
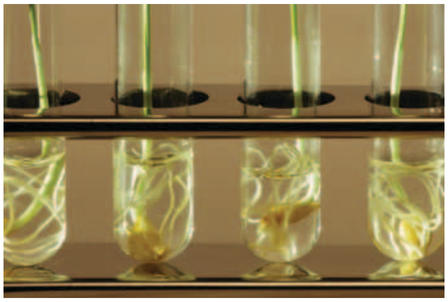

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BIOSCIENCE AT A CROSSROADS: AGRICULTURE AND THE NAGOYA PROTOCOL*

Genetic resources for food and agriculture (GRFA) underpin human well-being and are vital for food security. The need to ensure the continued use and exchange of these resources raises distinctive access and benefit-sharing (ABS) issues. The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization, together with the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), create opportunities to develop ABS solutions that are supportive of the special needs of this sector.

POLICY CONTEXT

The ITPGRFA establishes an ABS Multilateral System for 64 of the most important food security and forage crops (included in Annex I of the treaty). *Ex situ* collections of PGRFA held by the Centres of the Consultative Group on International Agricultural Research and other institutions are governed and exchanged under similar terms and conditions.

Genetic resources not covered by the ABS regime of the ITPGRFA comprise many food and agricultural crops and all ornamental crops. Legal access to these resources as well as to Annex I crops used outside the scope of the ITPGRFA, for example for pharmaceutical purposes, is thus governed by the CBD — as well as the Nagoya Protocol once it enters into force. This includes animal, invertebrate and microbial genetic resources used by the agricultural sector.

The Nagoya Protocol gives special consideration to the importance of GRFA and their role for food security. It also acknowledges the ITPGRFA and the FAO Commission on Genetic Resources for Food and Agriculture.

* This factsheet has been prepared by Rachel Wynberg. For more details, see the policy brief on the agricultural sector at www.cbd.int/abs.

WHO IS INVOLVED?

The sector comprises a diversity of multinational seed, biotechnology, horticultural and chemical corporations, smaller companies, public and private genebanks, research institutions, farmers, traders, governments, NGOs and supporting and servicing organisations. These include a variety of company sizes, markets and technologies.

WHAT GENETIC RESOURCES ARE USED AND WHY?

Genetic resources used comprise wild-collected plants, animals or microbes, including crop wild relatives, as well as landraces and commercial or elite varieties. Plant genetic resources are used in three main ways:

- For conventional breeding purposes,
- For "molecular-assisted" breeding using biotechnology,
- For crop protection and the research and development (R&D) of pest, disease and herbicide resistance.

About 90-95% of all genetic resources used in the plant breeding industry today are elite, modern varieties, the remaining 5-10% representing landraces or wild relatives.

Wild species require considerable investment to become commercially viable and have risky returns. However, there is growing interest and investment in crop wild relatives, due both to consumer demand and to the fact that they contain important genes for stress resistance and improved productivity. Technological advances, greater precision and declining technology costs are dramatically increasing our understanding of their potential.

The crop protection sector is especially interested in novel compounds, screening these for active ingredients, developing those that hold promise, and commercializing those that are viable.

THE MARKET

- The sector has transformed massively over the past 40 years, characterized by mergers, acquisitions and the significant consolidation of the commercial seed and agrichemical industry.
- Consolidation trends are driven by competition, but also by the acquisition of patents for key technologies, strategies to take ownership of new genetic technologies and the need to increase access to germplasm.
- Combined turnover and market share of the top ten companies in the $45 billion global commercial seed market is $20 billion.
- 94% of the global seed market is proprietary (branded varieties subject to intellectual property protection), 35% of which is genetically modified seed.
- The global market value of crop protection was $40 billion in 2010.
- The world trade value in horticulture in 2011 was $19 billion.

SCIENCE AND TECHNOLOGY TRENDS

Scientific and technological developments have had profound effects on how PGRFA are used and developed. Key trends include the following:

- Molecular biology and genomics have fundamentally changed plant breeding through improved understanding of metabolic processes, greater precision in gene identification, and the increased speed, throughput and scale of activities such as screening and DNA extraction and evaluation.
- Whole genome sequencing is revolutionizing analysis of crop germplasm and is becoming a quick and cheap way to find traits for breeding.
- New geographic methods, along with huge increases in computing power and the development of bioinformatics, are enabling more efficient mining of germplasm.
- Large seed companies continue to use advanced marker-assisted selection and breeding techniques, focused on traits that improve performance and farming efficiency, especially for major crops. Technological investment remains low for smaller companies and for other crops.
- There has been continued focus in the crop protection industry on the development of new insect control traits, with increased use of chemical discovery through genomics.
- R&D efforts in crop protection have shifted from conventional agrichemical research to transgenic crops, focused on herbicide tolerance and insect resistance.
- Private sector involvement in agricultural research and seed supply has escalated with an associated decline in public sector contributions. The research focus has shifted towards crops and traits important to developed country farmers.
- Ornamental horticulture relies less on novel R&D and tends to focus on existing products.

RELEVANCE OF THE NAGOYA PROTOCOL TO AGRICULTURE

Significant strides have been made through the ITPGRFA to facilitate the exchange of PGRFA. Given that the ITPGRFA was negotiated in harmony with the CBD, the Nagoya Protocol provides an important opportunity to build on these experiences and enhance coordination and policy coherence between the environmental and agricultural sectors.

Providing legal certainty – The Nagoya Protocol helps to address uncertainty about ABS obligations and compliance. Through requirements for Parties to establish competent national authorities and national focal points, the Protocol helps to ensure that those seeking access to genetic resources or associated traditional knowledge will obtain information about the relevant authority to consult, and the necessary procedures to obtain prior informed consent and establish mutually agreed terms. The establishment of an ABS Clearing-House also helps to achieve this goal.

Providing clarity on scope – Many PGRFA fall outside the ITPGRFA. The Nagoya Protocol thus fills a critical regulatory gap by clarifying the relationship between multilateral and bilateral approaches to ABS.

Streamlining procedures and reducing administrative bottlenecks – Different ministries often administer the ITPGRFA and the CBD and may introduce different access requirements for the same genetic resources, depending on their use. Implementation of the Nagoya Protocol can help to bring coherence to administrative procedures for PGRFA by promoting mutually supportive implementation of both instruments, and lead to a strengthening of partnerships between users and providers.

Improving tracking and monitoring – Genetic resources that are accessed for one purpose may enter different value chains for incorporation into different types of non-agricultural products. The checkpoints and monitoring system of the Nagoya Protocol can help to monitor the use of genetic resources and ensure benefit sharing.

Building the capacity of governments, researchers and companies to engage with ABS and changing scientific and technological developments – Capacity development remains an important need among all provider and user groups, an issue well recognized by the Nagoya Protocol, which calls for a strengthening of human resources and institutional capacities.

CBD

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