



FAO Global Conference on Green Development of Seed Industries, 4-5 November 2021

Frequently Asked Questions¹

1. Why is FAO holding the conference now?

In 2019, about two billion people lacked regular access to safe, nutritious and sufficient food. This situation underscores a worsening trend of food insecurity and malnutrition which is mostly manifested in the Least Developed Countries and in the Small Island Developing States. The world is not on track to achieve the Sustainable Development Goals (SDGs) by 2030, in particular SDG 2 to ‘End hunger, achieve food security and improved nutrition and promote sustainable agriculture’. In addition, the expected 50 percent increase in food production needed to feed an ever-growing global population by 2050 may now be an underestimate, as the COVID-19 pandemic has increased food insecurity and malnutrition.

FAO seeks to reverse these trends through its new [Strategic Framework](#) – a ten-year plan of action for the Organization. It aligns FAO’s overall work to the attainment of the SDGs and is built around the four main aspirations of better production, better nutrition, a better environment and a better life. Crop production systems that “produce more with less” are critically important to achieving these “Four Betters”. To make this possible, farmers need access to quality seeds and planting materials of the productive, nutritious and resilient crop varieties that are most suited to their production systems.

Over 80 percent of our food is plant-based and, without good seeds, there can be no good crops. It is imperative, therefore, that the low adoption rates of improved crop varieties and the limited use of quality seeds and planting materials in many parts of the world must be enhanced significantly. In particular, the current cultivars will have to be replaced by more intra- and inter-specific diverse ones which are productive, nutritious, stress tolerant and input use-efficient and, complemented by the requisite agronomics, will produce higher yields with fewer external inputs and a reduced environmental footprint.

While the pressures on the global food system are so enormous that they could derail the achievement of SDG 2, there are also significant advances in the science and technology of plant breeding and seed delivery systems that could mitigate them. However, they are not used in the food insecure countries that are the main focus of FAO’s work. The conference is a means for FAO to provide a neutral forum for its members, partners, industry leaders, opinion leaders and other stakeholders to engage in focused dialogues on how best to make quality seeds of preferred productive, nutritious and resilient crop varieties available to farmers, especially in food insecure parts of the world.

2. What are the objectives of the conference?

The conference’s objectives are to:

- Increase awareness of the contributions of the seed industry to green innovation of plant production;
- Promote cooperation between sectors, especially for public-private partnerships;
- Foster priority setting and the targeted mobilization and pooling of scientific, technical and financial resources for strengthened seed systems; and
- Debate evidence and share updated knowledge about green development of the seed industry.

¹ Prepared 1 September 2021

3. How will the conference programme be organised?

The conference will consist of a plenary session with keynote speakers, a series of parallel sessions and a high-level ministerial segment. The conference programme will be structured around the following five themes:

- Advanced technologies;
- Crop varietal development and adoption;
- Conservation of plant genetic resources for food and agriculture;
- Seed systems; and
- Policy and governance.

The over-arching theme of policy and governance will be embedded into the two sessions dedicated to each of the other four themes.

The organization of the conference is facilitated by a [Steering Committee](#), chaired by Ms Beth Bechdol, FAO Deputy Director-General, which provides FAO with strategic advice on the organization of the Conference and a [Scientific Advisory Panel](#), chaired by Ms Ismahane Elouafi, the FAO Chief Scientist, which provides advice on the conference programme.

4. What outputs are expected from the conference?

- Identification of priority intervention areas where key stakeholders, including FAO, can support countries to strengthen their seed systems;
- Identification of potential actions and strategies that will best enable countries to assist their farmers, especially in food insecure regions, to increase their access to quality seeds of preferred productive, nutritious and resilient crop varieties;
- Increased recognition of FAO as a trusted convener of evidence-based discourse on the green development of seed industries;
- Proceedings of the conference, including a compilation of key presentations, other information materials and a synthesis of the state of innovations that enable the green development of the seed industry.

5. Will the conference be held virtually?

Yes, the conference will be held virtually.

6. Who can participate in the conference?

The conference is open to everyone to attend through the virtual platform. Instructions for registering will be provided at a later date.

7. What do we mean by green development?

By green development, we mean development that is more sustainable, environmentally friendly and that uses natural resources wisely. In the context of crop production systems, the concept of “producing more with less” is central to green development. This means being able to produce more food, of higher nutritious content, using fewer inputs, such as water, land, fertilizers, pesticides and/or fossil fuels. It also connotes the optimization of productivity and nutritional attributes of crops and the concomitant minimization of the environmental footprints of their production systems.

