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# COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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# REVISED DRAFT VOLUNTARY GUIDELINES FOR PREPARING A NATIONAL STRATEGY FOR FOREST GENETIC RESOURCES

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## I. INTRODUCTION

1. At its last session, the Commission on Genetic Resources for Food and Agriculture (the Commission) requested FAO to prepare draft voluntary guidelines for preparing a national strategy for forest genetic resources and taking into account existing guidelines for the preparation of national forest programmes and for the formulation of forest policy to avoid duplication of work.[1]

2. The Intergovernmental Technical Working Group on Forest Genetic Resources (the Working Group) considered the document *Draft voluntary guidelines for preparing a national strategy for forest genetic resources* at its Fifth Session in May 2018. The Working Group requested the Secretariat to invite National Focal Points on forest genetic resources, relevant regional networks and international organizations to submit comments on the draft voluntary guidelines by 31 July 2018, and consolidate them in the light of comments received, for consideration by the Commission at this session.[2] Comments and/or feedback were received from the National Focal Points in Australia, Chile, Germany, India, Madagascar, Mexico and Spain.

3. This document presents revised draft voluntary guidelines for preparing a national strategy for forest genetic resources, for consideration by the Commission.

## II. BACKGROUND

4. The revised draft voluntary guidelines aim to support countries in implementing the *Global Plan of Action for the Conservation, Sustainable Use and Development of Forest Genetic Resources* (Global Plan of Action)[3] and promote the integration of forest genetic resources into other relevant national instruments and strategies. A national strategy for forest genetic resources (national FGR strategy) is a roadmap and an action plan for the conservation, sustainable use and development of forest genetic resources at the national (or subnational) level. It should be based on the national status of forest genetic resources and their current level of management, and define targets for the conservation, sustainable use and development of these resources.

5. The national FGR strategy and its implementation should be considered as a continuous process that includes monitoring of progress against agreed targets and regular revision of the strategy (e.g. every 10 years), as needed. In addition to the targets, the national FGR strategy should identify priorities for improving the management of forest genetic resources and related actions, as well as clarify responsibilities and mobilize resources for its implementation. The revised draft voluntary guidelines explain steps that may be followed while preparing the national FGR strategy and options for integrating the national FGR strategy with other relevant national strategies.

[1] CGRFA-16/17/Report, paragraph 73.
[2] CGRFA/WG-FGR-5/18/Report, paragraph 11.
[3] http://www.fao.org/3/a-i3849e.pdf

**APPENDIX**

# REVISED DRAFT VOLUNTARY GUIDELINES FOR PREPARING A NATIONAL STRATEGY FOR FOREST GENETIC RESOURCES



Forest genetic resources (FGR) refer to the heritable materials maintained within and among tree and other woody plant species that are of actual or potential economic, environmental, scientific or societal value (FAO, 2014a). Forest trees and other woody plant species provide wood, fibre, fuel and many non-wood forest products. They also contribute to a broad range of ecosystem services and fulfil environmental functions. There are approximately 60 000 tree species in the world (Beech *et al*., 2017) but few of them have been studied in any depth for their present and future potential. Globally, around 2 400 species of trees, shrubs, palms and bamboos are actively managed for products and/or services, and more than 700 tree species are subject to tree improvement programmes (FAO, 2014a).

Forests cover nearly 4 billion hectares, equalling 30 percent of the global land area, and the area of other wooded lands accounts for an additional 1.2 billion hectares (FAO, 2016a). In 2016, global roundwood production was estimated at 3.7 billion cubic meters of which half was used for industrial purposes and the other half for woodfuel (FAO, 2016b). A large number of people rely on forests and trees outside forests to meet their needs for food, energy and shelter. It is estimated that about 2.4 billion people cook with woodfuel, and that 764 million of these people also boil their water with wood (FAO, 2016c). Forest products also make a significant contribution to the shelter of at least 1.3 billion people (FAO, 2016c). Furthermore, the collection of edible non-wood forest products supports food security and provides essential nutrients for many people. Forests and trees also contribute to sustainable development in several other ways (FAO, 2018a).

Genetic diversity ensures that trees and other woody plant species can survive, adapt and evolve under changing environmental conditions. Genetic diversity is also needed for maintaining the vitality of forests and provide resilience to pests and diseases. Furthermore, genetic diversity is the foundation of biological diversity at species and ecosystem levels. Forests are home to the vast majority of the Earth's terrestrial biodiversity and trees are the keystone species of forest ecosystems. Therefore, forest genetic resources are a corner-stone of sustainable forest management (see Box 1).

**Box 1.** The concept of sustainable forest management

In Resolution 62/98 (2007), the UN General Assembly recognized that forests and trees outside forests provide multiple economic, social and environmental benefits, and emphasized that sustainable forest management contributes significantly to sustainable development and poverty eradication. It further recognized sustainable forest management as a dynamic and evolving concept that is intended to maintain and enhance the economic, social and environmental value of all types of forests, for the benefit of present and future generations. The seven elements of sustainable forest management are 1) extent of forest resources, 2) forest biological diversity, 3) forest health and vitality, 4) productive functions of forest resources, 5) protective functions of forest resources, 6) socio-economic functions of forests, and 7) legal, policy and institutional framework.

In 2017, the United Nations (UN) General Assembly adopted the UN Strategic Plan for Forests 2017-2030 which provides a global framework for actions at all levels to sustainably manage all types of forests and trees outside forests, and to halt deforestation and forest degradation. The strategic plan includes six global forest goals and 26 associated targets to be achieved by 2030. These voluntary goals

and targets contribute to the implementation of the 2030 Agenda for Sustainable Development and the Paris Agreement of the UN Framework Convention on Climate Change (UNFCCC), as well as the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD).

Global Forest Goal 2 (*Enhance forest-based economic, social and environmental benefits, including by improving the livelihoods of forest-dependent people*) includes the conservation and sustainable use of genetic diversity of forests and trees outside of forests as one of the indicative thematic areas for action. Forest genetic resources are also highly relevant for several other thematic areas of Global Forest Goal 2, such as the contribution of forests to poverty eradication and livelihoods, forests and trees in the urban context and agroforestry. Sustainable and appropriate use of FGR is crucial for achieving Global Forest Goal 1 (*Reverse the loss of forest cover worldwide through sustainable forest management, including protection, restoration, afforestation and reforestation, and increase efforts to prevent forest degradation and contribute to the global effort of addressing climate change*), and in particular for its subgoals aiming at increasing forest area by 3 percent worldwide and maintaining or enhancing the world's forest carbon stocks.

