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# Genetic Diversity and its Conservation

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## INTRODUCTION

Biological diversity is the variance found in all plant and animal species, as well as their genetic material and the habitats in which they live. There are three types of diversity: genetic diversity, species diversity, and ecosystem diversity. Biodiversity's value to humanity has been widely recognized in recent decades, and many would argue that diversity is necessary for the long-term development of various human activities. Biological diversity can help social and economic institutions thrive in ways that help the world's poorest people satisfy their food and nutritional needs while also preserving the cultural diversity of countries throughout the world. Each country's biological resources are significant, but not all countries are equally endowed, necessitating international cooperation for the successful protection and utilization of our global biodiversity. In recent years, there has been a growing recognition of the significance of taking a comprehensive approach to biodiversity, including agricultural biodiversity, and of tying conservation to long-term use and development. Plant genetic resources are among the most important of the world's natural resources, and significant progress has been achieved in conserving them during the previous two to three decades. Plant genetic resource conservation, on the other hand, deserves significantly more attention than it currently receives. There have been some positive improvements in recent years, such as increased efforts to develop improved in situ conservation approaches that would allow for dynamic plant population conservation. The introduction and cultivation of better cultivars of many major and minor agricultural species have been a general trend in recent decades. These cultivars had a tendency to be uniform in appearance. They are usually developed from a small number of elite lines that are frequently exploited in the manufacture of several cultivars, resulting in a crop genetic basis that is becoming increasingly narrow. This, combined with the widespread cultivation of genetically homogenous cultivars, has exacerbated the genetic susceptibility of many key agricultural crop species, with often fatal results. Geographic disparities in genetic diversity distribution are highly widespread. Populations can differ in terms of all aspects of diversity, including the number of alleles, the identity of those alleles, and the impact they have on the population's traits. A species' breeding system has a significant impact on allele distribution. The extent and distribution of genetic variation is influenced by the mating system, floral morphology, and mechanism of reproduction. These effects are manifested through geographical characteristics as well as genetically controlled factors. When an outbreeding population goes through a bottleneck (i.e., new populations are produced with a small number of progeny plants), genetic variety decreases in proportion to the bottleneck severity. The more genetic variation a population loses, the smaller it becomes and the longer it remains tiny. While small population sizes affect all aspects of genetic diversity, bottlenecks are expected to have a greater immediate impact on allelic diversity than heterozygosity. Genetic diversity partitioning within and between populations is a critical issue to consider in most conservation initiatives, particularly in *situ* conservation. The connection between the subdivisions utilized for sampling has a significant impact on measures of genetic variation in space. In the end we can say Crop genetic resource conservation might be tough to sell, yet the stakes are great. All individuals concerned in plant genetic resources conservation and utilization must become increasingly involved in all elements of genetic variety - studying, understanding, enhancing, conserving, and using it. To do so, we must do adequate research, field investigations, and analysis to determine the quantity and distribution of biodiversity in species and ecosystems. Any conservation effort should be based on an integrated conservation approach, which includes a mix of ex-situ and in situ measures.