8. How are seed systems organised/structured?

Seed systems involve multiple organisations and agencies in the public and private sectors which are involved in the development of improved crop varieties and the production and marketing of their quality seeds and planting materials. A continuum of interconnected activities enables farmers to access quality propagules of well-adapted crop varieties. These include, principally, the breeding of new crop varieties and the multiplication of their seeds to produce sufficient quantities for farmers’ needs. Subsequently, these seeds are processed, possibly treated, packaged and then marketed.

Crop breeding and other related research endeavours result in the continuous development of progressively superior new crop varieties. The well-characterized and documented plant genetic resources for food and agriculture which are safeguarded in *ex situ* genebanks and *in situ*, i.e. in nature and/or maintained on-farm, serve as reservoirs of the traits which are used for breeding the new crop varieties. Though some organisations span more than one activity (for example, breeding and seed production), often activities are undertaken by different organisations in the public or private sector.

Countries designate competent authorities to monitor and enforce seed production and quality standards, particularly in relation to releasing and registering crop varieties, and in assuring the quality of seeds that are produced and marketed. These authorities can be in the public or private sectors. The authorities, along with the seeds covered by the regulatory instruments, and the organisations involved in their breeding, production, marketing and distribution are referred to as the “formal seed system”.

Farmers’ or “informal seed systems” refer to situations in which regulatory frameworks are not used or followed and a competent seed authority does not provide regulatory oversight during the process of seed production or marketing. In these informal systems, seeds are produced, multiplied, sold, exchanged or otherwise distributed by organisations or individuals who are not registered or inspected by a competent seed authority. Crop varieties in informal seed systems may have been originally developed and released within the formal system or have arisen through selection by farmers or via natural selection. There can be many types of interactions and linkages between formal and informal seed systems, arising through their own accord or fostered through coordinated activities. The co-existence of these different mechanisms is often referred to as “Integrated seed systems”.

9. How important are seeds for smallholder farmers in developing countries?

Seeds are *the* essential input for farming. All farmers need access to quality seeds and planting materials of their preferred productive, nutritious and well-adapted crop varieties in order to have the desired returns on their investments. The seed lots of quality seeds meet set minimum standards for trueness to type; contamination with debris and seeds of other crops, varieties or weeds germination percentage; vigour; appearance; physiological and physical state of the seeds and freedom from diseases and pests. Quality seeds are the means for translating the potentials that have been bred into improved crop varieties into the expected performance on farmers’ fields, such as yield and resistance to stressors and, in the final products, such as nutritional and culinary quality attributes.

In spite of the above obvious advantages which quality seeds confer on crop production systems, many smallholder farmers, especially in developing countries, do not have optimal access to this most critical input. In sub-Saharan Africa, for instance, where crop productivity is low and food insecurity and malnutrition pervasive, less than 10 percent of seeds used by farmers are quality assured. FAO's efforts target the enhanced use of quality seeds as a complement to the optimal use of other inputs as a sustainable means to improve crop productivity.

Farmers obtain seeds and planting material from both formal and informal systems – such as own harvests, social networks (neighbours, family, friends), agro-dealer shops, local markets, government projects, local enterprises and more. Even smallholder farmers regularly purchase seeds, including of beneficial new crop varieties, when possible. This is because quality seeds “do not cost, they pay”. So, smallholder farmers in developing countries are already engaged in seeking out quality seeds. Investing time or resources in seeds is therefore not a new or alien concept for farmers. So, the goal of FAO's significant investments in the strengthening of the seed sector is to enhance farmers' access to affordable quality seeds and planting materials of preferred crop varieties in timely manners as means to get better returns for their investments.

10. How important are improved crop varieties for smallholder farmers in developing countries?

Farmers, especially the smallholders in developing countries, need to have access to a diverse suite of productive and nutritious crop varieties that are adapted to their production systems and meet end-user preferences. These are necessary for the imperative of attaining the required significant increases in food production, estimated at 50 percent over the 2012 figures, in order to feed an ever-growing population in 2050 without further exacerbating the environmental footprints of agricultural production. In essence, more yields must be attained with even fewer external inputs in spite of the abiotic and biotic stresses that are resulting from climate change. This is possible as improved crop varieties have been shown to account for 50 to 90 percent increase in yields.

Smallholder farmers, who usually subsist on precarious low input production systems and, along with their households, are vulnerable to food insecurity and malnutrition, require these more productive and nutritious crop varieties. However, the adoption rates of newly improved crop varieties and hence the replacement of old low yielding varieties that are susceptible to biotic and abiotic stresses and have poor nutritional qualities, are low. The average adoption rate of improved crop varieties is a little over 30 percent in sub-Saharan Africa, for instance. Unless this rate is increased significantly, it is improbable that the productivity of crop production systems in developing countries will be sufficient to attain the 2030 Agenda goal of zero hunger in less than 10 years. FAO's efforts aim at a significant increase in the adoption rates of improved crop varieties, especially by small-scale farmers.

