

## Study: How do we reach 'food security'? Biotechnology is key

Global warming causes a range of negative impacts on plants especially due to rapid changes in temperatures, alterations of rainfall patterns, floods or drought conditions, and outbreaks of pests and diseases.

These, in turn, affect crop production reducing the quality and quantity of agricultural produce. Climatic extremes and high population growth significantly increase the world's food demand.

Therefore, fulfilling the goal of attaining food security for the present and future generations is of prime importance. Biotechnology enables creating dramatic alterations on crops to withstand stress which is difficult to attain using conventional breeding approaches. It is a viable tool used to improve agricultural production.

The development of biotechnological approaches such as genetic engineering, genome editing, RNA-mediated gene silencing armored with next-generation sequencing, and genome mapping have paved the way for precise and faster genetic modifications of plants. Such intensive efforts are currently underway creating desirable crop cultivars to meet the food demand and to support sustainable agricultural productivity for climate change adaptation.

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No "Silver bullet technology" would solve the impact of climate change. Therefore, an integrated strategic plan is needed to solve the issue. In terms of research practices, diversity is preferred over the regularly used protocols.

For example, in making insect-resistant crops, *Bt* toxins are the most used proteinaceous molecule for most species. The spectrum of molecules could be increased such as by using peptides, or other compounds such as secondary metabolites from other species using novel genetic engineering approaches. Since there are several plants containing a range of medicinal properties the gene pool can be broadened to increase the diversity as different techniques are used even the same crop is modified for the same purpose.

Studies showed that CRISPR/Cas9 editing tools have been efficiently utilized in several horticultural crops including petunia, citrus, grape, and apple for gene mutation, repression, activation, and epigenome editing,

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Adapting climate-smart agriculture is considered to ensure a sustainable increase in agricultural productivity to satisfy the global food demand. This review provides an overview of the development and application of plant biotechnology as a positive contribution to climate change adaptation in the field of agriculture.

Genetic engineering approaches and new tools are used to improve plants adapted to an increasing number of challenges brought by the changing climate. Specific examples on crops are discussed on their improvement showing that these measures integrating modern biotechnology can be effectively used to improve the agricultural productivity of the world.

Despite the efforts that are being taken to design climate-ready crops using modern biotechnology. Improved research efforts, filling the technical and knowledge gaps could substantially accelerate the process of creating crops adapted to the ever-changing climatic conditions.

**[This is an excerpt. Read the original post here](#)**