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COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Item 3 of the Provisional Agenda

INTERGOVERNMENTAL TECHNICAL WORKING GROUP ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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FAO ACTIVITIES IN SUPPORT OF THE IMPLEMENTATION OF THE SECOND GLOBAL PLAN OF ACTION FOR PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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I. INTRODUCTION

1. The Commission on Genetic Resources for Food and Agriculture (the Commission), at its last session, took note of FAO's work in support of the implementation of the Second Global Plan for Action for Plant Genetic Resources for Food and Agriculture (Second GPA) and welcomed the overall progress made in this regard.[1] The Commission requested FAO and donors to continue supporting countries in their efforts to conserve plant genetic resources for food and agriculture (PGRFA) *in situ* and on farm, to maintain genebanks for the continued collection, conservation, characterization, evaluation, use and provision of crop germplasm, and to strengthen the links and complementarity between *ex situ* and *in situ* conservation.[2]

2. The Commission also requested FAO to continue supporting countries in strengthening their crop improvement and plant breeding capacities[3] and in the development or revision of their national seed policy and legislation.[4] The Commission further referred the revised *draft Voluntary guidelines on national level conservation and sustainable use of farmers' varieties/landraces* and the concept note on *Global networking on in situ conservation and on-farm management of plant genetic resources for food and agriculture* and referred them to its Intergovernmental Technical Working Group on Plant Genetic Resources for Food and Agriculture (Working Group) for further review and consultations[5]. It also requested FAO, to continue strengthening national and regional PGRFA conservation networks, including through capacity-building activities and facilitating partnerships.[6]

3. This document reports on activities carried out by FAO since the last session of the Commission in support of the implementation of the Second GPA, for consideration of the Working Group.

II. BACKGROUND

4. The Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture (Second GPA)[7] provides an important internationally agreed framework for the conservation and sustainable use of PGRFA. The Second GPA is a supporting component of the International Treaty on Plant Genetic Resources for Food and Agriculture (the Treaty) as per its Article 14 and its implementation is an essential contribution to achieving the objectives of the Treaty.[8]

5. FAO's work on the themes of the Second GPA fall within the aegis of the organization's Strategic Programme 2, *"Make agriculture, forestry and fisheries more productive and sustainable"* and Strategic Programme 5, *"Increase the resilience of livelihoods to threats and crises through reducing vulnerability to drought and other impacts of climate change*".

6. FAO's Strategic Framework[9] aligns the organization's work with the Sustainable Development Goals (SDGs).[10] In particular, the implementation of the Second GPA contributes to SDG 2 on Zero Hunger[11] with FAO being the custodian United Nations agency for its Indicator 2.5.1 on *ex situ* conservation of plant and animal genetic resources for food and agriculture. By implementing the

[1] CGRFA-16/17/Report/Rev. 1, paragraph 52.
[2] CGRFA-16/17/Report/Rev.1, paragraph 58.
[3] CGRFA-16/17/Report/Rev.1, paragraph 59.
[4] CGRFA-16/17/Report/Rev.1, paragraph 60.
[5] CGRFA-16/17/Report/Rev.1, paragraphs 63-64.
[6] CGRFA-16/17/Report/Rev.1, paragraph 65.
[7] http://www.fao.org/agriculture/crops/thematic-sitemap/theme/seeds-pgr/gpa/en/
[8] Second GPA, paragraph 313.
[9] http://www.fao.org/3/a-ms431reve.pdf
[10] https://sustainabledevelopment.un.org/sdgs
[11] Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture; Target 2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed.

Second GPA, countries also address essential components of the Strategic Plan for Biodiversity 2011-2020, including the Aichi Biodiversity Targets,[12] adopted under Convention on Biological Diversity.[13]

7. The implementation of the Second GPA also helps countries to meet their obligations under the Paris Climate Accord,[14] especially the Nationally Determined Contributions (NDCs),[15] to implement the related Sendai Framework for Disaster Risk Reduction[16] and the Koronivia Joint Work on Agriculture.[17] By resulting in the enhanced access of farmers to a diverse suite of nutrient-dense crops and varieties, the implementation of the Second GPA also contributes to the attainment of the aims of the ICN2 Framework of Action[18] and the United Nations Decade of Action on Nutrition (2016-2025).[19]

8. Regionally determined objectives may also benefit from the implementation of the second GPA. In Africa, for instance, work on the conservation and sustainable use of PGRFA contributes to the achievement of aims set out in the Comprehensive Africa Agriculture Development Programme (CAADP) and to the implementation of the strategy and roadmap of the Malabo Declaration towards ending hunger in the continent by 2025.

III. *IN SITU* CONSERVATION AND ON-FARM MANAGEMENT

A. Global networking on *in situ* conservation and on-farm management of plant genetic resources for food and agriculture

9. The Commission, at its last session, reviewed the concept note on Global networking on *in situ* conservation and on-farm management of plant genetic resources for food and agriculture and referred it to its Working Group for further consultations.[20]

10. In response to the Commission's request and upon consultation with experts and stakeholders, FAO developed two separate concept notes, on *Global networking on on-farm management of plant genetic resources for food and agriculture* and on *Global networking on in situ conservation of plant genetic resources for food and agriculture* respectively, for the consideration of the Working Group.[21,22]

11. Notwithstanding the complementarity between *in situ* conservation and on-farm management of PGRFA, they warrant being addressed through different networks given the differences in their stakeholder base. The Bureau of the Seventeenth Regular Session of the Commission took note of this revised approach (of addressing the themes separately) at its first and second meetings.

12. Both concept notes outline the need and feasibility of the respective global networks. They also propose the means and steps to their establishment and the financial implications. The draft calls for inaugural meetings, as a first step to establish the global networks, are provided as annexes to the respective concept notes.

