

Thematic Evaluation Series

**Evaluation of FAO's contributions to
Sustainable Development Goal 2 - "End
hunger, achieve food security and improved
nutrition and promote sustainable
agriculture"**

Protection and fair share of genetic resources for food and agriculture

Abstract

Genetic resources for food and agriculture are essential to global food production in the face of population and consumption growth and are the building blocks for developing new materials adapted to changing climates, environments and production demands. This study focuses on the links between FAO's policy work on genetic resources and its related actions at national level. It identifies some of the key opportunities and challenges to expanding and improving its genetic resources work in the context of Sustainable Development Goal 2 (SDG 2) and reviews the degree to which its work contributes to Zero Hunger. The review finds that FAO's work on genetic resources builds on its comparative advantage and mandate in data aggregation and dissemination. FAO is also well positioned as the leading institution on genetic resources for food and agriculture.

However, many less developed countries are not very involved with the Commission on Genetic Resources for Food and Agriculture and the International Treaty on Plant Genetic Resources for Food and Agriculture. It appears difficult for less developed countries to keep pace with new FAO guidelines, standards and tools. The study recommends that technical and institutional support to enhance national capacity and frameworks should be practical, with a less bureaucratic and technical approach. FAO should continue to produce its State of the World reports, ideally more frequently with data from more countries. Genetic resource support mechanisms should focus more on establishing multi-stakeholder platforms to reduce the risks associated with government transitions and priority changes, especially in developing countries.

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Abbreviations and acronyms

BSF	Benefit-sharing Fund
CBD	Convention on Biological Diversity
CGRFA	Commission on Genetic Resources for Food and Agriculture
FAO	Food and Agriculture Organization of the United Nations
GPA	Global plan of action
GRFA	Genetic resources for food and agriculture
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
NGO	Non-governmental organization
PGRFA	Plant genetic resources for food and agriculture
SDG	Sustainable Development Goal

1. Introduction

1. Genetic resources for food and agriculture (GRFA) include the plant, animal, aquatic, microbial, forest and other genetic resources of relevance to agriculture, farming and food systems. They are essential to global food production, particularly in the face of expected growth in population and consumption. GRFA are the raw materials that farmers, fishers, foresters and researchers rely on to improve the quality and amount of food produced. In addition, GRFA provide the building blocks for the development of new materials that are adapted to changing climates, environments and production demands.
2. This study is one in a series of reviews conducted as part of the Food and Agriculture Organization of the United Nations (FAO) evaluation of its work on Sustainable Development Goal 2 (SDG 2). It conducts a critical analysis of FAO's work on genetic resources to support countries in achieving the SDG 2 targets, focusing on the links between the Organization's global policy work on genetic resources and related actions at national level.
3. The study is primarily based on interviews with key stakeholders (Appendix 1) and a comprehensive document review (please see the bibliography for the list of documents reviewed). It includes reviews of real-life experiences in Africa, Asia and Latin America and three best-practice cases studies from Mexico, Bangladesh and Southern Africa/Zimbabwe.
4. In particular, the study aims to identify some of the key opportunities and challenges (both internal and external) to expanding and improving its work on genetic resources at national level in view of SDG 2. It also reviews the degree to which FAO's work on genetic resources contributes to SDG 2 and makes use of the key principles of the 2030 Agenda, in particular:
 - i. Holistic views and interconnectedness: Are the contributions narrowly sectoral or cross-sectoral, addressing synergies and tradeoffs between SDG 2 and other SDG targets?
 - ii. Social and economic inclusion to "leave no one behind": To what extent are gender and other social equity considerations, particularly in relation to indigenous peoples, mainstreamed in FAO's work on genetic resources?
 - iii. Acting at scale: Does FAO's work involve multiple stakeholders, including the private sector, to mobilize and share financial resources, knowledge, expertise and technology for development?