11. How is the conservation of plant genetic resources for food and agriculture relevant to the seed industry?

The safeguarding of plant genetic resources for food and agriculture (PGRFA) in genebanks, in their natural habitats or through on-farm management of diversity, is an insurance for cropping systems against future shocks, such as abiotic and biotic stresses that may be induced by climate change. *In situ* conservation focuses on conserving plants in their natural environment while *ex situ* conservation entails the preservation of genetic resources in collections external to the natural environment in which the plants are found. The on-farm management of crop diversity within a farming system generally entails the enhanced intra- and inter-specific diversity of crops, usually involving the use of farmers' varieties/landraces – which have been selected by farmers over time to allow for adaptation to local environments and local preferences.

Crop germplasm, which is conserved *in situ*, *ex situ* and through on-farm diversity, is the 'raw material' for developing new improved crop varieties. This is because a well-characterized, properly documented and accessible germplasm collection is a repository of desirable heritable traits such as resistance to biotic stresses, i.e. pests and diseases, and abiotic stresses, e.g. drought, high temperature, flooding and salinity; plant stature and other factors that influence crop productivity; and nutritional quality traits such as higher contents of protein and micronutrients. Scientists study these PGRFA in order to understand the mechanisms for the inheritance of these desirable traits while plant breeders introgress the characteristics as novel attributes in progressively superior crop varieties. The success of plant breeding is therefore dependent on the ability to identify and have access to the sources of novel traits and to introduce such attributes into new varieties.

12. How do policy and governance contribute to a responsive seed sector?

Policies, laws and regulations shape every aspect of the seed sector. For example, policies and legislation affect the funding and overall goals of crop variety development and release; the enabling environment for the development of new crop varieties, in particular by the private sector; how national capacities are maintained and developed; the time, process and cost for evaluating and releasing a new variety; the ability to export or import seeds; the species that are covered by the seed regulatory framework; and the inspecting mechanisms, by the government or delegated to the private sector.

Policies may provide an enabling environment that spurs the emergence or sustenance of diverse, local, seed enterprises, which may contribute to a responsive seed sector. This is more so when they provide incentives for the participation of a multiplicity of stakeholders, for instance through public-private partnerships and the engagement of producer organizations in the seed systems and aid the strengthening of value addition and linkages to markets. Seed policies, laws and regulations are implemented by national seed authorities. These bodies play an important role in the overall governance of the seed sector, and the representation of different key stakeholders in the seed sector, particularly of farmers as seed users, also affects how well the sector can cater to the interests of different stakeholders.

13. What are advanced technologies and why is the conference addressing these?

The enormous progress which is being made continually in various scientific and technological areas results in significantly enhanced progress in the understanding of the heredity of desirable traits and the ability to exploit the knowledge in the generation of progressively superior crop varieties. These areas include genetic modification, whereby hereditary materials from more than one source are brought together in the laboratory to produce new DNA sequences that result in new traits. Another area is genome (or gene) editing which refers to a new set of techniques for inducing precise heritable changes in specific regions of an individual's genetic makeup, i.e. genome. Additionally, Next Generation Sequencing enables the genome of virtually any organism to be decoded.

The ability to integrate the ensuing genomics data with phenotypic data, made possible by improved computing and engineering capacities, and make accurate inferences permit the reliable prediction of the value of an offspring through various methods that are collectively known as marker-assisted breeding. The progress being made in other related disciplines such as synthetic biology, microbiomics, machine learning and artificial intelligence coupled with those in these aforementioned biotechnologies are being leveraged to develop superior crop varieties at significantly enhanced time- and cost-efficiencies. These cutting edge scientific and technological innovations are therefore germane for this conference.

14. How does FAO assist farmers to have access to quality seeds and planting materials of suitable crop varieties?

FAO, through a combination of normative and operational work with its Member Nations, strengthens institutional and human capacities for the development, release and use of new progressively superior crop varieties and for the availability of, and timely access to, their affordable quality seeds and planting materials.

FAO's operational activities in the field include the implementation of development projects aimed at the strengthening of the adoption of crop varieties through, for instance, the establishment of demonstration plots at Farmer Field Schools, and assistance with the setting up of small-scale seed enterprises. FAO's normative activities support countries in the development of seed laws and policies and the regulatory frameworks. The Organization also provides assistance to the harmonization of rules for seed production and trade across countries in regional economic blocs.