13. FAO, in collaboration with Bioversity International, conducted a survey in order to inventory Community Seed Banks (CSBs), sometimes also called Community Genebanks, and to characterize their functions, composition and foci. An analysis of the responses was made available during an informal dialogue scheduled for 24 July 2018, i.e. immediately before the Ninth Session of the Working Group. The dialogue aimed at exploring the potential benefits of both the mainstreaming of the work of

[12] https://www.cbd.int/sp/
[13] https://www.cbd.int/2011-2020/
[14] http://unfccc.int/files/home/application/pdf/paris_agreement.pdf
[15] http://unfccc.int/focus/items/10240.php
[16] https://www.unisdr.org/we/coordinate/sendai-framework
[17] https://unfccc.int/files/meetings/bonn_nov_2017/application/pdf/cp23_auv_agri.pdf
[18] http://www.fao.org/3/a-mm215e.pdf
[19] http://www.who.int/nutrition/decade-of-action/workprogramme-2016to2025/en/
[20] CGRFA-16/17/Report/Rev. 1, paragraph 64.
[21] CGRFA/WG-PGR-9/18/Inf.5. Rev.1
[22] CGRFA/WG-PGR-9/18/Inf.6.

CSBs in the ongoing efforts to strengthen on-farm management of PGRFA and the deliberate inclusion of these community-level initiatives in the development of a global network dedicated to the theme. A summary of the outcomes of the dialogue will be presented to the Working Group during the session.

B. Crop wild relatives and farmers' varieties/landraces

14. The Commission, at its last session, endorsed the *Voluntary Guidelines for the Conservation and Sustainable Use of Crop Wild Relatives and Wild Food Plants* and requested FAO to publish them[23]. In response to the Commission's request, the guidelines have been published in four languages (Arabic, English, French and Spanish) and are now available in print and electronic formats.[24]

15. The Commission, at its last session, also referred the revised draft *Voluntary guidelines on national level conservation and sustainable use of farmers' varieties/landraces*[25] to the Working Group for further review and invited Members, observers and National Focal Points (NFPs) to provide comments on this document.[26] It requested FAO to revise the draft voluntary guidelines in the light of comments received. Through Circular State Letter C/CBD-7, FAO invited Members and observers to provide comments on the draft guidelines and, subsequently, revised the draft guidelines in the light of comments received.[27]

C. Technical support

16. Since the last session of the Commission, FAO continued to provide technical support to countries in the implementation of the Second GPA. The recently concluded Global Environment Facility (GEF)-funded project in Ecuador enabled 4160 smallholder farmers to incorporate an increased diversity of indigenous crops in their crop production systems spanning over 1790 hectares. Furthermore, a similar FAO-supported project is resulting in enhanced on-farm diversity of local crops and varieties in Panama.[28] Likewise, other GEF-supported initiatives on on-farm management of local crops and their varieties are being developed in China,[29] Cuba,[30] and Mexico.[31]

17. In four countries of Asia (Cambodia, Lao PDR, Myanmar and Nepal) and within the Zero Hunger Challenge framework,[32] national policy frameworks were assessed and incentives and disincentives for agricultural diversification and dietary diversity identified.[33] Overall, the outputs of these initiatives that are aimed at increased inter- and intra-specific on-farm diversity of crops, especially underutilized species, are contributing to the improvements of both the resilience of production systems to the effects of climate change and the nutrition of the populace.

[23] CGRFA-16/17/Report/Rev. 1, paragraph 62.
[24] FAO 2017. Voluntary Guidelines for the Conservation and Sustainable Use of Crop Wild Relatives and Wild Food Plants. FAO, Rome. Available online from: http://www.fao.org/3/a-i7788e.pdf
[25] CGRFA-16/17/Inf.19.
[26] CGRFA-16/17/Report/Rev. 1, paragraph 63.
[27] CGRFA/WG-PGR-9/Inf. 4.
[28] PAN/17/001//01/99 Asistencia Técnica orientada a la restauración de los sistemas productivos en comunidades indigenas, en el Marco del Plan de Desarrollo Integral de los Pueblos Indígenas y del Programa de Reformas del Ministerio de Gobierno.Convenio PNUD MINGOB PS 83709
[29] GCP /CPR/060/GFF On-farm Conservation and Sustainable Use of Genetic Diversity of Crops originating in China.
[30] GCP /CUB/018/GFF Introduction of new farming methods for the conservation and sustainable use of biodiversity, including plant and animal genetic resources, in production landscapes in selected areas of Cuba.
[31] GCP /MEX/306/GFF Securing the Future of Global Agriculture in the face of climate change by conserving the Genetic Diversity of the Traditional Agroecosystems of Mexico (PPG).
[32] https://www.un.org/zerohunger/
[33] TCP/RAS/3602 (16/IX/RAS/284) Creating Enabling Environments for Nutrition-Sensitive Food and Agriculture to Address Malnutrition.

18. In Somalia, through FAO's support, landraces of maize, sorghum and cowpea were purified, bulked and distributed to farmers.[34] In Uzbekistan,[35] FAO is also working to promote the use of quality seeds of alternative crops in wheat and cotton farming systems.

19. Technical support FAO provided to the Philippines has resulted in the establishment of Community Seed Banks in strategic rice production areas to ensure that farmers have access to quality seeds of the crop every planting season.[36]

IV. *EX SITU* CONSERVATION

A. Genebank Standards for Plant Genetic Resources for Food and Agriculture

20. In 2013, the Commission endorsed the *Genebank Standards for Plant Genetic Resources for Food and Agriculture*[37] (*Genebank Standards*) and requested FAO to survey their application and report on their impact, relevance and efficacy to the Working Group.[38] In 2015, at its Fifteenth Regular Session, the Commission requested FAO to continue supporting countries in the implementation of the *Genebank Standards* and to propose a mechanism to monitor their application.[39]

21. In response to the Commission's request, FAO undertook a global survey on the use of the *Genebank Standards* and organized an expert consultation in conjunction with the Global Crop Diversity Trust. The results of the survey are contained in the document *Facilitating the implementation and monitoring of the Genebank Standards*.[40]

22. The outcomes of both endeavours indicated the need for presenting the information in the Genebank Standards in a concise and user-friendly format detailing the action steps of a genebank workflow in a sequential manner. The action steps for the three germplasm conservation methods, orthodox seeds, field genebanks and *in vitro* culture, are presented in Annexes 1-3 of the document *Facilitating the implementation and monitoring of the Genebank Standards*.[41] These will form the basis for practical guides to the use of the Genebank Standards for the above conservation methods. The practical guides might also facilitate the monitoring of the implementation of the Genebank Standards. As the technologies mature and validated protocols become available, FAO may also develop additional guidance for recalcitrant seeds, cryopreservation, and DNA samples, respectively.

