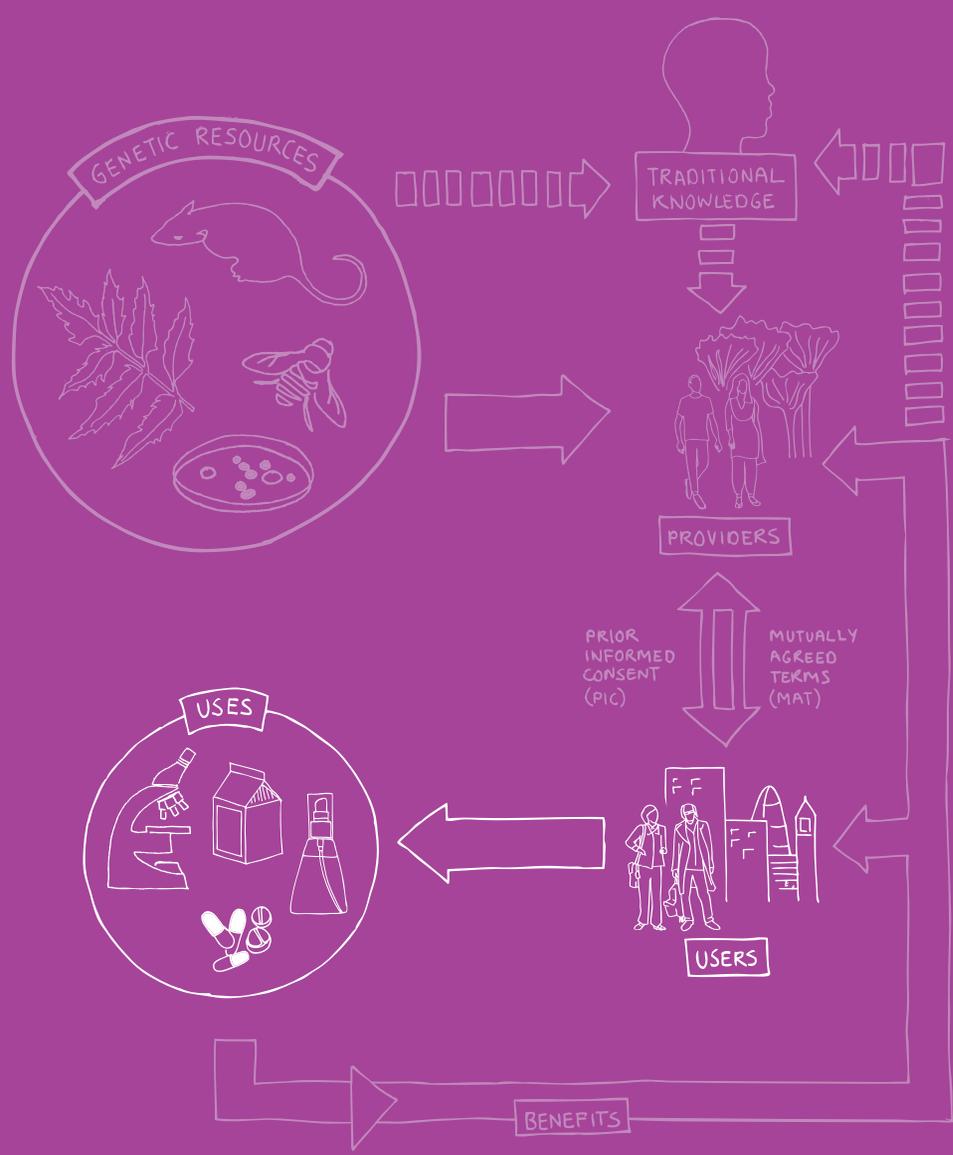


Convention on Biological Diversity: ABS

THEME

Uses of genetic resources





← **Biotechnology industries span a range of activities including pharmaceutical, industrial and agricultural technology**

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What does ‘using’ genetic resources mean?

Using genetic resources, whether from plants, animals or micro-organisms, refers to the process of researching their beneficial properties and using them to increase scientific knowledge and understanding, or to develop commercial products.

Why are genetic resources useful?