2. FAO's role and responsibilities

5. FAO has long been a key actor in the field of GRFA. In 1983, the Organization received a mandate "to ensure that plant genetic resources of economic and/or social interest, particularly for agriculture, will be explored, preserved, evaluated and made available for plant breeding and scientific purposes" (FAO, n.d.c.).
6. Since the creation of the Commission on Genetic Resources for Food and Agriculture (CGRFA) in 1995, FAO has hosted an intergovernmental body with a broadened mandate to "facilitate an integrated approach to agrobiodiversity and coordination with governments, which are increasingly dealing with policy issues regarding biological diversity in an integrated manner" (FAO, n.d.d.). The CGRFA is the main institutional body in FAO dealing with coordination and policy (a policy convergence function), while technical work (including networking and capacity development) is performed by relevant technical units.
7. The CGRFA has established four intergovernmental technical working groups, with representatives from different geographical regions, to assist in specific areas of genetic resources. The main purpose of these working groups is to review the status of and issues related to biodiversity in their areas of expertise, to advise and make recommendations to the Commission on those matters and to consider the progress made in implementing the Commission's programme of work.
8. FAO Members place great importance on plant genetic resources for food and agriculture (PGRFA). The FAO Conference adopted the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in 2001 and, as of today, 146 countries have ratified it. The Treaty was negotiated by the CGRFA and entered into force in 2004. It is the only legally binding international agreement that specifically deals with PGRFA. The objectives of the Treaty are the conservation and sustainable use of PGRFA and the fair and equitable sharing of their benefits, in line with the Convention on Biological Diversity (CBD), for sustainable agriculture and food security.
9. One of the key mechanisms of the ITPGRFA is its Multilateral System of Access and Benefit-sharing (MLS). More than 5 million samples of PGRFA have been exchanged through the system in its first ten years of operation, with transfers going to researchers, farmers, breeders, conservationists and educators in 181 countries. The function of the ITPGRFA Governing Body is to promote the full implementation of the Treaty with its objectives in mind. To this end, the Governing Body has established a funding strategy with a target range of USD 0.9 billion to USD 1.1 billion per year over a ten-year period through a wide range of sources and channels, with a view to a high level of implementation on all FAO PGRFA priority actions by 2030.
10. The establishment of the CGRFA and the adoption of the ITPGRFA responded to increased global attention on genetic resources in recent decades. There has been a steady increase in the CGRFA membership base since 1995, as well as in voluntary contributions to FAO's GRFA work. ITPGRFA membership has also increased rapidly since it came into force in 2004. At the same time, FAO's mandated GRFA work has increased over time to include additional State of the World reports, associated global plans of action (GPAs) and activities, and the CGRFA's growing multi-year programme of work, all of which have required more voluntary contributions. Project activities in the field are also overwhelmingly funded by

11. voluntary contributions. FAO's Technical Cooperation Programme (TCP) projects, funded from its regular budget, have primarily supported State of the World reporting and GPA activities in some countries.

2.1 State of the World reports and global plans of action

12. FAO's major global instruments covering GRFA work are its State of the World reports on GRFA (plant, animal, forest, biodiversity and aquatic genetic resources) and their associated GPAs. The reports provide a comprehensive picture of the global situation and trends in biodiversity, including genetic resources, for food and agriculture. The global assessments are undertaken by FAO through a participatory, country-driven process. They are based on national assessments of the state of genetic resources, their uses, the causes of their erosion, and the challenges and opportunities of conserving and using them in a sustainable way to contribute to food security and nutrition. Thus, they provide information on various topics for action, serving countries in setting conservation and sustainable utilization priorities at the national, regional and international level. So far, FAO has produced seven State of the World reports:
 - i. The State of the World's Plant Genetic Resources for Food and Agriculture (FAO, 1997);
 - ii. The State of the World's Animal Genetic Resources for Food and Agriculture (FAO, 2007);
 - iii. The Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture (FAO, 2009);
 - iv. The State of the World's Forest Genetic Resources (FAO, 2014);
 - v. The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture (FAO, 2015);
 - vi. The State of the World's Biodiversity for Food and Agriculture (FAO, 2019a); and
 - vii. The State of the World's Aquatic Genetic Resources for Food and Agriculture (FAO, 2019b).
13. While there was initially a large gap between the reports, including those focusing on the same topic, they have recently become more frequent. This may help to maintain momentum and institutional support at country level. The reports have been followed up with GPAs on the topics in question.
14. All State of the World reports are based on country reports (between 90 and 169 per publication). The preparation of the country reports is one of the most important steps in the process. They fill critical gaps in existing information and establish a baseline at country level. The preparatory process is considered a strategic planning exercise, as the country reports provide an overview of countries' sustainable management practices in terms of GRFA and are a tool for assessing national priorities and future needs. Thus, the country reports are seen as an opportunity to engage and stimulate the interest of a wide range of stakeholders from different sectors, including smallholders, at country level.