B. Technical support

23. FAO supported, during the reporting period, the *ex situ* conservation of grape germplasm in field genebanks in Armenia[42] and of local, well-adapted germplasm of hazelnut in Azerbaijan.[43] In the Philippines, traditional rice varieties were collected and conserved in the genebanks of the Philippine Rice Research Institute and National Plant Genetic Resources Laboratory with FAO's support.[44]

[34] OSRO/SOM/516/EC Improving the genetic quality of seeds in Somalia.
[35] TCP/UZB/3601 Demonstration of diversification and sustainable crop production intensification.
[36] GCP/PHI/062/GFF - Dynamic conservation and sustainable use of agricultural biodiversity to ensure food security and ecosystems services and resiliency
[37] http://www.fao.org/3/a-i3704e.pdf
[38] CGRFA-14/13/Report, paragraph 103.
[39] CGRFA-15/15/Report, paragraph 51.
[40] CGRFA/WG-PGR-9/18/Inf.3.
[41] CGRFA/WG-PGR-9/18/Inf.3.
[42] TCP/ARM/3503 Grape Genetic Resources Conservation and Sustainable Use in Armenia
[43] GINC/AZE/001/AZE The FAO Azerbaijan Partnership Programme
[44] GCP/PHI/062/GFF - Dynamic conservation and sustainable use of Agricultural biodiversity to ensure food security and ecosystems services and resiliency

V. SUSTAINABLE USE

24. The Commission, at its last session, requested FAO to continue supporting countries in strengthening their crop improvement and plant breeding capacities, including through multistakeholder platforms, such as the Global Partnership Initiative for Plant Breeding Capacity Building (GIPB), and the Joint Programme of FAO and the International Atomic Energy Agency (IAEA), and to report on the impact of these activities to the Working Group at its next session.[45] FAO has continued to support countries in the development and release of well-adapted crop varieties and the requisite effective seed delivery systems.

A. Review of status and trends of seed policies

25. The Commission at its last session requested FAO to support countries in the development or revision of their national seed policy and legislation, taking into account the Commission's *Voluntary Guide for National Seed Policy Formulation*.[46,47] The Commission also included as a major output in its Multi-Year Programme of Work, a review of the status and trends of seed policies.[48]

26. In response to the Commission's request, FAO supported during the reporting period Armenia, Lao PDR and Mali[49] in reviewing and updating national seed policies or seed laws.

27. FAO also prepared the *Review of the Status and Trends of Seed Policies and Seed Laws*,[50] an exploratory analysis, which is available to the Working Group. The analysis provides a global review of seed policies, laws, regulations and ancillary provisions. It assesses the extent to which seed-related legal, policy and regulatory instruments may constrain on-farm diversity of PGRFA, for example by restricting farmers' ability to sell or exchange farmers' varieties/landraces.

28. Seed policies, laws and regulations of 94 countries, the Andean Community and the European Union, as available from FAOLEX, an electronic collection of national laws, regulations and policies on food, agriculture and natural resources,[51] were examined. The review used 15 parameters that were based on the *Voluntary Guide for National Seed Policy Formulation*[52] to query the provisions of instruments for possible impacts on on-farm diversity of PGRFA.

29. The seed laws, policies and/or regulations of 45 percent of the countries studied apply to all seeds irrespective of the species, and thus regulate every commercial seed transaction, including those involving farmers' varieties/landraces. However, for 42 percent of the countries studied, seed laws, policies and/or regulations apply to certified seeds only; they do not restrict commercial transfers of seeds of farmers' varieties/landraces. It is unlikely that in these countries the seed laws, policies and/or regulations have an impact on the diversity of farmers' varieties and landraces used by farmers. They may, however, have indirect impacts by setting significant incentives for the formal seed sector.

30. Twenty-eight percent of the countries studied require registration for varieties of all crops and certification for all marketed seed. This requirement, especially if enforced by penalties, might discourage the production and dissemination of seeds and propagating materials of farmers' varieties/landraces.

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[45] CGRFA-16/17/Report/Rev. 1, paragraph 59.
[46] CGRFA-16/17/Report/Rev. 1, paragraph 60.
[47] http://www.fao.org/3/a-i4916e.pdf
[48] CGRFA/WG-PGR-9/18/Inf.7.
[49] GCP/ARM/006/EC Technical assistance to the Ministry of Agriculture of the Republic of Armenia for European Neighbourhood Partnership agriculture and rural development (FAO/ENPARD)
[50] CGRFA/WG-PGR-9/18/Inf.7
[51] FAOLEX. http://www.fao.org/faolex/en/
[52] FAO. 2015. Voluntary Guide for National Seed Policy Formulation. Available from: http://www.fao.org/3/a-i4916e.pdf

31. The findings of the study will require more in-depth analysis for valid inferences to be made. Possible areas for further analysis could include case studies. Certainly, a disaggregation of the two groups, i.e. those countries that regulate all seeds and those for which only certified seeds were regulated, is warranted. It would also be necessary to analyse the extent of the implementation of seed polices and the enforcement of the laws and regulations.

32. More importantly, the legal and policy frameworks of countries for which the registration of all crop varieties is mandatory requires detailed analysis. This is because it is unlikely that farmers and small producers are able to meet the usual requirements for crop varietal registration and release.

