20 countries had management plans addressing CWRs and wild food plants. A total of 78 activities on *in situ* conservation and management of CWRs and wild food plants were implemented with institutional support in 19 countries. More than 2 000 entries, predominantly CWRs, were reported to be conserved *in situ*. These encouraging developments were, however, rather limited in scope. The reporting countries rated their achievements with respect to this PA as the lowest across all 18 PAs of the Second GPA. This indicates that, given the importance of these PGRFA, more effort needs to be invested in their conservation and management.

***Ex situ* conservation**

13. The group of 12 indicators pertaining to the PAs associated with the *ex situ* conservation of PGRFA received the second highest average rating, indicating countries' relatively high satisfaction with the progress made on *ex situ* conservation.

PA5, Supporting targeted collecting of PGRFA. Reflecting the high level of attention given to the PA, 31 countries implemented a total of 890 collecting missions. These led to the collection of more than 20 000 samples of 800 crops or groups of crops. Cereals, vegetables and pulses were the crop groups with the most collected materials. The 12 international agricultural research centres also reported collection of more than 8 100 samples of 18 crops or crop groups. 29 countries identified gaps in their collections and reported that mitigating targeted collecting strategies had been developed for a large majority of the crops conserved. Based on gap analyses, targeted collecting was required by countries for almost 350 crops or crop groups. For the international centres, gaps in the holdings of over 65 crops or crop groups required addressing through targeted collecting.

PA6, Sustaining and expanding ex situ *conservation of germplasm.* Whereas an overall increase in human, financial and infrastructural capacity was observed, there was nonetheless a significant reduction in these capacities in the majority of the countries of sub-Saharan Africa and Latin America. About 3.6 million accessions are conserved by the 71 assessed countries and 12 international centres (approximately 20 percent of the total). About half the total holdings belong to the nine major food crops. Compared to 2009, *ex situ* PGRFA conservation efforts had been strengthened significantly overall, as shown by the increases of 16 and 27 percent, respectively, in the number of genera and species conserved, and the

increased level of safety duplication of individual accessions (on average 41 percent of the national collections and 83 percent of the collections held by the international centres). The 17 percent decrease in the number of accessions conserved was mainly the result of rationalization of conservation programmes in countries and more consistent reporting, in which data on duplicated working collections were removed. No major irreplaceable losses were reported by countries. The conservation activities of the international agricultural research centres remained significant and continued to complement the efforts of countries, especially with regard to their regional and global coverage.

PA7, Regenerating and multiplying ex situ *accessions.* Of the three PAs on *ex situ* conservation, this is the one with the least encouraging results. Information gathered on almost 900 thousand accessions showed that 18 percent had been regenerated, whereas 38 percent were in need of regeneration. For about 40 percent, of those that were due for regeneration, adequate budget was not available. The collections of the international agricultural research centres have a better, though not ideal, status: about 10 percent had been regenerated during the reporting period, 13 percent were in need of regeneration, and for 12 percent of those due for regeneration, the required budget was not available.

(ii) Sustainable use of plant genetic resources for food and agriculture

14. The sustainable use of PGRFA had the second highest HCI score (Figure 1). Activities that were reported on included the characterization and evaluation of accessions, the management and distribution of collections, pre-breeding and breeding, seed systems and promotion of the diversification of crop production and increase of crop diversity on-farm. There were variations in the ratings provided for the different PAs: supporting seed production and promoting diversification actions received the highest and lowest average ratings, respectively.

PA8, Expanding the characterization, evaluation and further development of specific collection subsets to facilitate use. More than 50 percent of the accessions held in national gene banks have been morphologically characterized and, impressively, almost 1 000 trait-specific subsets of collections developed. More than 175 000 accessions (and more than 350 000 samples) of about 280 different crops were distributed by national gene banks. Similar figures were reported by the international agricultural research centres for the accessions held in their gene banks.

PA9, Supporting plant breeding, genetic enhancement and base-broadening efforts. There were almost 500 breeding and pre-breeding programmes or projects for more than 300 crops, the majority of which were for the major crops. More than half of the germplasm used in these breeding activities was obtained from regional or international networks or the gene banks of international centres, thus demonstrating clear interdependency. About one-third of the activities aimed to address constraints relevant to the production systems of small-scale farmers or local communities. About 200 genetic enhancement and pre-breeding activities were implemented in 20 countries for almost 100 crops. Local cultivars and landraces were by a wide margin the types of materials that were most used. About 2 000 active plant breeders were working in public-sector institutions in 30 countries; their work focused mostly on fruits, cereals and vegetables. Almost 500 plant breeders were working in the private sector, with a significant majority of them working on cereals. The international centres reported 56 breeding programmes or activities on 36 crops and employed 150 plant breeders.

PA10, Promoting diversification of crop production and broadening crop diversity for sustainable agriculture. There were crop diversification programmes and activities in 24 countries for 145 different crops, with almost 70 new crops or wild species introduced into cultivation. More than 160 underutilized species with potential for commercialization were identified. In addition, 25 projects or programmes related to the improvement of plant genetic diversity in the cropping systems of 12 different crops or crop groups were implemented by the international centres.