Other Global Forest Goals are also highly relevant for FGR. Efforts made towards Global Forest Goal 4 (*Mobilize significantly* increased, *new and additional financial resources from all sources for the implementation of sustainable forest management and strengthen scientific and technical cooperation and partnerships*) help mobilizing financial resources for the conservation, use and development of FGR. Furthermore, Global Forest Goal 6 calls for enhancing "*cooperation, coordination, coherence and synergies on forest-related issues at all levels*".

**Global Plan of Action for the Conservation, Sustainable Use and Development of FGR**

The FAO Conference adopted the *Global Plan of Action for the Conservation, Sustainable Use and Development of Forest Genetic* Resources (GPA-FGR) in June 2013. It was developed based on the findings of the first-ever *State of the World's Forest Genetic Resources* (SoW-FGR-1) (FAO 2014a). Both the GPA-FGR and the SoW-FGR-1 were prepared on the request of the Commission on Genetic Resources for Food and Agriculture (CGRFA) and following recommendations by the Intergovernmental Technical Working Group on Forest Genetic Resources (ITWG-FGR). In June 2014, the FAO Committee on Forestry (COFO) also welcomed the SoW-FGR and the GPA-FGR, and acknowledged the importance of FAO's work in this area. Furthermore, in July 2018, COFO invited member countries to strengthen the implementation of the GPA-FGR as part of their efforts to mainstream biodiversity in the forest sector.

The GPA-FGR identifies a total of 27 strategic priorities for action for the conservation, sustainable use and development of FGR (FAO 2014b). Each strategic priority is assigned to international, regional or national level, depending on what level the proposed action should take place. Furthermore, the strategic priorities are grouped into the following four priority areas:

1. Improving the availability of, and access to, information on FGR;
2. Conservation of FGR (*in situ* and *ex situ*);
3. Sustainable use, development and management of FGR; and
4. Policies, institutions and capacity-building.

The GPA-FGR is voluntary and non-binding, and it should be implemented in line with national legislation and international agreements, where applicable. It is a rolling document that can be updated by the CGRFA. The relative priority of the strategic priorities and associated actions may differ significantly across different countries and regions. They are based on the assumption that countries have sovereign rights over their natural resources and that international cooperation is necessary for effective management of FGR.

Several strategic priorities of the GPA-FGR refer to national strategies on FGR. Strategic Priority 18 calls for development of national strategies for *in situ* and *ex situ* conservation of FGR and their sustainable use. Furthermore, Strategic Priority 19 urges countries to update FGR conservation and management needs and integrate them into wider policies, programmes and frameworks of action at

national, regional and global levels. Strategic Priority 20 encourages collaboration and coordination among national institutes and programmes related to FGR.

**Targets and indicators for forest genetic resources**

Targets (also called criteria or objectives) and indicators, together with goals and verifiers, have long been used for conceptualizing and evaluating the management of natural resources, including forest genetic resources (Boyle, 2000). They are interlinked and have the following hierarchy:

- Goals provide the overall justification for targets, indicators and verifiers.
- Targets make goals more meaningful and operational without being themselves direct measures for implementation.
- Indicators are based on components of natural or man-made systems that can be attributed to, or used as a proxy for, the sustainability or other aspects of these systems and their utilisation.
- Verifiers are data or information that provide means of verification. Each indicator needs one or more verifiers.

Targets and indicators for forest genetic resources have been developed and tested for over 20 years. The purpose of various indicator schemes have ranged from monitoring of genetic diversity within tree populations at the forest management unit level (e.g. Namkoong *et al*., 2002) to assessing the status and trends of forest genetic resources at the global level (e.g. Graudal *et al*., 2014). Indicators are usually developed within a conceptual framework that is based on state, pressure, benefit and response indicators (UNEP/CBD/AHTEG, 2011).

In February 2017, the CGRFA adopted targets, indicators and verifiers for forest genetic resources to be used as assessment tools for monitoring the implementation of the GPA-FGR (see Annex 1). The targets for forest genetic resources specify objectives for countries to achieve in response to the GPA-FGR and track the extent to which countries have met the objectives. The indicators measure the progress countries make against the objectives.

The targets and indicators consist of two sets. The first set of indicators tracks the policy responses of countries to the GPA-FGR, and the second one focus on the state of conservation, use and development of FGR. The targets and indicators were formulated based on the broader needs and actions identified at the level of priority areas in the GPA-FGR.

As the targets, indicators and verifiers were specifically designed for global-level assessment of the progress made in implementing the GPA-FGR, they cannot be directly used for national-level assessment of the FGR work. However, they can be easily modified to develop a basic set of targets, indicators and verifiers for monitoring the conservation, use and development of FGR at national (or subnational) level. Technical terms referred to in the targets, indicators and verifiers are explained in Annex 2.

**Why is a national (or subnational) FGR strategy needed?**

In the forest sector, it has long been recognized that a sectoral policy should contribute to the achievement of development goals of the whole society and that such a policy should not only focus on outlining the principles and objectives for the management of forest resources. Subsequently, the development and implementation of forest policy in many countries have been based on a holistic and cross-sectoral approach, and have acknowledged the importance of conserving forest genetic resources (FAO, 1987).

Since the UN Conference on Environment and Development, held in 1992, global and regional forest policy dialogues have made considerable progress in developing and promoting sustainable forest management. These efforts also produced a strategic concept, i.e. “national forest programmes” (NFPs) which covers a wide range of approaches used for forest policy formulation, planning and implementation at the national (or subnational) level. This concept involves a continuous communication and dialogue process that typically includes the following phases; 1) analysis, 2) policy formulation and planning, 3) implementation, and 4) monitoring and evaluation (FAO, 2006; 2010a; see also Figure 1). Many NFPs include a forest forum or a similar platform to provide an opportunity for all

relevant stakeholders within and outside of the forest sector to express their views on forest policy. As of 2008, 135 countries and areas had developed a forest policy and 131 had established a NFP (FAO, 2010b).