The rapid development of modern biotechnology over the past decades has enabled us to use genetic resources in ways that have not only fundamentally altered our understanding of the living world, but has also led to the development of new products and practices that contribute to human well-being, ranging from vital medicines to methods that improve the security of our food supplies. It has also improved conservation methods that help safeguard global biodiversity. Genetic resources can be put to commercial or non-commercial use:

- In commercial use, companies can use genetic resources to develop specialty enzymes, enhanced genes, or small molecules. These can be used in crop protection, drug development, the production of specialized chemicals, or in industrial processing. It is also possible to insert genes into crops to obtain desirable traits that can enhance their productivity or resilience to disease.
- In non-commercial use, genetic resources can be used to increase knowledge or understanding of the natural world, with activities ranging from taxonomic research to ecosystem analysis. This work is usually conducted by academic and public research institutes.

The distinctions between commercial and non-commercial use, and the actors involved, are not always clear cut. Companies can cooperate with public entities on commercial research, and sometimes research with no commercial intentions leads to a discovery that has commercial applications.

Different uses by sector

Commercial use

Biotechnology industries

Biotechnology industries span a wide range of activities including pharmaceutical, industrial, and agricultural technology. The use of genetic resources in these industries is extremely varied.

- **Pharmaceutical industry:** Chemical compounds or substances produced by living organisms found in nature continue to play an important role in the discovery of leads for the development of drugs and contribute significantly to the bottom lines of large pharmaceutical companies. For example, the US National Cancer Institute worked with a small pharmaceutical company to develop compounds called Calanolides, derived from a tree in the Malaysian rainforest. Research demonstrated that they have the potential to treat HIV (type 1) and certain types of cancer. Clinical trials are ongoing.
- **Industrial biotechnology:** Enzymes are used by textile, detergent, food, feed and other industries to improve the efficiency and quality of their products and production processes. Industrial biotechnology companies are particularly interested in genetic resources found in areas with high species diversity, as well as in extreme or unique environments, like salt lakes, deserts, caves, and hydrothermal vents.
- **Agricultural biotechnology:** Seed, crop protection and plant biotechnology industries rely heavily on genetic resources. Resources with traits that improve performance and farming efficiency for major crops are a key focus area for large seed companies. There is considerable growth in the value of the market for plant biotechnology-based products.

Ornamental horticulture industries

There are about 100-200 plant species used as genetic resources in commercial horticulture and 500 in domestic horticulture. Originally, this sector used plants from the wild, but now the majority of the resources are taken from sources like nurseries, botanical gardens and private collections. In 1998, the South Africa National Botanical Institute (SANBI) and the Ball Horticultural Company created a partnership which led to the commercialization of several South African horticultural and floricultural products.

Non-commercial use

Taxonomy

Genetic resources are a key source of information for taxonomy, the science of describing and naming species. Taxonomic research provides crucial information for effective environmental conservation.

Conservation

Genetic resources are the building blocks of life on earth. By developing our understanding of them, and conserving them, we can improve conservation of threatened species, and the communities who depend on them. Kew Gardens' Millennium Seed Bank project worked in partnership with farmers' groups, community-led nurseries and government agencies in over 50 countries to collect, conserve and use seeds from a wide range of useful and threatened species. Effective benefit-sharing means that the local communities that rely on these natural resources for food, medicine, fuel and building materials, can continue to do so.



A complex process

The use of genetic resources is rarely a simple process. Usually, it involves a number of actors and processes. In commercial research, for example, there tends to be a series of different research steps between gaining access to the genetic resource and the development of the final commercial product. Even in non-commercial use, research results are often passed on to other researchers, who use them to inform their own research.

This user chain can blur the distinction between providers and users, as the first user may become a provider for another user. Recognizing this has implications for the design of national access and benefit-sharing frameworks, as the second provider may need to go back to the original provider to renegotiate terms of access and benefit-sharing.

Who needs to understand the uses of genetic resources?

Providers: Understanding the uses of genetic resources is essential in enabling providers to understand their value, which in turn provides an incentive to conserve them and use them sustainably, as well as to ensure that any potential benefits that may result from their use are shared equitably.

Users: Users of genetic resources include a range of research institutions and industries. All of these depend on developing their understanding of genetic resources to further their work. End users can include anyone who buys or benefits from the commercialized products, or benefits indirectly from the value that genetic resources can have in improving production, such as increasing agricultural yields and food supplies.



Kew Gardens in London, UK: Non-commercial uses of genetic resources can be used to increase knowledge or understanding of the natural world

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Uses of genetic resources

Traditional knowledge

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Convention on
Biological Diversity



United Nations Environment Programme



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