2.2 The country report preparation process

15. The country reports are prepared based on guidelines set out by the CGRFA. These aim to help countries assemble baseline information and highlight the importance of a collaborative process, bringing together experts (including those with experiential knowledge, such as farmers, pastoralists, forest dwellers and fisher folk) across sectors to assess the information available and analyse gaps and needs. At the same time, the guidelines are structured as a tool to guide data collection, planning and policymaking at national level. They make a distinction between

information that countries may wish to provide to support their own strategic planning and the information needed to prepare the State of the World report. Countries may wish to draw on documents prepared for the various sector State of the World reports for their cross-sectoral synthesis.

16. The CGRFA recommends that a participatory process be used to prepare country reports. Each country should appoint a national focal point to coordinate the process and act as focal point for FAO. The national focal point should organize the preparation of the first draft, which should then be reviewed by a national committee. The focal point should also facilitate a consultative process for broader stakeholder review, including various stakeholders from ministries, departments, non-governmental organizations (NGOs), research institutions and those with experiential knowledge.
17. Countries are also encouraged to establish a national committee to oversee the preparation of the country report. Because the report is cross-sectoral in nature, the committee should comprise a diversified group of stakeholders (representing government, research and civil society) from different sectors and people able to support the analysis. It is recommended that the national committee also include a gender specialist. Within the allocated preparation timeframe (usually around a year), national committees should meet frequently to review progress and consult widely with key stakeholders. They may decide to establish cross-sectoral and interdepartmental or interministerial working groups to compile data and information for specific sections of the country report, or to write specific chapters.
18. The contracting parties to the Treaty submit national reports on Treaty progress and share information and identify progress and constraints on implementation. Their reports are usually prepared by a nominated national focal point and make recommendations on capacity-building.

3. Holistic views and interconnectedness of the SDGs

19. The importance of genetic resources is directly embedded in SDG 2, and particularly SDG target 2.5, which focuses on: i) maintaining 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 level, and ii) promoting access to and the fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed.
20. FAO has been the driving force behind the development of the SDG target 2.5 indicators. For SDG indicator 2.5.1, the data for plant genetic resources are based on the country reports submitted to FAO by monitoring the implementation of the second GPA for PGRFA, which is a supporting component of the Treaty.

SDG target 2.5

21. SDG indicator 2.5.1: Number of plant and animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities
22. SDG indicator 2.5.2: Proportion of local breeds classified as being at risk of extinction
23. Genetic resources can generally be seen as accelerators of the 2030 Agenda, contributing not only to SDG 2, but also a number of other SDGs, such as SDG 1 (poverty alleviation), SDG 3 (healthy lives and wellbeing), SDG 5 (gender equality), SDG 9 (global goals), SDG 12 (sustainable consumption and production patterns), SDG 13 (climate change) and SDG 15 (life on land). In addition, the biodiscoveries arising from the work of the CGRFA and Benefit-sharing Fund (BSF), among others, typify the national and international partnerships (SDG 17) needed to promote all of the SDGs.
24. The links between FAO's work on genetic resources and SDG target 15.6 (to promote fair and equitable sharing of the benefits arising from the utilization of genetic resources) – for which the ITPGRFA Secretariat, through FAO, acts as a contributing agency – are particularly strong. The CBD Secretariat is the custodian agency for SDG indicator 15.6.1 (the number of countries that have adopted legislative, administrative and policy frameworks to ensure fair and equitable sharing of benefits). Since 2016, it has been providing information and data on this indicator of ITPGRFA implementation. The data area sourced from the reports submitted by each country on measures taken to implement their Treaty obligations.
25. The contracting parties to the Treaty are taking more and more steps to enhance sectoral synergies on national implementation. PGRFA is being mainstreamed into national planning in a crosscutting manner. A large number of the contracting parties have, in recent years, integrated PGRFA considerations into national biodiversity strategic action plans. Other countries recognize the need to incorporate more robust breeding strategies into their national strategies to combat climate change.