B. Technical seed systems support

33. Initiatives aimed at strengthening the seed delivery value chain have been implemented in 24 countries.[53] The foci of these initiatives have included: the enhanced adoption of crop varieties, including biofortified ones; community-level seed production and delivery systems; pre basic and basic seed production and supply; capacity development for seed testing laboratories; training and provision of seed processing equipment and the strengthening of seed certification systems.

34. In Botswana, Lesotho, Malawi, Mozambique, the United Republic of Tanzania and Zambia, FAO promoted increased access to quality seeds and planting materials of well-adapted varieties[54]. In the same vein, access to quality seeds of wheat in Tajikistan[55] and cowpea, maize, rice and sorghum in Somalia[56] was enhanced. In Bangladesh, the enhanced use of suitable crops and their varieties has contributed to increased homestead food production and improved nutrition in urban and peri-urban areas.[57] Two-hundred and fifty roof-top and ten school-based vegetable gardens have been established in Dhaka and Chittagong.

35. The collaborative activities with the World Food Programme (WFP) and the International Fund for Agricultural Development (IFAD) under the auspices of an European Union-funded project in Mozambique over the past four years has resulted in communities adopting 19 varieties of maize, cowpea, beans and rice – including a biofortified variety of maize and three varieties of beans.[58,59,60] Also in Africa, FAO is strengthening capacities for the production and delivery of quality rice seeds in ten African countries (Benin, Cameroon, Côte d'Ivoire, Guinea, Kenya, Mali, Nigeria, Senegal, the United Republic of Tanzania and Uganda). This initiative is being implemented under the aegis of the organization's South-South Cooperation programme, with funds provided by the government of Venezuela. The overarching goal is a strengthened rice sector in the region.[61]

36. FAO also supported the establishment of small- and medium-size seed enterprises for community-level seed delivery systems in Honduras through strengthened management skills of bean

[53] Azerbaijan, Benin, Bhutan, Cameroon, Côte d'Ivoire, the Democratic People's Republic of Korea, Ecuador, Georgia, Guinea, Guinea-Bissau, Honduras, Kenya, Mali, Mozambique, Nicaragua, Nigeria, Pakistan, Peru, Senegal, Sudan, Tajikistan, Uganda, the Gambia, and the United Republic of Tanzania.
[54] SPGRC/FAO TCP-SFS-3402 Support for the development of national capacities for conservation and sustainable utilization of plant genetic resources for food and agriculture.
[55] GCP/TAJ/010/AUS Improving access of small-scale farmers to high quality seed in Tajikistan
[56] OSRO/SOM/516/EC Improving the genetic quality of seeds in Somalia
[57] TCP/BGD/3503 Enhancing Urban Horticulture Production to Improve Food and Nutrition Security – promoting crop diversification at the roof-top gardening
[58] GCP /MOZ/111/EC National Programme on Food security - (EU-MDG Initiative - Agriculture, food security, rural development and natural resource management)
[59] GCP /MOZ/116/BEL Food Security and Nutrition Program for Gaza Province, Mozambique
[60] TCP/MOZ/3503 Capacity building and activation of the Angonia Seed Plant in the region of Tete in Northern Mozambique
[61] GCP/RAF/489/VEN Partnership for sustainable rice systems development in sub-Saharan Africa Benin, Cameroon, Côte d'Ivoire, Guinea, Kenya, Mali, Nigeria, Senegal, the United Republic of Tanzania and Uganda

seed producers and improved access to markets.[62] Similarly in Ecuador,[63] Nicaragua[64] and Peru,[65] capacities for community-level production and delivery of quality seeds in family farming production systems were strengthened. In Georgia, FAO's interventions resulted in the establishment of farmers' cooperatives[66] and strengthened national capacity for seed certification and the production of early generation seeds, i.e. breeder and foundation seeds.

37. In order to enhance the resilience of crop production systems to climate change, FAO enhanced the access of smallholder farmers in Somaliland to quality seeds of drought- and flood-tolerant varieties of crops, including sorghum, maize and sesame.[67] Similarly, in Uganda, smallholder farmers benefitted from enhanced access to quality seeds and planting materials of multiple local crops and their varieties such as deep rooting fodder crops, legumes that improve soil fertility, drought tolerant and short season varieties of root and tuber crops – as means to drought resilient crop production systems.[68] In Zimbabwe,[69] the focus was on the seed delivery systems of the drought tolerant small grains sorghum and millet and cowpeas, which additionally improved the nutritional status of the people.

C. Rehabilitation of seed systems

38. In 2016-17, FAO distributed quality seeds worth nearly USD 71 million to farmers in 92 countries as part of its emergency responses to massive crop failures that resulted from natural hazards such as hurricane Matthew in Haiti;[70] earthquakes in Nepal;[71] floods in Ghana;[72] and snow in Syria.[73]

39. In 2016-17, large-scale emergency seed interventions were implemented in response to the drought associated with El Niño. In Ethiopia the 2016 emergency seed response was the largest ever, reaching 1.5 million households with 32 000 metric tonnes of seed.[74] In Southern Africa, it reached over 320 000 households in nine different countries (Angola, Lesotho, Madagascar, Malawi, Mozambique, South Africa, Swaziland, the United Republic of Tanzania, and Zimbabwe). In South Sudan, over 500 000 livelihood kits including seeds and planting materials for staple crops and vegetables were distributed by FAO in 2017, reaching 4.6 million beneficiaries. In 2017 still, such kits were distributed