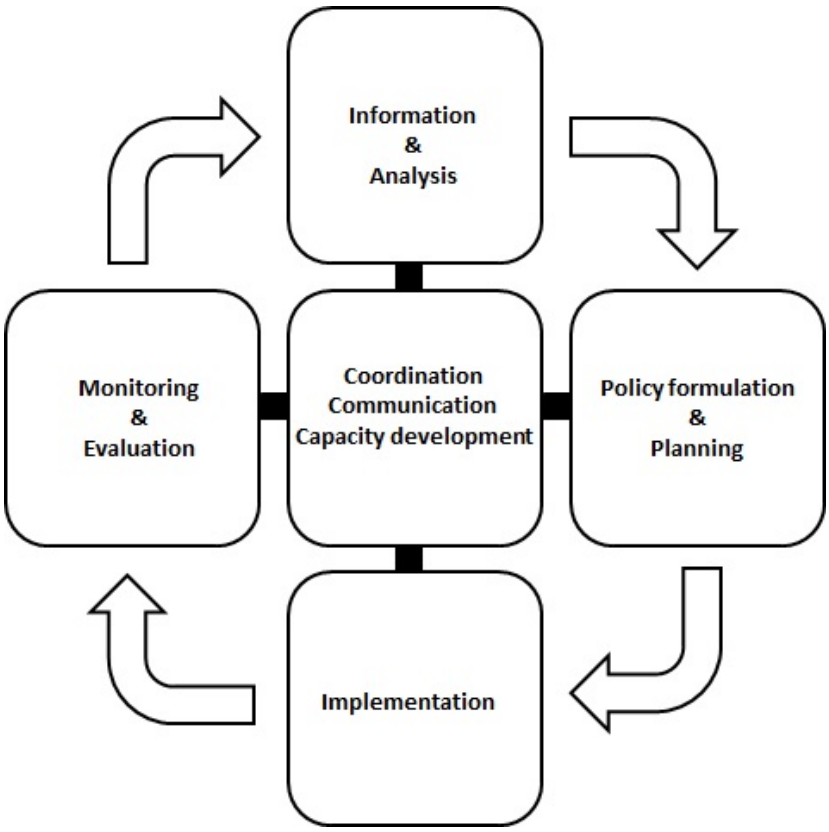


**Figure 1.** The four-stage policy development and implementation cycle (modified based on FAO, 2006; 2010a).

It is widely acknowledged that NFPs play an important role in fostering sustainable forest management and in ensuring that the forest sector contributes to sustainable development (FAO, 2012). The NFPs are sometimes mistaken for "forest policy", "forest strategy", or even "forest law". Instead, the NFP refers to a comprehensive mechanism that is used for developing forest policy, related strategies and action plans, and for facilitating and monitoring their implementation (FAO, 2010a). The difference between a forest policy and a forest strategy is explained in Box 2.

**Box 2.** What is the difference between a forest policy and a forest strategy (FAO, 2010a)?

A forest policy is typically a government document in which long-term goals and objectives for forest sector's contributions towards sustainable development are set. A forest strategy describes how these goals and objectives will be achieved. The forest strategy is supported in many countries, as appropriate, by separate forest legislation, which provides the legal framework for the implementation of the forest strategy. Action plans are then designed to operationalize the forest strategy into concrete activities.

The importance of FGR is often poorly recognized in national forest policies (FAO, 2014a). Subsequently, these resources are addressed in forest strategies to a varying degree and action plans may not include specific activities on FGR. In cases where they are considered, forest strategies and actions plans often only focus on FGR conservation and neglect activities promoting their use and development.

To address these shortcomings, it is recommended that countries analyse systematically the contributions of FGR conservation, use and development to sustainable forest management when they develop and/or revise forest policies and strategies. Based on this analysis, it is further recommended that countries prepare a specific national (or subnational) FGR strategy and also establish a national

coordination mechanism on FGR. This can be done without duplicating efforts, either as part of, or in close collaboration with, the overall forest policies and the NFPs.

A national FGR strategy is a roadmap for the conservation, sustainable use and development of FGR at national (or sub-national) level. It should build on relevant policy and institutional framework, efforts already made for conserving, using and developing FGR and the state of FGR in both natural and planted forests, as well as in agroforests and tree populations outside forests, as appropriate. The national FGR strategy should define targets for the conservation, sustainable use and development of these resources and include a specific action plan to achieve these targets.

The preparation and implementation of a national strategy should be considered as a continuous process, including monitoring of progress against the targets and revision of the strategy (e.g. every 10 years), as needed. In addition to the targets, the national strategy should identify priorities for improving the management of FGR and related actions, as well as clarify responsibilities and mobilize resources for its implementation. This cycle of a national strategy should be synchronized with the similar cycle of a national forest policy, when possible.

While the main purpose of the national strategy is to translate the GPA-FGR into concrete activities at national level, it also contributes to the UN Strategic Plan for Forests 2017-2030, the 2030 Agenda for Sustainable Development and other relevant international commitments on forests. Therefore, the national strategy should be fully in line with, and supportive to, other relevant national policies and strategies related to forests, biodiversity, climate change, bioeconomy, energy, nutrition, poverty reduction and sustainable development.

**National strategies as building blocks of regional strategies on forest genetic resources**

Several regional networks on FGR have developed, or are in the process of developing, regional strategies for the implementation of the Global Plan of Action. For example, in 2014, the Asia Pacific Forest Genetic Resources Programme (APFORGEN) developed such regional strategy by identifying the most relevant strategic priorities of the GPA-FGR for the region. In 2017, APFORGEN updated the regional strategy for 2018-2022[4] and it was welcomed by the FAO Asia-Pacific Forestry Commission in the same year. Another example is provided by the Sub-Saharan Africa Forest Genetic Resources Programme (SAFORGEN) which also identified regional priorities and developed a draft regional strategy for the implementation of the Global Plan of Action.[5]

National FGR strategies are important building blocks for the development and implementation of regional strategies for the Global Plan of Action. When countries prepare a national action plan for the conservation, sustainable use and development of FGR, they typically also need to gather more and better data and information on FGR. This facilitates the development of regional strategies on FGR as the state of FGR conservation, use and development can then be better assessed also at regional level, and the regional strategies can better reflect the needs of different countries.

Further to developing regional strategies to support the overall implementation of the Global Plan of Action, national FGR strategies also serve as building blocks for more specific actions on FGR, such as development and implementation of regional *in situ* conservation strategies (Strategic Priority 11). The work of the European Forest Genetic Resources Programme (EUFORGEN) offers an example of this kind of more specific action at regional level. In 2015, EUFORGEN finalized the pan-European conservation strategy for FGR after several years of collaborative efforts. The overall goal of the conservation strategy is to maintain both adaptive and neutral genetic diversity of forest trees across their entire distribution range by establishing a core network of conservation units for FGR (de Vries *et al*., 2015). It also sets, based on a commonly agreed approach, a minimum conservation target for each country in which a given tree species occurs.