3.2 Social inclusion and leaving no one behind

26. Biodiversity conservation is conditional on fair and equal access to natural resources for all, as much as equality of representation enhances sustainable management of resources. The ITPGRFA makes specific contributions to supporting the livelihoods of the most vulnerable. Managing and

sustainably deploying plant genetic diversity is one of the key options available to vulnerable farmers in their efforts to increase resilience and secure their livelihoods.

27. Greater attention and support are needed if farmers are to reap the full benefits of genetic diversity. The key role of women in managing biodiversity needs to be further recognized and strengthened, too. The implementation of farmers' rights underpins national efforts to recognize the contribution of local and indigenous communities and farmers to sustainable development, as well as their specific needs. The recognition of the value of indigenous and local knowledge and practices contributes to the more comprehensive and efficient management of forests and watersheds.
28. The multilateral system offers huge opportunities to introduce greater diversity in response to the needs of vulnerable farmers. The BSF, for instance, has a strong focus on supporting vulnerable farming communities. The Nagoya Protocols focus on access to and benefit-sharing of genetic resources to support biodiversity conservation and equity by guaranteeing that the benefits yielded by using genetic resources will be shared fairly between providers, local knowledge holders and users (CBD, 2011). It also empowers indigenous communities by giving them the right to be informed and to decide on the use of natural resources on which they depend and about which they hold specific knowledge.
29. The working process within the CGRFA and the Treaty seems to be less inclusive, however, with the voices and needs of less developed, lower-capacity countries not always reflected in discussions. This seems to be the result of somewhat bureaucratic working procedures, which tend to focus on the needs of countries that already have fairly developed systems and capacities, neglecting some of the weakest countries, which often lack even basic infrastructure and capacity in this area. As a result, many countries still do not contribute to the State of the World reports (for instance, only 91 countries supplied information for The State of the World's Biodiversity for Food and Agriculture (FAO, 2019a), and these were primarily larger, more developed countries).

4. Acting at scale

30. The scaling up of FAO's work on genetic resources at national level is, to a large extent, embedded in the comprehensive processes involved in producing the global and national State of the World reports. These processes are supposed to mirror the results of the Organization's global work at country level.
31. There has been limited focus on transferring good experiences and best practices from country to country, although regional preparatory meetings and CGRFA and ITPGRFA meetings indirectly serve this purpose. There are some examples from Latin America of countries inspiring each other to develop GRFA legislation. There have also been some positive recent attempts to support parallel national PGRFA policy developments by integrating support at national level with subregional interaction.
32. While most national focal points on GRFA matters confirmed the usefulness of FAO's normative products on GRFA, as well as the State of the World country reports, in the Evaluation of FAO's work in Genetic Resources (FAO, 2016), there seems still to be a relatively large group of countries for which these normative products are less useful and, basically, too technical or advanced.
33. In many cases, national data collection processes appear to be closely linked to country reporting processes and do not often become institutionalized. The historically large gaps between the State of the World reports are a further challenge in this regard. However, as the gaps between the State of the World reports shorten and regular updates on genetic resources information are required for other international instruments and undertakings (such as the CBD and SDG target 2.5), it may be possible for more countries to develop a more permanent reporting mechanism in the future.
34. Interviews for this review revealed that many countries have struggled to institutionalize the genetic resource agenda and convert it into national policy. A main explanatory factor seems to be a lack of coordination and cooperation between ministries of agriculture and ministries of environment. Because of these inefficiencies, the process of reporting to FAO often happens in isolation from national policy processes.
35. In addition, FAO's assistance with GRFA processes at national level often tends to focus too much on technical aspects and less on supporting processes that lead to multi-stakeholder engagement. Likewise, the nature of its technical support is often short-term and insufficient to respond to countries' long-term needs and to properly develop GRFA capacity, including legislative and institutional frameworks to effectively sustain and support upscaling. Thus, many countries would like to see a different FAO supporting framework that is built on more continuous engagement on the ground, with GRFA assistance embedded in Country Programming Frameworks (CPFs) and reflected in regional programming.
36. Lastly, it should be noted that the preliminary evaluation findings on the third project cycle of the BSF showed that it facilitated multistakeholder collaboration to leverage conservation and sustainable use of PGRFA for food security in the context of climate change. Partnership is one of the best assets and possible outcomes of the BSF, and the goodwill of stakeholders in and outside projects was noteworthy.
37. In the following paragraphs, we present three examples of good practices and experiences in relation to FAO's work on genetic resources in different regions and countries.