[62] MTF/HON/042/TEC Fortalecer las capacidades de gestión empresarial de las empresas, las redes regionales y la red nacional de productores/as de semillas 2. Impulsar los procesos de comercialización y producción entre las redes de productores de semilla y los diferentes canales de mercado articulados a la cadena de frijol.
[63] TCP/ECU/3502 Apoyo al fortalecimiento en los procesos de fomento de servicios especializados del Ministerio de Agricultura, Ganadería, Acuacultura y Pesca (MAGAP) en el ámbito de la innovación tecnológica y producción de semillas.
[64] GCP/SLM/001/MEX Nicaragua Desarrollo de Capacidades Técnicas para incrementar la calidad de semillas criollas y acriolladas de la agricultura familiar de Nicaragua
[65] UNJP/PER/050/UNJ Inclusión Económica y Desarrollo Sostenible de productores de Granos Andinos en zonas rurales de extrema pobreza de Ayacucho y Puno
[66] GCP/GEO/004/AUS Capacity Development of the Ministry of Agriculture of Georgia: Improved Policy Making and Effective Implementation of the Strategy for Agricultural Development (contribution to ENPARD Georgia Programme)
[67] OSRO/SOM/515/EC Reviving Spate irrigation in Somaliland
[68] GCP /UGA/044/GFF Fostering Sustainability and Resilience for Food Security in Karamoja subregion (FSP - implemented jointly with UNDP - FAO component)
[69] OSRO/ZIM/702/WFP Building resilience of smallholder farmers by increasing small grains production and productivity
[70] OSRO/HAI/701/EC Réhabilitation et diversification des moyens d'existence des ménages affectés par l'ouragan Matthew
[71] OSRO/NEP/503/NOR Emergency assistance to restore agricultural-based livelihoods of vulnerable earthquake-affected smallholder farmers in the six most affected districts in Nepal
[72] TCP/GHA/3506 Restoration of productive capacities of flood affected agricultural households in Ghana
[73] TCP/SYR/3502 Emergency assistance to restore the livelihoods of vulnerable greenhouse vegetable crop producers affected by the snow storm.
[74] http://www.fao.org/emergencies/fao-in-action/stories/stories-detail/en/c/455625/, reflecting multiple projects, including: OSRO/ETH/604/CHA; OSRO/ETH/606/NET; OSRO/ETH/607/IRE; OSRO/ETH/608/CHA ; TCP/ETH/3504

to 138 000 households in Nigeria;[75] 26 000 in the Democratic Republic of the Congo (DRC);[76] 72 000 in Central African Republic,[77] 52 000 in Syria and 16 000 in Yemen.[78] Burundi, DRC, El Salvador, Eritrea, the Gambia, Guatemala, the Niger, Peru, Somalia, Sri Lanka and Sudan were amongst the other countries assisted with recovery after El Niño.

40. War, displacement, and instability are significant drivers of food insecurity, putting populations at risk. FAO assistance also targeted displaced people as well as vulnerable populations in host communities (such as households with malnourished children under five and/or pregnant and lactating mothers).[79] The integration of former combatants through farming activities has also been promoted in the Central African Republic.[80] FAO supported countries in increasing the resilience of affected populations through rehabilitating the seed systems in Afghanistan,[81] Burundi,[82] Philippines,[83] Sudan[84] and Syria.[85]

41. An underlying principle of FAO's support to countries in the re-building of agricultural production systems post disasters and strife has been ensuring that the provision of emergency seed relief form part of the overall seed sector development in the long term. The supply of seeds and other inputs are typically accompanied with training and support to enhance farmers' capacities to adopt more climate smart agricultural production practices. As part of rehabilitation efforts, farmer groups have been supported to produce quality seeds and planting materials of adapted crop varieties. For instance, in Haiti, Artisanal Seed Production Groups were established across the country,[86] while decentralized seed production groups have been supported in South Sudan.[87]

42. FAO is increasingly adopting the use of input trade fairs (ITFs) as an alternative to seed distribution. Through ITFs, beneficiaries use the cash or vouchers provided to them through the intervention to procure their choice of seeds and planting materials from the assembled suppliers. This enhances the diversity of crops and varieties available to farmers. In 2016-17, ITFs were organized in five countries (Burundi, Central African Republic, Haiti, Malawi, and South Sudan) with farmers from 297 000 households accessing seeds worth USD 3.3 million in 2016, and USD 4 million in 2017.

43. The interventions driven by FAO also seek to use better methodologies for the assessment of seed system security as the basis for both the immediate responses and for devising the seed sector development strategies that reflect the prevailing national contexts. Over the reporting period, FAO, in collaboration with partners, carried out seed security assessments in DRC, Ethiopia, Lesotho, Nigeria,

[75] http://www.fao.org/3/I8721EN/i8721en.pdf ; projects include TCP/NIR/3602; TCP/NIR/3502; OSRO/NIR/704/BEL; OSRO/NIR/709/GER

[76] http://www.fao.org/fileadmin/user_upload/emergencies/docs/FAO%20DRC%20sit%20update_November%202017.pdf

[77] http://www.fao.org/fileadmin/user_upload/emergencies/docs/FAOCARsitupdate_October2017.pdf

[78] http://www.fao.org/emergencies/resources/documents/resources-detail/en/c/1074448/

[79] OSRO/YEM/605/CHA Integrated Food security and Nutrition sensitive response to the most vulnerable households with malnourished under five (U5) children and pregnant and lactating women (PLW) in Hodeida Governorate

[80] TCP/CAF/3603 Assistance d`urgence pour la relance d`activités agricoles des jeunes ex-combattants démobilisés

[81] OSRO/AFG/702/CHA Support conflict and natural disaster affected farming families with emergency agricultural livelihoods

[82] OSRO/BDI/502/EC Appui à l'amélioration des capacités de résilience des populations vulnérables les plus affectées par les effets de la crise multifactorielle au Burundi

[83] OSRO/PHI/701/BEL Emergency assistance in restoring food security and agricultural production in conflict-affected communities in Autonomous Region in Muslim Mindanao (ARMM), Philippines

[84] OSRO/SUD/702/USA Strengthened Food Security and Livelihoods Sector coordination and provision of humanitarian livelihood support to IDPs and vulnerable host communities in Darfur

[85] OSRO/SYR/606/CHA Emergency agriculture and food security assistance to crisis affected people in Syria

[86] OSRO/HAI/607/BEL Protection, réhabilitation et diversification des moyens d'existence des populations affectées par l'ouragan Matthew en Haïti

[87] OSRO/SSD/705/NET Improving seed production, availability and access for crisis-affected populations in South Sudan

Madagascar, Malawi, Mozambique, Swaziland, South Sudan, Zambia, and Zimbabwe with further activities planned for Sierra Leone and South Sudan.