PA11, Promoting development and commercialization of all varieties, primarily farmers' varieties/landraces and underutilized species. Across most of the 20 countries that provided data for this PA there were 53 different national laws, policies, etc. for promoting the development and/or commercialization of farmers' varieties and/or landraces. In addition, there were more than 530 programmes or projects for more than 200 different crops. In all, 1 443 landraces of almost 200 crops, as well as 168 underutilized species with potential for commercialization were identified. Eight of the international centres reported 19 programmes or projects promoting the development and commercialization of varieties. They also identified 633 landraces and 16 underutilized species with potential for commercialization.

PA12, Supporting seed production and distribution. About 6 400 varieties were released in 29 countries. Vegetables and cereals constituted the majority of the crop groups. More than 9 000 registered seed enterprises operated in 26 countries. On average 14.5 varieties were cultivated on 80 percent or more of the total cropping area for the five most widely spread crops of the reporting countries. Although difficult to judge without comparisons, this latter aspect could be a reliable indicator for assessing within-crop diversity and vulnerability of monocropping systems.

(iii) Building sustainable institutional and human capacities

15. Progress towards the PGRFA target on Institutional and Human Capacities was greater than that towards the other targets. The corresponding HCI indicated the highest average of country ratings (Figure 1). PA 13 Building and Strengthening National Programmes had the highest score of all the 18 PAs. It might therefore be inferred that this PA was the highest priority for most countries. It might also be expected that this heightened national-level coordination of activities should improve national priority setting and promote the efficient use of human and material resources. It is also plausible to expect this trend to translate into greater national awareness of the importance of PGRFA. The lowest reported progress among the PAs of this group was on the development and strengthening of systems for monitoring and safeguarding genetic diversity and minimizing genetic erosion (PA 16). This showed that significant work still needed to be done with respect to this important aspect of the Commission's PGRFA target. Details of countries' performances for the different PAs are presented below.

PA13, Building and strengthening national programmes. The achievements made in strengthening capacity for the conservation and sustainable use of PGRFA were quite impressive for most of the countries and could be considered a positive signal for the future. In all, 29 countries reported on the existence of entities or mechanisms that coordinated PGRFA activities at the national level and rated this indicator relatively highly. In half of the reporting countries, these entities oversaw not only PGRFA but also genetic resources in other sectors. The appointment of a national PGRFA coordinator was also positively rated by countries. Another encouraging development was the existence of legal instruments for governmental policy frameworks for the conservation and use of PGRFA in most countries. Countries also reported progress on the use of one or more information-sharing mechanisms for PGRFA and other information management tools; 56 percent reported using the National Information Sharing Mechanism (NISM). While acknowledging its inclusive, positive role, they also recognized that ensuring its sustainability required continuous effort.

PA14, Promoting and strengthening networks for PGRFA. A total of 56 countries across all continents reported being members of one or more regional or international networks. A total of 124 networks were listed, including PGRFA regional and global networks, as well as crop networks. In addition, the international agricultural research centres played an active role in at least 29 PGRFA conservation and use networks. Only a relatively small number of countries reported on the production of publications and negatively rated their achievements in this regard.

PA15, Constructing and strengthening comprehensive information systems for PGRFA. Only a very small number of countries reported maintaining information on CWRs and farmers' varieties and landraces in publicly available information systems. However, countries reported more than 1.375 million *ex situ* conserved accessions documented in such information systems. It should be noted that only a few countries included CWRs in documentation systems; they rated the corresponding indicator lowest of all. The international centres, on average, updated their data in Genesys rather irregularly. Characterization and evaluation data were available, respectively, for a little over 40 percent and less than 2 percent of conserved accessions. Characterization and evaluation data were available for more than 56 percent of the accessions in the gene banks of international centres. In addition, 19 countries recorded almost 16 500 released varieties in publicly available information systems.

PA16, Developing and strengthening of systems for monitoring and safeguarding genetic diversity and minimizing genetic erosion of PGRFA. Fourteen countries had one or more systems in place to monitor and safeguard genetic diversity and minimize genetic erosion. Less than half of the international centres had variable approaches for monitoring genetic diversity and minimizing genetic erosion for their mandate crops. Sixteen countries had undertaken a number of remedial measures that resulted from their monitoring systems. However, compared with the other PAs, countries' ratings were among the lowest, reflecting their disappointment with achievements in this PA.

PA17, Building and strengthening human resource capacity. Educational and training programmes on PGRFA were reported by 30 countries. The international centres trained more than 1 000 persons on various research and routine operations related to the conservation and sustainable use of PGRFA. The employment of almost 1 500 PGRFA professionals was reported by 33 countries, and 28 national PGRFA programmes reported a staff strength that included 508 professionals. Countries also reported encouraging figures on the upgrading of the skills of their scientific staff, both through formal education (PhD and MSc levels) and through ad hoc in-service training. More than 50 percent of staff received further training in one or more disciplines relevant to the conservation and sustainable use of PGRFA.

PA18, Promoting and strengthening public awareness of the importance of PGRFA. Countries carried out more than 130 public-awareness programmes or activities with the participation of a broad spectrum of stakeholders. The development of a wide range of advocacy and information-dissemination products was also reported and relevant media were used to reach the target groups.