[4] http://www.apforgen.org/
[5] https://www.bioversityinternational.org/research-portfolio/forests/saforgen/

### Purpose of the guidelines and how to use them

The purpose of these guidelines is to assist countries, especially developing countries, in preparing a national strategy for the implementation of the Global Plan of Action and to promote the integration of forest genetic resources into relevant national strategies and mechanisms, in particular forest strategies and the NFPs. The guidelines explain steps that may be followed while preparing the national FGR strategy and options for integrating the strategy with other relevant national strategies. It is recognized that countries may not manage FGR at national level but at subnational level. Therefore, countries can decide at which level they may want to apply these guidelines.

Similarly to forest policy formulation and NFPs, there is no single approach for preparing a national FGR strategy as the situations and needs differ from country to country. Therefore, the guidelines suggest steps and options, and provide checklists of questions that countries may want to consider while preparing such a strategy.

## PREPARING THE NATIONAL STRATEGY FOR FOREST GENETIC RESOURCES

### Establishment of a coordinating mechanism on FGR

National (or subnational) level coordination plays an important role not only in the preparation of a national FGR strategy but also in its implementation and monitoring. There are several options for doing this, depending on the existing mechanisms dealing with forests and how the work on genetic resources is organized at national or subnational level across the agriculture, forest, fisheries and aquaculture sectors. It is recommended that a specific mechanism is created for this purpose if such a mechanism is not in place. If a national (or subnational) coordinating mechanism on FGR already exists, it may be necessary to analyse how well it is functioning, and whether there is a need to change its institutional arrangement.

If a country has a NFP or similar arrangement in place, it is worth investigating the possibility for the NFP to assume the coordinating role, or to establish a FGR working group operating under the NFP for this purpose. This arrangement would offer several benefits. Firstly, it would provide an immediate access to most, if not all, relevant stakeholders and a channel for creating awareness on the importance of FGR as part of sustainable forest management. Secondly, as the NFP and its stakeholders have already collected data and information on forest resources and perhaps even on FGR, this would allow a head start for the preparation of a national FGR strategy. Thirdly, the alignment of the national FGR strategy with the overall forest policy and strategy is likely to be easier if the coordinating mechanism on FGR operates as part of the NFP. Fourthly, the implementation of the national FGR strategy and monitoring the progress made can create synergies and reduce costs if done as part of the NFP work cycle.

Another option for establishing a coordinating mechanism on FGR is a national commission or committee on genetic resources for food and agriculture, or a similar body on biological diversity. This option offers somewhat similar benefits than the NFP option but additionally it is more likely than the NFP option to increase cross-sectoral collaboration on genetic resources. A potential risk of this option is that the national FGR strategy is not closely aligned with the forest strategy and that extra efforts are needed to reach and engage relevant stakeholders. However, there are several countries in which a subcommittee or a working group on FGR is operating successfully under the national committee on genetic resources for food and agriculture and in close collaboration with country's NFP.

In some countries, the coordination responsibility is also given to a national FGR programme or network, which brings together a core group of national agencies and other stakeholders mandated, and possibly supported financially, by the relevant ministry to carry out specific activities on FGR. The core group typically includes forest services and other agencies or companies (public and private) involved in the selection, procurement, documentation, storage and testing of forest reproductive material, an official body responsible for approving this material for international and/or domestic trade and maintaining a registry of the material, organizations tasked to manage national FGR conservation and tree seed systems, as well as research institutes and universities that carry out relevant research and development work. Such a core group may already exists informally and granting it an official status would facilitate gathering the necessary information on FGR at national (or subnational) level as

individual members of the core group often have information, knowledge and expertise on FGR readily available in their area of work. A potential constraint is that an existing core group may be too technical and/or scientifically focused, and that it may have limited connections to other relevant stakeholders within the forest sector and beyond.

Regardless of the option selected for establishing the coordination mechanism on FGR, experiences show that it is important to ensure a wide participation of different stakeholders. They include forest owners, farmers, local communities, indigenous people, private sector, non-governmental organizations, government organizations (including state-owned enterprises), research organizations (including universities), relevant ministries and other relevant stakeholders. It is useful to map the interests of stakeholders and their activities related to FGR during a preparatory analysis. Some countries have established coordinating mechanisms through legislation while others have used other measures for this purpose. Finally, it is also important that the relationship between the coordinating mechanism on FGR and other relevant national coordination mechanisms is well-defined, and that they do not compete with each other.

**Preparatory analysis: gathering key background information**

Sound data and information on a range of topics related to forests and FGR are needed for the preparation of a national FGR strategy. This is necessary to define where the country stands in terms of FGR conservation, use and development, and what it wants to achieve and in which timeframe. Furthermore, the data and information is needed to engage all stakeholders meaningfully in discussions and consultations.

It is recommended that countries compile and review existing data and information on FGR, gather new data on FGR and conduct additional studies, as appropriate. The scale and depth of the preparatory work depends on the circumstances, human and financial resources, as well as the time available for this work. If a country has submitted reports to FAO for the SoW-FGR and/or for monitoring the implementation of the GPA-FGR, these reports offer a good starting point for the preparatory work.

The targets, indicators and verifiers for FGR, adopted by the CGRFA, provides a basic list of topics on which countries may consider gathering data and information for the preparatory analysis. At this step, countries may focus on Targets A.1-A.4 and B.4 and their indicators as they are most relevant for initiating the preparation of a national FGR strategy. Countries may consider the following questions:

- □ Has a national FGR strategy (or subnational FGR strategies) already been developed? If so, is there a need to revise it?
- □ Is there a national (or subnational) coordination mechanism(s) on FGR? If so, how well it is functioning?
- □ Who are the main stakeholders which should be involved in the preparation of a national FGR strategy?
- □ Have FGR conservation, use and development been integrated into a national (or subnational) forest policy?
- □ Have FGR conservation, use and development been integrated into a national (or subnational) biodiversity action plan(s)?
- □ Have FGR conservation, use and development been integrated into a national (or subnational) strategy (-ies) for climate change?
- □ Is there an operational national (or subnational) FGR inventory (-ies)?Is there an up-to-date national (or subnational) FGR information system(s)?
- □ Is there an operational national (or subnational) *in situ* conservation system(s) for FGR?
- □ Is there an operational national (or subnational) *ex situ* conservation system(s) for FGR?
- □ Is there an operational national (or subnational) tree seed system/programme(s)?
- □ Are there tree breeding programmes operating within the country? If so, which stakeholders are operating them?
- □ Have extension activities on FGR been carried out? If so, which stakeholders have been targeted and/or reached?
- □ Which organizations are participating in international research and development collaboration on FGR?