D. Strengthening plant breeding

44. During the reporting period, FAO continued to implement several initiatives to strengthen capacities for developing well-adapted crop varieties that are most suited to local agroecologies and farming systems.

45. FAO supported the genetic improvement of berry in Moldova,[88] improved the capacities of smallholders as well as strengthened market linkages. In Mongolia, farmers' enhanced access to quality planting materials led to 36 different well-adapted varieties of apple, plum, cherry, blueberry, blackcurrant, and strawberry being introduced into cultivation.[89]

46. FAO, in collaboration with partners, especially the African Union and the African Agricultural Technology Foundation, has articulated the constraints that continue to prevent the widespread adoption of improved varieties of cassava, maize and rice and the use of their quality seeds and planting materials in sub-Saharan Africa. Based on this, a roadmap to guide FAO's crop improvement-related activities in the Regional Initiative 2: Sustainable Production Intensification and Value Chain Development in Africa under Strategic Programme 2 (RI2) is being prepared.

47. Efforts are ongoing to increase uptake of well-adapted varieties in Zambia, a country of closer observation for FAO's RI2. In this regard, FAO supports efforts to promote the availability of quality seeds of rice[90] and pigeon pea through the enhanced production of breeder and foundation seeds.

48. As contribution to crop diversification and enhanced nutrition, FAO continues to build upon the success of the International Year of Quinoa by promoting the production, evaluation, management, utilization and marketing of the crop under diverse farming systems and agroecological regions in six countries in West and Central Africa.[91] FAO promotes crop diversification in Djibouti with the introduction of cactus for human and animal consumption, while controlling soil erosion[92]. In Cabo Verde[93], improved nutrition was addressed through the introduction and multiplication of well-adapted fruits and vegetables.

49. The Joint Division of FAO and the International Atomic Energy Agency (IAEA) for Nuclear Techniques in Food and Agriculture (AGE) implemented 77 crop-improvement related TCPs in 70 countries. The outputs encompassed human capacity building, technology transfer, infrastructure upgrade and technical advice for the efficient use of mutation breeding in crop improvement. Additionally, through the Coordinated Research Projects (CRP) mechanism of the IAEA, AGE networked researchers from 44 different countries to collaborate on five crop improvement-themed collaborative projects.

50. Regarding the impacts of the activities of AGE, over the reporting period, for instance, about 4500 mutant lines with improved agronomic traits (disease resistance, heat tolerance, salinity tolerance, etc.) were developed through the TCPs and CRPs. These serve as a resource to breed new crop varieties – especially when the traits are otherwise not available in germplasm accessions accessible to plant

[88] TCP/MOL/3608 Strengthening the capacity of smallholders in berry production
[89] TCP/MON/3605 Improving Fruits and Berry Production in Mongolia
[90] TCP/ZAM/3501 Strengthening Rice Seed Production and Enhancing Extension Services to Increase Rice Production in Zambia
[91] TCP/RAF/3602 Assistance technique pour le renforcement du système alimentaire du quinoa - Phase II
[92] TCP/DJI/3503 Introduction de la culture des variétés adéquates du figuier de Barbarie (*Opuntia ficus-indica*) à Djibouti et sa gestion et production et son utilisation pour le contrôle de l`érosion des sols, et la consommation humaine et animale
[93] TCP/CVI/3603 Relance des cultures fruitières au Cabo Verde

breeders. In addition, 24 new mutant varieties were released and 55 peer-reviewed publications produced as direct outputs of AGE-supported activities.

51. Over the reporting period, 534 trainees were supported to acquire enhanced relevant skills, both at AGE's Agricultural and Biotechnology Laboratory in Seibersdorf, Austria, and at other advanced training facilities around the world. The Plant Breeding and Genetics (PBG) Subprogramme of AGE, with its associated laboratory in Seibersdorf, has developed and published three protocols on biotechnologies for plant mutation breeding,[94] provided over 100 irradiation services, and hosted 86 (out of the 534) trainees supported by the IAEA.

52. Overall, about 3 275 mutant crop varieties have been released for cultivation in different countries of the world.[95,96] A significant proportion of these crop varieties, which have added billions of dollars in additional income to their growers,[97,98] can be traced directly to the work of AGE since the establishment of this unique FAO – IAEA partnership almost 55 years ago.[99] AGE is unique in being the only unit of an intergovernmental body that supports research and development work in induced mutations – a cheap, reliable, safe and accepted method for generating heritable useful variations that are used in breeding better crop varieties.

53. The GIPB is the FAO-convened multi-stakeholder platform aimed at supporting countries in the implementation of Article 6 of the International Treaty on Plant Genetic Resources for Food and Agriculture. GIPB was initially funded by the Bill and Melinda Gates Foundation (Gates Foundation) through the Global Crop Diversity Trust-managed "Securing the Biological Basis of Agriculture and Promoting New and Fuller Use of Crop Genetic Resources" project for five years, 2007 to 2012. During this period, it *inter alia* conducted a survey and published a database of global capacity for crop improvement. It facilitated networking of plant breeders through a global directory, developed and disseminated knowledge products and conducted training programmes, including the development of an e-learning course on pre-breeding. GIPB also awarded small grants for pre-breeding activities.

