Conservation and use of crop diversity in the bio-digital age

Objectives

The Pontifical Academy has held events and issued statements that relate to both agrifood systems, and nature conservation. Building on these discussions, this workshop addresses the importance of the inclusive application of advanced science to the conservation and use of crop diversity for productive and sustainable food systems.

To this end, the workshop will discuss

- how genomics, artificial intelligence, synthetic biology and other new technologies, will impact the operations and use of genebanks and other collections of food plant diversity;
- what policies and investments are needed to enable genebanks to take advantage of these opportunities to make them better fit for the future in a rapidly changing world,

Background

Advanced genomics combined with artificial intelligence allows faster, more precise characterization of crop diversity, which promises to greatly enhance, but also fundamentally change, plant breeding. At the same time, potentially transformative new scientific discoveries in the field of synthetic biology could boost the use of crop diversity not only in food and agriculture,

but also in industrial biotechnology and pharmaceuticals, thereby increasingly blurring the lines between sectors and raising the value of crop diversity.

In a similar vein, innovative technologies and methods can also improve the efficiency and quality of genebank management. They can greatly assist, for example, in establishing genetically representative collections, identifying duplicates, comparing genetic diversity of collections, and detecting changes in genetic identity.

An unprecedented opportunity is therefore presenting itself for genebanks. They have the chance to evolve into veritable bio-digital research centers, conserving their collections much more efficiently, actively investigating their potential, and making crop diversity available to their users in a significantly more targeted and effective manner. This would greatly magnify their impact.

However, genebanks differ hugely in their capacity to take advantage of these scientific innovations. Without the necessary investments and policy support, many risk being left behind, and their collections overlooked. Shifting ownership of genomic data to the private domain and delinking data from the physical resource could undermine the effectiveness of the multilateral system that has been set up to facilitate the open exchange of crop diversity globally.

Thus, making genebanks fit for the future will require building technical and human capacities to take advantage of scientific opportunities while adapting governance systems and related institutions to ensure that the new technologies strengthen rather than undermine conservation and sustainable use of crop diversity for the benefit of all.