**Alignment of national FGR strategy with relevant national policies and strategies**

When initiating the preparation of a national FGR strategy, it is necessary to map the existing national policy and strategy "landscape" relevant for FGR. In many countries, this landscape includes a national forest policy, a national biodiversity strategy and an action plan, a national strategy for climate change and a national poverty reduction strategy, to name a few.

Such alignment is often rather straightforward in case of the national forest and biodiversity strategies but can be more challenging with other strategies. Many countries have gained valuable experiences in mapping the national policy and strategy "landscape" while they have prepared their forest strategies and these experiences should be harnessed for the preparation of a national FGR strategy. The main result that the mapping exercise should achieve is an analysis of implications of relevant national policies and strategies for the conservation, use and development of FGR, and identification of challenges and opportunities for FGR.

For the alignment of the national FGR strategy with the national adaptation strategy to climate change, there are other guidelines available providing relevant guidance and options that can also be applied for this purpose. They include the guidelines for integrating genetic diversity into national climate change adaptation planning (FAO, 2015) and for integrating climate change into national forest policy in support of sustainable forest management (FAO, 2018b).

**Assessment of the status of FGR conservation, use and development**

If available resources and time did not allow assessment of the status of FGR conservation, use and development during the preparatory analysis, it is recommended that in-depth analysis is conducted as part of the national FGR strategy preparation so that feasible and realistic targets can be formulated. In addition to assessing the current status, the analysis should identify gaps and needs for future work on FGR.

Similar to the preparatory analysis, this step can also build on the earlier reports and targets, indicators and verifiers for FGR presented in these guidelines (Annex 1). A basic assessment of the status of FGR conservation, use and development can focus on Targets B.1-B.3 and related indicators. Countries may consider the following questions during this step:

- For which species is an up-to-date national distribution range available?
- Which species have been characterized based on non-molecular information?
- Which species have been characterized based on molecular information?
- Which species have been included in *in situ* conservation system/programme(s)?
- How much of FGR are conserved in terms of *in situ* conservation units and their area, and where these units are located within the country?
- Which species have been included in *ex situ* conservation system/programme(s)?
- How much of FGR are conserved in terms of *ex situ* conservation units and their area, and *ex situ* accessions in seed and clone banks?
- Which species have been included in a national (or subnational) tree seed system/programme(s)?
- How many seed stands and seed orchards there are for these species?
- Which species have been included in tree breeding programme(s)? At which state are the breeding efforts for these species?
- Is there capacity to produce planting stock through macro and/or micropropagation? If so, for which species is this being done and how much planting stock is produced annually?
- Does the production of forest reproductive material meet the demand?

It is recommended that any additional data and information on FGR that are available are also reviewed and summarized, including results of relevant studies and research projects. Furthermore, it is recommended that countries gather more detailed level data and information on their efforts to conserve, use and develop FGR for their own planning purposes (e.g. georeferenced data on the location of *in situ* conservation units and seed stands).

**Setting national goals and targets**

Based on the mapping of the national policy "landscape" and the assessment of the status of FGR conservation, use and development, goals and targets can be formulated for the national FGR strategy. The strategy should be in line with, and supportive of, the existing national policies and their goals. Furthermore, the strategy should contribute to the implementation of the GPA-FGR, the UN Strategic Plan for Forests 2017-2030 and other international commitments on forests. The national FGR strategy should not have too many goals, and often a single high-level goal is enough to describe the purpose of the strategy. This would also facilitate communication efforts on the strategy.

The targets of the national FGR strategy should be specific and measurable, defining clearly what the strategy intends to achieve. It is recommended that one or more targets are formulated for each of the four priority areas of the GPA-FGR as this will also facilitate the preparation of country progress reports on the implementation of the GPA-FGR. The targets of the GPA-FGR may be used as a starting point for formulating the national targets that reflect country's priorities and needs.

The national targets should also take into account the aims of other relevant national strategies. For example, many countries have committed themselves to restoring large areas of forests and other wooded lands under various global and/or regional forest restoration initiatives, or to mitigating climate change with forest-based measures. The national targets concerning the use of forest genetic resources should therefore take into account the needs of the forest restoration and climate change mitigation programmes in terms of the amount and type of forest reproductive material required and species preferred. Additionally, while setting the national goals and targets, it is important to consider the expected implications of climate change for the conservation, use and development of FGR (e.g. Alfaro *et al*., 2014; FAO, 2014a; Konnert *et al*., 2015; Bouillon *et al*., 2015).

**Preparation of a national action plan**

The purpose of a national action plan is to translate the targets into concreate activities. For each target, a set of activities should be included into the action plan describing what will be done to achieve the target. Each activity should have a lead agency responsible for its implementation. Contributing agencies and stakeholders should also be listed. The action plan should also provide a timeframe, i.e. by when the activities and possible milestones along the way will be achieved. An important component of the action plan is a budget indicating the human and financial resources needed to implement the activities.

**Endorsement of the national FGR strategy**

It is essential to obtain high-level political endorsement to the national FGR strategy. Depending on the conditions and governance of a country, the endorsement could be sought from the ministry responsible for forests, or even from the government, which should also express a political commitment for the implementation of the strategy. This is also necessary for other relevant national strategies to take note of the national FGR strategy as this will create awareness on the importance of FGR among policymakers. Before the national FGR strategy is finalized, all relevant stakeholders should also have expressed their commitment to the strategy as this is often a requirement for obtaining the political endorsement.

**Communication and capacity development**

Throughout the different steps of the strategy preparation process, it is important to invest in communication and capacity development efforts on FGR. Communication and capacity development should also be considered as core functions of the process together with the national coordination mechanism on FGR. It is crucial to keep in mind that if the national FGR strategy and action plan are not well known or understood, and if there is no capacity to implement them, they have no impact.

Communication and outreach efforts should be targeted to all stakeholders and the public. It also important to create opportunities and mechanisms for two-way communication especially for stakeholders to allow dialogue. NFPs often have such a mechanism in place as effective communication can promote an open and inclusive national dialogue on forests, manage expectations, promote transparency, and create and maintain momentum (FAO, 2010b). There are many ways to communicate

with and involve stakeholders and the wider public, including meetings (from national to local level), publications, press releases, websites, videos, radio, social media and television. Communication campaigns directed at different target audiences are also an effective way but they often require substantial human and financial resources. Concerning content, the communication efforts should be tailored for specific target groups, provide key messages and evidence, and explain options based the information on FGR gathered and analysed during the strategy preparation process.