54. Since the completion of the Gates Foundation-funded project, it has not been possible to secure additional extra-budgetary resources to implement the collaboratively developed Business Plan of GIPB. However, through FAO's regular budget, some skeletal activities have been implemented. For instance, the Plant Breeding Capacity Assessment Tool (PAT) for evaluating the effectiveness of plant breeding programmes has been developed. PAT will be accessible through a dedicated portal on the FAO website. FAO is also revising the format of the e-learning course on pre-breeding in order to meet the current industry standards. Both the course and PAT will be available online by the end of 2018.

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[94] Bradley J. Till, Joanna Jankowicz-Cieslak, Owen A. Huynh, Mayada M. Beshir, Robert G. Laport, Bernhard J. Hofinger (2015) Low-Cost Methods for Molecular Characterization of Mutant Plants Tissue Desiccation, DNA Extraction and Mutation Discovery: Protocols. Springer International Publishing (http://www.springer.com/gp/book/9783319162584)
Joanna Jankowicz-Cieslak, Thomas H. Tai, Jochen Kumlehn, Bradley J. Till (2016) Biotechnologies for Plant Mutation Breeding. Protocols. Springer International Publishing (http://www.springer.com/gp/book/9783319265889)
Souleymane Bado, Brian P. Forster, Abdelbagi M.A. Ghanim, Joanna Jankowicz-Cieslak, Gunter Berthold, Liu Luxiang (2016) Protocols for Pre-Field Screening of Mutants for Salt Tolerance in Rice, Wheat and Barley. Springer International Publishing (http://www.springer.com/gp/book/9783319450193).

[95] Mutant Variety Database: http://mvd.iaea.org/#!Home

[96] Maluszynski, M.; Nichterlein, K.; van Zanten, L.; Ahloowalia, B.S. Officially released mutant varieties—The FAO/IAEA database. Mutat. Breed. Rev. 2000, 12, 1–88.

[97] Ahloowalia, B.S.; Maluszynski, M.; Nichterlein, K. Global impact of mutation-derived varieties. Euphytica 2004, 135, 187–204.

[98] Kharkwal, M.C.; Shu, Q.Y. The Role of Induced Mutations in World Food Security. In Induced Plant Mutations in the Genomics Era; Shu, Q.Y., Ed.; Food and Agriculture Organization of the United Nations: Rome, Italy, 2009; pp. 33–38.

[99] Mba, C. 2013. Induced Mutations Unleash the Potentials of Plant Genetic Resources for Food and Agriculture. Agronomy 3: 200-231 (doi:10.3390/agronomy3010200).

VI. BUILDING SUSTAINABLE INSTITUTIONS AND HUMAN CAPACITIES

55. The Commission, at its last session, also requested FAO to continue strengthening national and regional PGRFA conservation networks, including through capacity-building activities and facilitating partnerships.[100] In response to this Commission's request, FAO supported the strengthening of human and institutional capacities for the conservation and sustainable use of PGRFA especially in its developing member states.

A. National strategies for PGRFA

56. Under the auspices of FAO's RI2 in Sub-Saharan Africa, the organization continues to support, *inter alia*, the strengthening of root and tuber crops' value chains in Benin, Cameroon, Côte d'Ivoire, Ghana, Malawi, Rwanda and Uganda.[101] The interventions include the use of farmer field schools to strengthen the capacities of farmers for improved cultivation and harvesting practices and facilitation of access to quality planting materials of improved varieties of cassava, yam and potatoes.

57. Efforts are also ongoing for the development of national strategies and action plans for PGRFA that will address capacity needs and link conservation to sustainable use in Angola, Mauritius, Namibia, Swaziland, South Africa and Zimbabwe.[102]

58. FAO developed a Regional Rice Strategy in the Asia Pacific Region. This provides the guidelines for member countries to review and formulate their National Rice Strategies. Through the ongoing Regional Rice Initiative, FAO has provided support for the application of environmentally friendly rice farming systems in Asia. In Bhutan, for example, the capacities of extension services personnel, technical staff and smallholder farmers have been strengthened in order to improve yield and productivity of rice in three different agro-ecological zones.[103] This work included the strengthening of seed support systems (breeder's seed, basic seed, foundation seed, certified seed and seed certification schemes) to increase the availability of quality seeds and planting materials for farmers.

59. FAO supported the building of capacity for the development of a National PGRFA Programme in Moldova in order to strengthen the linkages between the national stakeholders involved in PGRFA conservation and its sustainable use.[104] Similar initiatives are ongoing in Belarus[105] and Madagascar[106] and aim at strengthening institutional and technical capacity in PGRFA management and the upgrade of the infrastructure of the national genebanks.

60. In addition, FAO supported Uzbekistan in improving legislation and strengthening institutional capacities of the national stakeholders for variety testing, registration and protection, seed quality control

[100] CGRFA-16/17/Report/Rev. 1, paragraph 65.
[101] GCP/RAF/448/EC Strengthening linkages between small actors and buyers in the Roots and Tubers Sector in Africa.
[102] TCP/SFS/3601 (16/VI/SFS/11) Support for the development of national capacities for conservation and sustainable utilization of plant genetic resources for food and agriculture
[103] TCP/BHU/3602 Improving rice productivity in Bhutan to enhance rice self –sufficiency- importing fruit scion and rootstock cultivars
[104] TCP/MOL/3504 Support to the development of a National Programme for Plant Genetic Resources for Food and Agriculture in Moldova
[105] TCP/BYE/3601 Strengthening National PGR Program in Belarus for Conservation and Use of Plant Genetic Resources
[106] TCP/MAG/3605 RPGAA aux bénéfices des populations locales_ Stratégie Nationale RPGAA et Symposium International

and certification,[107] while Georgia[108] was supported in the establishment of a seed law and national seed certification scheme. Similarly, in Armenia, capacities were strengthened for the production of phylloxera-resistant certified grape-planting materials by supporting national certification services and capacities for producing *in vitro* planting materials.[109] FAO also supported the Dominican Republic to strengthen its capacity for producing disease-free planting materials of various crops, ranging from root crops to coffee.[110] FAO is supporting Georgia with the establishment of the first seed testing laboratory.[111]