4.1 Case study 1: Mexico

38. Mexico is a prime example of a situation in which discussions on genetic resources went from more than a decade of dynamism, with multi-stakeholder engagement and a supportive government, to far less of a national priority after a change of government.
39. The process was started back in 2000, with the first national diagnosis of the status of Mexico's genetic resources system. From 2002 to 2008, a comprehensive national plan for genetic resources was developed, including a list of 44 products in four specific focus areas. The products were selected partly based on their social value and partly with a view to their nutritional importance. National experts on each of these products were dispersed across the country, so a network was established for each product, comprising different key stakeholders and experts. A diagnosis was prepared for each product.
40. In 2008, the Centro Nacional de Recursos Genéticos (the national centre for genetic resources) was established. It was put into operation over the following four years through a lengthy, but highly participatory, process. Later in 2012, Mexico ratified the Nagoya Protocol, and 2012–2013 proved a dynamic period, in which seed banks were established (to register seed varieties and product baselines) and informal inter-institutional platforms were created, with the participation of key actors.
41. FAO's technical support was fundamental to Mexico's progress to 2013, creating momentum within the government of the time. FAO played an important role, both as a facilitator and convener of key stakeholders, as well as a provider of technical assistance.
42. Mexico's change of government in 2013, however, marked a drastic change in its prioritization of genetic resource issues. In the subsequent years, very limited progress has been made. Key members of the inter-institutional platforms formed back in 2012–2013 have continuously tried to introduce genetic resource topics into sectoral discussions (mainly in relation to the environment) and to link the issue to government priorities (such as digitalization).

4.2 Case study 2: Bangladesh

43. Bangladesh signed the ITPGRFA in 2009 and, shortly afterwards, the Ministry of Agriculture formed a committee made up of focal points from key research institutes, private seed companies and NGOs.
44. In the years that followed, a number of multi-stakeholder workshops were organized to support the committee's work to develop instruments to protect plant varieties. A large World Bank-funded intervention (the National Agricultural Technology Programme) has also supported the process. Bangladesh's well-developed and clearly set-out SDG roadmap has been another guiding tool in the process.
45. Eventually, in 2019, after a lengthy process, the government approved the Plant Variety Protection Act, which made provisions for a Plant Variety Protection Authority, currently being established.
46. FAO has been an important co-facilitator of this process in Bangladesh over the past decade, as well as a crucial convener of key stakeholders (workshops) and provider of technical assistance.

4.3 Case study 3: Southern Africa (Angola, Eswatini, Namibia and Zimbabwe)

47. This is an interesting case study, as it combines national and subregional programme interventions in 2018 and 2019. Through this intervention, national PGRFA strategies (still pending approval) were developed in parallel processes in Angola, Eswatini, Namibia and Zimbabwe through an inclusive, participatory, country-led, subregional process. In all four countries, PGRFA is now considered a national priority and receives budget support.
48. In addition to strategy development, the project has bolstered national and subregional linkages and forged a sense of ownership and commitment among key stakeholders. As an interesting side note, the project introduced and supported the development of local agroecological farming systems to demonstrate the connection to genetic resources.
49. The project was implemented and facilitated by FAO through its regional and national offices, in cooperation with the Southern African Development Community Plant Genetic Resource Centre (SPGRC), national PGRCs, government ministries, private-sector actors, NGOs, farmer organizations and groups of resource-poor farmers.

5. Conclusions and recommendations

5.1 Conclusions

Conclusion 1. Overall, FAOs work on genetic resources aligns with the principle of country-led data collection and builds on FAO's comparative advantage and mandate in data aggregation and dissemination. Thus, the reporting process and mechanism may provide inspiration for broader SDG 2 reporting practices. It also provides good opportunities for cooperation with multiple partners, including other United Nations (UN) agencies.

Conclusion 2. FAO is well positioned and has become globally accepted as the leading and coordinating institution on GRFA. Through its work of the CGRFA and the ITPGRFA, FAO has built a global network of partners, including the CBD, other UN agencies (such as UN Environment and the United Nations Educational, Scientific and Cultural Organization [UNESCO]), donors (such as Switzerland, Germany and Norway) and NGOs (such as the World Wildlife Fund and Oxfam), as well as a network of national focal points. This provides opportunities for further engagement and partnership, also at country level, to make FAO's support for national processes more effective and responsive to specific requests and needs.