Capacity development on FGR should aim at increasing the skills, knowledge and expertise of different stakeholders and the country as a whole. This requires more time and more substantial resources than communication efforts. Capacity building efforts should not only clarify the aims and steps of the strategy preparation process but also to improve understanding of the concepts related to the conservation, use and development of FGR. All stakeholders (both individual and organizational levels) may not have adequate capacity to participate meaningfully in the strategy preparation process, as well as in its implementation. Therefore, capacity-development needs should be identified and addressed during each step of the process.

Publications and other training materials on FGR are readily available for capacity development efforts. These includes practical guides for the management of FGR (e.g. FAO, DFSC, IPGRI, 2001; FAO, FLD, IPGRI, 2004a; FAO, FLD, IPGRI, 2004b) and various textbooks on FGR (e.g. Young *et al*., 2000; Finkeldey, 2005; Geburek and Turok, 2005; Eriksson *et al*., 2006). Training materials on FGR are also available online (e.g. FAO and FLD, 2005; Boshier *et al*., 2014). Furthermore, technical guides have been developed for more specific topics, such as handling of forest seed (FAO and DFSC, 1985; Schmidt, 2000) and operating a nursery for producing seedlings (Wilkinson *et al*., 2014). FAO's Sustainable Forest Management Toolbox[6] and Climate-smart Agriculture Sourcebook[7] also include modules on FGR. In addition to short-term training events and self-learning, these materials can also be used for forestry education.

In many countries, the management of FGR is not adequately included in curricula offered by forestry colleges and universities (e.g. Rudebjer *et al*., 2008). Therefore, challenges and opportunities for enhancing the knowledge, skills and expertise on FGR as part of forestry education and research in a country should be mapped during the strategy preparation process. There are also guides available for curricula development that can be applied for FGR-related education and learning (e.g. Rudebjer *et a*l., 2011).

## IMPLEMENTING THE NATIONAL STRATEGY FOR FOREST GENETIC RESOURCES

### Mobilizing resources

The implementation of the national FGR strategy will undoubtedly require additional financial resources and strengthening of institutional and human capacities, particularly in developing countries. In order to acquire adequate financial resources, it is often necessary to secure funding from different sources based on well-developed proposals including a realistic and detailed budget which is a basic requirement for resource mobilization.

As a first step, the level of in-kind contributions by various stakeholders and the agencies responsible for different activities should be analysed to determine available resources. Secondly, the possibility of allocating domestic financial resources for the implementation of the strategy should be explored. These steps will be useful for discussions with potential external donors and multilateral financing mechanisms which often require some level of co-funding from a recipient country and/or the agencies implementing the supported activities.

Several countries have prepared, or are preparing, a national forest financing strategy to mobilize resources for sustainable forest management. The preparation of these financing strategies has been

[6] http://www.fao.org/sustainable-forest-management/toolbox/modules/en/
[7] http://www.fao.org/climate-smart-agriculture-sourcebook/production-resources/module-b8-genetic-resources/b8-overview/en/

promoted and supported by the Global Forest Financing Facilitation Network (GFFFN)[8]which was stablished the United Nations Forum on Forests in 2015 for increasing access to financial, technical and scientific resources to implement sustainable forest management. When countries prepare or revise national forest financing strategies, it is necessary that they recognize the resources needed to implement the national FGR strategies.

At its Seventeenth Regular Session in 2019, the CGRFA will consider an information document on main forest-related financing mechanism[9] and an updated draft funding strategy for the implementation of the GPA-FGR[10]. These documents present more detailed information on opportunities for mobilizing financial resources from multilateral financing mechanisms and external donors for the implementation of the national FGR strategies.

**The role of national forest programmes and other relevant national mechanisms**

It is recommended that national FGR strategies and action plans be implemented in close coordination and collaboration with the NFPs and other relevant national mechanisms. This would allow continuing the interactions that were initiated during the preparation of the national FGR strategy. Furthermore, the continued collaboration with NFPs and other relevant national mechanisms would allow learning from their previous experiences during the implementation phases and staying updated on changes and developments in the other relevant national policies and strategies.

**Monitoring and evaluation**

Monitoring and evaluation is an essential part of any strategy implementation as it allows early detection of problems and possibilities for making adjustments to the action plan. At minimum, all stakeholders should meet annually or bi-annually, and agencies responsible for different activities should present their reports on progress made and resources used. This is necessary not only for monitoring purposes but also for maintaining stakeholders' commitment and for sharing information and knowledge.

In addition to the stakeholder meetings, it is recommended that a separate monitoring and evaluation plan is prepared. It could include a mid-term and an end-of-cycle evaluation, and describe which indicators will be used for each target, and what data and information will be used as verifiers. Data and information collected during the preparatory analysis can be used as a baseline against which the progress made can be measured.

## CONCLUDING REMARKS

It has been pointed out that a forest policy is a policy for people and society, not for the forestry administration (FAO, 2010a). The same holds true for a national FGR strategy. It should explain to the whole society, not to experts or scientists, what needs to be done, and why, to manage FGR, and how these resources contribute to sustainable forest management, biodiversity conservation, climate change adaptation and sustainable development in general.

During the past three decades, countries have been urged to prepare national policies and strategies following global agreements and instruments on the above-mentioned topics. Many countries have made progress in implementing sustainable forest management and conserving biodiversity but these efforts have often neglected the importance of FGR. The reasons for this are probably perceptions that FGR are complex as a subject, and that they are difficult to measure and value. Another likely reason is that gathering even basic information on FGR means a lot of work for many countries with hundreds, or even thousands, of tree and other woody plant species. While it is true that the conservation, use and development of FGR involve challenges, this does not mean that these efforts are impossible to carry out. In case the number of species is an issue, it is recommended to initiate the work by focusing on

[8] http://www.un.org/esa/forests/forum/capacity-development/forest-financing/index.html
[9] CGRFA-17/19/10.2/Inf.2
[10] CGRFA-17/19/10.2/Inf.4

selected and/or most important species to balance the work load with available human and financial resources, and cover more species later.