61. Through a GEF-funded project, Sri Lanka is receiving FAO's assistance with improving regulatory, institutional and technical capacities in the effective implementation of the National Biosafety Framework according to the Cartagena Protocol on Biosafety to the Convention on Biological Diversity.[112]

62. Following the FAO International Symposium on the Role of Agricultural Biotechnologies in Sustainable Food Systems and Nutrition in 2016,[113] FAO continued to provide member countries with the platform for the exchange of knowledge and the sharing of experiences on biotechnologies. Two regional meetings, for Asia and the Pacific (RAP)[114] and sub-Sahara Africa (RAF),[115] were organized in 2017. Topics discussed, and/or for which examples of their contributions to family farming were showcased, ranged from such low-tech applications as tissue culture to the relatively high-tech use of molecular markers in germplasm characterization and plant breeding.

B. National Focal Points

63. The Commission at its Fifteenth Regular Session, invited countries that have not yet done so to nominate a National Focal Point (NFP) for reporting on the implementation of the Second GPA.[116] In response to this request, the nomination of 114 NFPs has been notified to FAO. This reflects the high level of commitment for reporting on the state of conservation and sustainable use of PGRFA. Beyond the periodic reporting on the implementation of the Second GPA and on SDG indicator 2.5.1, the NFPs play critical roles in the implementation of the Second GPA and the preparation of country reports for *The Third Report on the State of the World's Plant Genetic Resources for Food and Agriculture*.

C. World Information and Early Warning System on PGRFA

64. The Commission, at its last session, welcomed the upgrading of the computer application for the National Information Sharing Mechanisms (NISMs) and its full integration with the World Information and Early Warning System (WIEWS)[117] to facilitate reporting on the implementation of the Second GPA.[118]

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[107] TCP/UZB/3602 Support to improvement of the national seed, plant variety protection and phytosanitary legislation
[108] GCP/GEO/004/AUT Capacity Development of the Ministry of Agriculture of Georgia: Improved Policy Making and Effective Implementation of the Strategy for Agricultural Development (contribution to ENPARD Georgia Programme)
[109] TCP/ARM/3601 Development of a new certification system for grape planting materials
[110] TCP/DMI/3601 Strengthening capacity for providing plant and animal health services in Dominica
[111] GCP/GEO/001/EC ENPARD Technical Assistance - Capacity Development of the Ministry of Agriculture of Georgia
[112] GCP /SRL/066/GFF Implementation of the National Biosafety Framework in accordance with the Cartagena Protocol on Biosafety (CPB).
[113] http://www.fao.org/about/meetings/agribiotechs-symposium/en/
[114] http://www.fao.org/asiapacific/events/detail-events/en/c/1440/
[115] http://www.fao.org/africa/events/detail-events/en/c/1035227/
[116] CGRFA-15/15/Report, paragraph 18.
[117] www.fao.org/wiews
[118] CGRFA-16/17/Report/Rev. 1, paragraph 33

65. During the intersessional period, FAO actively pursued the maintenance and improvement of WIEWS. Information on progress made is provided in the document *Status of Development of the World Information and Early Warning System on Plant Genetic Resources for Food and Agriculture*.[119]

VII. GUIDANCE SOUGHT

66. The Working Group may wish to:

IN SITU *CONSERVATION AND ON-FARM MANAGEMENT OF PGRFA*

1) Review and revise, as appropriate the two concept notes on: (i) Global networking on *in situ* conservation of crop wild relatives and wild food plants; and (ii) Global networking on-farm management of farmers' varieties/landraces, taking into account the outcomes of the informal dialogue, for consideration of the Commission, at its next session.
2) Recommend that the Commission request FAO to support countries in the development or revision of their national plans for the conservation and sustainable use of crop wild relatives and wild food plants, taking into account the Commission's *Voluntary Guidelines for the Conservation and Sustainable Use of Crop Wild Relatives and Wild Food Plants*.
3) Review and revise, as appropriate, the revised draft *Voluntary Guidelines for the Conservation and Sustainable Use of Farmers' Varieties and Landraces,* for consideration by the Commission at its next session.

EX SITU *CONSERVATION*

1) Recommend that the Commission request FAO to continue providing support to countries in their efforts to maintain genebanks for the continued collecting, conservation, characterization and evaluation of crop germplasm.
2) Recommend that the Commission request FAO to prepare practical guides to the use of the Genebank Standards based on the action steps outlined in the document *Facilitating the implementation and monitoring of the Genebank Standards*, for consideration by the Working Group and the Commission, at their next sessions.

SUSTAINABLE USE

Strengthening seed systems

1) Recommend that the Commission request FAO to continue assisting countries in strengthening national seed systems for the delivery of quality seeds and planting materials, in particular to smallholder farmers.
2) Recommend that the Commission request FAO to carry out in-depth case studies of the effects of seed policies, laws and regulations on farm-diversity of PGRFA, for consideration of the Working Group and the Commission at their next sessions.
3) Recommend that the Commission request FAO to support countries in the development or revision of their national seed policy and legislation, taking into account the Commission's *Voluntary Guide for National Seed Policy Formulation*.
4) Recommend that the Commission call upon donors for support of countries, including through extrabudgetary funds, in their development and implementation of national seed policy and legislation.

Strengthening Plant Breeding

Recommend that the Commission request FAO to continue supporting countries in strengthening their crop improvement capacity, including through the GIPB platform and the Joint Programme of FAO

[119] CGRFA/WG-PGR-9/18/3

and the IAEA and, in particular, in support of the implementation of the Second GPA and Article 6 of the Treaty.

BUILDING SUSTAINABLE INSTITUTIONS AND HUMAN CAPACITIES

National Strategy for PGRFA
Recommend that the Commission call for extra-budgetary funds to support countries in the implementation of the Second GPA, including through the development and implementation of national strategies for PGRFA.