Conclusion 3. According to interviews conducted for this review, a relatively large group of less developed, low-capacity countries are not very involved in discussions within the CGRFA and the ITPGRFA. Likewise, it appears difficult for a number of the less developed countries to keep pace with and implement new FAO guidelines, standards and tools. Where countries do not even have genetic banks, it makes little sense for them to think about collection issues.

Conclusion 4. The experiences of some countries have underscored the risk of progress reversing after a change of government. This underlines the importance of mobilizing and formalizing multi-stakeholder platforms to mitigate the risks of administration change. The lack of cooperation between ministries of agriculture and environment in many countries often becomes a huge challenge for GRFA processes.

Conclusion 5. The ITPGRFA's multilateral access and benefit-sharing system is not working properly, however. It has not been possible for participating countries to reach a consensus on broader access to genetic resources, the sharing of information, common benefits, etc. This raises a further challenge in terms of resource allocation to the field, as funding only comes from governments, not from users.

In view of the 2030 Agenda, the capacities of PGRFA users, especially in developing countries, will need to be strengthened to maximize the contributions of the multilateral system to sustainable development. This includes providing information on PGRFA facilitates and on users of genetic diversity. Further development of a global information system on PGRFA is, therefore, essential to support the operation of the multilateral system, as the major value of plant genetic resources is embedded in the information that is conveyed to breeders and farmers.

Conclusion 6. The State of the World reports are recognized globally for their quality and depth and they are a strong reference tool for promoting GRFA. There is significant work involved in producing the State of the World reports and the level and quality of information they include has strong potential for application at country level, too.

Conclusion 7. FAO has created a strong platform for its normative work and developed appropriate tools, guidelines and standards for the GPAs. These products, however, still need to be transformed for broader use at national level. While FAO's work to develop these tools, guidelines and standards has been within the traditional "comfort zone" of the Organization's core mandate and field of competence, not all countries have the ability and capacity to absorb and adapt these products into country-level actions. In addition, an excessively strong focus on working with government institutions may make the processes very sensitive to government changes.

Conclusion 8. GRFA is closely linked to agroecology and the landscape approach and could make more of this. It is also important to be aware of the differences between the two concepts, however, especially when analysing why different levels of effort seem to be channelled into their discussion and mobilization at national level. Based on interviews conducted for this review, many key stakeholders consider FAO's work on genetic resources to be highly scientific, bureaucratic and planning oriented, with a tendency towards a form of "controlled economy". There are legal implications to such control of genetic resources (state, corporations, other actors, etc.).

In contrast, agroecology is more of a contextualized, evolving concept that seeks transformation and re-design. In some ways, it is seen more as a development paradigm that can be linked to the SDGs, to reversing ecosystem and biodiversity decline and to combating climate change – all the things that the SDGs and humanity need to address. The appeal of agroecology is that it views sustainable food and agriculture systems as whole systems and not just parts of a system (genetic resources). This is where human understanding is headed (complexity, systems, transdisciplinary thinking) and needs to be heading to tackle these complex, interrelated problems.

Conclusion 9. FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors (2019) may present a better opportunity for bringing aspects of genetic diversity into discussions on biodiversity. Interviews with FAO representatives from the CGRFA and the ITPGRFA indicated that more countries are now showing increased engagement in the biodiversity agenda. FAO's Strategy on Mainstreaming Biodiversity across Agricultural Sectors (FAO, 2020), adopted by the Council in June 2019, is also seen as an opportunity for greater focus on this particular topic. It has required FAO to develop an action plan, including a timetable for putting the strategy into action.

Biodiversity mainstreaming has been defined as "the process of embedding biodiversity considerations into policies, strategies, and practices of key public and private actors that impact or rely on biodiversity, so that it is conserved and sustainably used both locally and globally" (Huntley & Redford, 2014). Mainstreaming biodiversity across the agricultural sectors involves prioritizing food and agricultural policies, plans, programmes, projects and investments that have a positive impact on biodiversity at the ecosystem, species and genetic levels, as well as ecosystem services that are essential to the sustainability of the agricultural sectors.