International efforts to improve the management of FGR were initiated 50 years ago (Palmberg-Lerche, 2007) and a first proposal for an action plan on FGR was already outlined in 1975 (FAO, 1975). The GPA-FGR has now renewed the momentum by providing a global framework to continue these efforts. It is hoped that these voluntary guidelines encourage countries to seize the momentum and prepare national (or subnational) FGR strategies for translating the globally-agreed strategic priorities on FGR into concrete activities.

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## ANNEXES

### Annex 1. Targets, indicators and verifiers for forest genetic resources.

| **Policy responses of countries to the Global Plan of Action for the Conservation, Sustainable Use and Development of FGR** | | |
|---|---|---|
| **Target A.1:** Availability of data and information on FGR is increased | **Indicator A.1.1:** Extent of national FGR inventories or similar arrangements | **Verifier A.1.1.1:** Number and list of countries with operational national FGR inventories or similar arrangements |
| | **Indicator A.1.2:** Extent of up-to-date national FGR information systems | **Verifier A.1.2.1:** Number and list of countries with up-to-date national FGR information system(s) or other similar arrangements |
| **Target A.2:** National *in situ* and *ex situ* systems for FGR conservation are strengthened | **Indicator A.2.1:** Extent of national *in situ* conservation systems | **Verifier A.2.1.1:** Number and list of countries with operational national *in situ* conservation systems |
| | **Indicator A.2.2:**Extent of national *ex situ* conservation systems | **Verifier A.2.2.1:** Number and list of countries with operational national *ex situ* conservation systems |
| **Target A.3:** Tree seed and breeding programmes, as well as extension efforts on FGR use, are reinforced, including for conservation collections | **Indicator A.3.1:** Extent of national tree seed programmes | **Verifier A.3.1.1:** Number and list of countries with operational national tree seed programmes or similar arrangements |
| | **Indicator A.3.2:** Extent of tree breeding programmes | **Verifier A.3.2.1:** Number and list of countries with operational tree breeding programmes |
| | **Indicator A.3.3:** Extent of extension efforts promoting appropriate use of FGR | **Verifier A.3.3.1:** Number and list of countries with ongoing extension programmes or activities on FGR use |
| **Target A.4:** National coordination mechanisms on FGR are created, and national strategies for FGR conservation and use are developed and implemented | **Indicator A.4.1:** Extent of national coordination mechanisms on FGR | **Verifier A.4.1.1:** Number and list of countries with national coordination mechanisms on FGR |
| | **Indicator A.4.2:** Extent of national strategies for FGR conservation and use | **Verifier A.4.2.1:** Number and list of countries implementing national strategies for FGR conservation and use |
| | **Indicator A.4.3:** Extent to which national strategies contribute to the implementation of regional or subregional FGR conservation strategies | **Verifier A.4.3.1:** Number and list of countries whose national strategy contributes to the implementation of regional or subregional FGR conservation strategy |

| **State of conservation, use and development of FGR** | | |
|---|---|---|
| **Target B.1:** FGR are regularly assessed and characterized | **Indicator B.1.1:** Assessment of FGR | **Verifier B.1.1.1:** Number and list of species for which an up to date national distribution range is available |
| | **Indicator B.1.2:** Characterization of FGR | **Verifier B.1.2.1:** Number and list of species that have been characterized based on non-molecular information (e.g. provenance trials, ecological or climatic zonation)<br><br>**Verifier B.1.2.2:** Number and list of species that have been characterized based on molecular information (e.g. range-wide sampling of populations for molecular marker studies) |
| **Target B.2:** FGR are conserved *in situ*, and complementary *ex situ* measures have been implemented | **Indicator B.2.1:** Amount of FGR conserved *in situ* | **Verifier B.2.1.1:** Number and list of species included in *in situ* conservation programmes<br><br>**Verifier B.2.1.2:** Number of *in situ* conservation units by species<br><br>**Verifier B.2.1.3:** Area (ha) designated and managed for *in situ* conservation by species |
| | **Indicator B.2.2:** Amount of FGR conserved *ex situ* | **Verifier B.2.2.1:** Number and list of species included in *ex situ* conservation programmes<br><br>**Verifier B.2.2.2:** Number of *ex situ* conservation units by species<br><br>**Verifier B.2.2.3:** Area (ha) designated and managed for *ex situ* conservation by species<br><br>**Verifier B.2.2.4:** Number of *ex situ* accessions (in seed and clone banks) by species |
| **Target B.3:** Use and development of FGR are enhanced | **Indicator B.3.1:** Species included in tree seed and breeding programmes (including international breeding cooperation and efforts carried out by the private sector) | **Verifier B.3.1.1:** Number and list of species included in national tree seed programmes<br><br>**Verifier B.3.1.2:** Number and list of species included in tree breeding programmes |
| | **Indicator B.3.2:** Production of forest reproductive material | **Verifier B.3.2.1:** Area (ha) and number of seed stands by species<br><br>**Verifier B.3.2.2:** Area (ha) and number of seed orchards by species<br><br>**Verifier B.3.2.3:** Amount (average number per year) of planting stock produced through macro and micropropagation by species |
| | **Indicator B.3.3:** State of tree breeding programmes | **Verifier B.3.3.1:** Testing and selection cycle (by generation number) by species |
| **Target B.4:** Policies and capacities supporting FGR conservation and | **Indicator B.4.1:** Integration of FGR conservation and use into relevant national policies | **Verifier B.4.1.1:** Number of countries that have integrated FGR conservation and use into their national forest programme and/or national forest policy |

| | | |
|---|---|---|
| sustainable use are strengthened | | **Verifier B.4.1.2:** Number of countries that have integrated FGR conservation and use into their national biodiversity action plans and/or related policies<br><br>**Verifier B.4.1.3:** Number of countries that have integrated FGR conservation and use into their national adaptation strategies for climate change |
| | **Indicator B.4.2:** Participation in regional/subregional collaboration on FGR | **Verifier B.4.2.1:** Number of countries participating in regional/subregional networks on FGR |
| | **Indicator B.4.3:** Participation in international research and development cooperation on FGR | **Verifier B.4.3.1:** Number of countries and national organizations participating in international R&D cooperation on FGR |

**Annex 2. Glossary of technical terms referred to in the targets, indicators and verifiers for forest genetic resources.**

**Characterization based on non-molecular information** refers to the description and evaluation of forest genetic resources (FGR) based on information obtained from field observations, provenance trials or ecological/climatic zonation of species' distribution range within a country, for example. The characterization of FGR is typically done at the level of populations or provenances. In general, genetic resources are characterized based on traits that are usually heritable, easy to observe by the eye and expressed across different environments.

**Characterization based on molecular information** refers to the description and evaluation of FGR based on information obtained through molecular markers and/or genomic approaches.

**Designated** means that an area has been assigned to *in situ* and/or *ex situ* conservation of FGR by law or other arrangement, depending on how a country (or state) has organized its work on FGR.

***Ex situ* accession** refers to a sample of FGR stored in a seed bank or a genotype held in a clonal collection.

***Ex situ* conservation of FGR** refers to the conservation of genetic resources of trees and other woody plant species outside their natural habitats.

***Ex situ* conservation unit** refers to a range of *ex situ* genetic conservation areas of forest trees and other woody plants species (e.g. *ex situ* conservation stands, provenance and progeny trials, and breeding populations).

**Extension programmes or activities** refers to training and communication efforts targeted to users of FGR (farmers, local communities, forest owners, etc.) with an aim to help them enhance their use of FGR to derive economic and other benefits. Extension activities may include short-term training courses and workshops, field trips, exhibitions, media campaigns and dissemination of information through leaflets, posters and guidelines, or even development of online tools.

**Forest genetic resources** (FGR) refers to the heritable materials maintained within and among tree and other woody plant species that are of actual or potential economic, environmental, scientific or societal value.

**Forest reproductive material** refers to any plant tissue that is created by sexual or asexual means (e.g. seeds, pollen and cuttings) and used for the production of new trees or other woody species.

***In situ* conservation of FGR** refers to the maintenance of viable populations of trees and other woody plant species in their natural surroundings, or within the environment to which they are assumed to be adapted.

***In situ* conservation unit** refers to a range of *in situ* genetic conservation areas of forest trees and other woody plants species (e.g. gene reserve forests, genetic conservation units or stands, gene management units or zones, and evolutionary conservation units or stands). Such units can be located in both natural and planted forests.

**International research and development cooperation** refers to global, regional and subregional research projects (or project proposals), tree breeding programmes and other R&D efforts.

**Macropropagation** refers to vegetative propagation of planting stock from cuttings, grafting or air-layering.

**Microprogation** refers to vegetative propagation of planting stock by *in vitro* technology producing plantlets, micropropagules or somatic embryos.

**National adaptation strategy for climate change** refers to a national adaptation strategy, action plan and/or programme(s) for climate change.

**National biodiversity action plan** refers to a national strategy, action plan and/or programme(s) for the conservation and sustainable use of biological diversity.

**National distribution range of a species** refers to area(s) within a country where a species is growing naturally, and where it might have been introduced.

**National forest programme** refers to a wide range of approaches that are used to develop and/or revise forest policy and related strategy (or strategies) at the national or sub-national levels, and to facilitate their implementation.

**National forest policy** is typically a government document that presents a vision or goals on forests (and trees) and their use shared by government and other stakeholders.

**National (or subnational) coordination mechanism on FGR** refers to a range of approaches that are used to coordinate the work on FGR at national or subnational levels. Various stakeholders (e.g. farmers, forest owners, the private sector, non-governmental organizations, research organizations and relevant ministries) are typically represented in such a national coordination mechanism. Examples of national coordination mechanisms include national (or subnational) FGR programmes and national (or subnational) committees or working groups on FGR.

**National (or subnational) *ex situ* conservation programme (or system) for FGR** refers to an *ex situ* conservation programme of FGR that is undertaken and coordinated by a designated national (or subnational) agency working in collaboration with various stakeholders. An *ex situ* conservation programme is often based on a combination of *ex situ* conservation stands, field collections (e.g. clonal archives and stool beds) and storage facilities for seed, pollen or other tissue.

**National (or subnational) FGR information system** refers to a database (or databases) and other electronic documentation systems (offline or online) that is used by a national FGR inventory to gather, store and/or make available the data and information on FGR. A national FGR information system is up-to-date when the data and information are updated periodically (e.g. annually) or whenever new data and information have become available.

**National (or subnational) FGR inventory(-ies)** refers to a mechanism that gathers data and information, often from several data-providers within a country, on areas and facilities managed for the conservation of FGR and the production of forest reproductive material, as well as related research and development (R&D) efforts, for example. A national (or subnational) FGR inventory is operational when the collection of data and information is repeated frequently, and when the data and information are processed, stored and made available to support policy-making, management of FGR and R&D efforts.

**National (or subnational) *in situ* conservation programme (or system) for FGR** refers to a long-term *in situ* conservation programme of FGR that is undertaken and coordinated by a designated national (or subnational) agency working in collaboration with various stakeholders. Typically, the main aim of such a conservation programme is to establish and maintain a network of *in situ* conservation units for FGR in a country (or state).

**National (or subnational) strategy(-ies) for FGR conservation and use** presents the country's (or its states') vision and goals for the conservation and use of FGR, and describes how it intends to achieve these goals. A national (or subnational) strategy for FGR conservation and use typically reflects both binding (e.g. the Convention on Biological Diversity) and non-binding (e.g. the Global Plan of Action for the Conservation, Sustainable Use and Development of Forest Genetic Resources) international commitments made by the country.

**National (or subnational) tree seed programme** refers to a mechanism (or mechanisms) that oversees and/or coordinates the selection, procurement, documentation, storage and testing of forest reproductive material at national or sub-national levels. Such a mechanism typically brings together an official body responsible for approving basic material and maintaining a national or subnational register of this material, as well as other stakeholders (public and private) involved in the selection, procurement, storage and testing of forest productive material.

**Operational** means that a programme and/or activities are being implemented, and that relevant stakeholders provide inputs and/or meet regularly.

**Regional or subregional FGR conservation strategy** refers to a vision and goals for the conservation of FGR that a group of countries may have agreed in the context of regional or subregional networks or other collaboration platforms on FGR.

**Regional or subregional network on FGR** refers to a regional or subregional network, programme or working group that promote international collaboration on forest genetic resources.

**Seed stand** refers to a delineated population of trees or other woody plant species that is identified and registered by a relevant national (or subnational) authority for producing forest reproductive material.

**Seed orchards** refers to a plantation of selected individuals of trees or other woody plant species (identified by clone, family or provenance) that is specifically managed for seed production.

**Tree breeding programme** refers to systematic efforts based on the application of genetic principles and practices to develop improved trees. Tree breeding programmes may be public, private or private–public partnerships, and they may operate at sub-national, national, regional or global scales.