There is potential to improve funding opportunities for ITPGRFA implementation if Treaty stakeholders make the case for PGRFA at national level, as well as its intrinsic links to development challenges, such as climate change, agricultural development, environment, biodiversity and nutrition.

5.2 Recommendations

These recommendations are based on a rapid review of a large programmatic area and should be taken as suggestions for programme development.

Recommendation 1. FAO's comprehensive and thorough work to produce the State of the World reports is unparalleled and important and should be continued. The Organization should aim to reduce the length of time between reports and add data and information from more countries.

Recommendation 2. FAO's work on IPTGRFA and CGRFA should become more sensitive to differences in countries' capacities and abilities. This will require FAO to explore models that offer more differentiated support and approaches with a view to supporting less developed countries in their efforts to "catch up" with more developed countries.

Recommendation 3. FAO should have a greater focus on subregional and regional interactions and support. GRFA assistance should be coordinated better between the regional and Country Programming Frameworks and their implementation plans, and be adaptive to Treaty decisions and focus areas.

Recommendation 4. Technical and institutional support to enhance national GRFA capacity and frameworks should be practical, with more handholding and a less bureaucratic and technical approach. As the support is process-oriented and participatory, it should have a medium- to long-term perspective.

Recommendation 5. FAO's GRFA work should be linked more closely to the agroecology agenda and, in particular, FAO's food systems and landscape approach. Experiences from the field and from the literature reviewed for this study show that agroecology and genetic resources would benefit from closer connection, both at the global discussions level and on the ground.

Recommendation 6. GRFA support mechanisms should focus more on supporting the establishment of multi-stakeholder platforms, to reduce the risks associated with changes in government priorities and government transitions, especially in developing countries. GRFA is still a somewhat tentative political issue in many developing countries and there is a risk that years of progress with one administration may be partly lost or stagnate when a new government takes office.

Recommendation 7. There is need for more coordinated action to mobilize funding for national plans of action related to the State of the World reports. Currently, it is very difficult to mobilize funding for these plans and current processes are not efficient. The FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors may become an important catalyst of more strategic resource mobilization to GRFA in the future, in particular as its mainstreaming strategy includes an action plan that explicitly considers interventions on genetic resources. Likewise, climate change and resilience funds should be explored, especially in the context of the link to agroecology. Likewise, the private sector is particularly interested in research and the commercial use of GRFA.

Recommendation 8. New, innovative digital solutions provide interesting opportunities for GRFA and should be explored, including in the context of required capacities for accessing and using such systems for the conservation and sustainable use of GRFA and the sharing of benefits derived from GRFA.

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Appendix 1. People interviewed

Last name	First name	Organization/Division	Position
Batta Torheim	Svanhild Isabelle	Norwegian Ministry of Agriculture and Food	Senior Advisor National Focal Point for the ITPGRFA, Norway
Diulgheroff	Stefano	ITWG-PGRFA	Secretary FAO Coordinator of the Global Plan of Action updating process
Gonzales Santos	Rosalinda	Dirección de Recursos Fitogenéticos para la Alimentación y la Agricultura, Servicio Nacional de Inspección, Mexico	Director
Hoffmann	Irene Maria	FAO Commission on Genetic Resources for Food and Agriculture	Secretary
Idemitsu	Aya	International Treaty on Plant Genetic Resources for Food and Agriculture	Programme Officer
Koskela	Jarkko	ITWG on Forest Genetic Resources	Secretary
Kusena	Kudzai	National Genebank of Zimbabwe	Genetic Resources Manager
Leskien	Dan	Commission on Genetic Resources for Food and Agriculture	Senior Liaison Officer
Negrelly Nogueira	Renata	CGRFA	Co-Chair Permanent Representative of Brazil to FAO
Ouedraogo	Moussa		Forest, Genetic Resources Conservation, Burkina Faso
Pythoud	Francois	CGRFA	Chair Permanent Representative of Switzerland to FAO
Salam	Abdus	ITPGRFA Bangladesh Agricultural Research Council	Member Director (Planning and Evaluation) & NFP
Toledo	Alvaro	International Treaty on Plant Genetic Resources for Food and Agriculture	Deputy Secretary

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