

Biotechnology in Agriculture for Long-Term Food Security

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Abstract

The recent military conflict in Eastern Europe and the coronavirus disease 2019 (COVID-19) pandemic have put the world's food security at risk. In light of the aforementioned risks, this article outlines the goals of the European Green Deal and the Sustainable Development Goals with regard to attaining food security and sustainable development in EU agriculture. Furthermore, it examines the prospects of plant agricultural biotechnology and artificial intelligence (AI) systems, with a focus on their capacity to achieve food security. Ironically, the current difficult circumstances might make it possible for EU stakeholders and legislators to seize opportunities and harness the potential of the biotechnology industry.

Keywords: Food security; Biodegradation; Agriculture

Introduction

The European Commission (EC) launched a number of programs to ensure the sustainability of the agricultural sector and the economy prior to the global crisis. The European Green Deal is the most ambitious and difficult of them all, with the goal of making the EU, the second-biggest economy in the world, climate neutral by 2050 [1]. A just, healthful, and ecologically sustainable food system is one of the main goals of the European Green Deal. The EC created the "Farm to Fork Strategy" [2] with the intention of achieving this objective by revolutionizing the production and consumption of food. The European Commission (EC) set targets for a number of actions in the EU Farm to Fork Strategy.

Methodology

by 2030, cut fertilizer use by at least 20%, increase organic production to account for 25% of EU agricultural land use, and reduce the use and risk of chemical pesticides by 50% as well as the use of more hazardous pesticides by 50% [3]. However, the viability and outcomes of this strategy have been greatly impacted by the recent events taking place in the world. Therefore, a new policy consensus is required to ensure food security in Europe and its neighboring countries. In addition, a Common Agricultural Policy (CAP) that emphasizes the Green Deal must back all initiatives aimed at guaranteeing food security. On January 1, 2023, the new CAP strategies will be put into effect in every EU nation [4].

The ideas have presented a clearer, more effective strategy for carrying out the European Green Deal's policy objectives [5]. The CAP, however, might have disastrous effects on the southern hemisphere, where working conditions and the environment are worse and government subsidies are lower. For example, it could destroy local farming economies and have a negative impact on the global south's working conditions and environment. A major component of the European Green Deal [6] is initiatives like the EU action plan for the circular economy [6], the Zero Pollution Action Plan [7], and the Biodiversity Strategy. The 2030 Biodiversity Strategy was released by the EC as part of the European Green Deal.

In response to the COVID-19 pandemic, the European Commission (EC) released the 2030 Biodiversity Strategy under the auspices of the European Green Deal. This plan outlines the goals of the EU for the next ten years [8]. The literature has demonstrated that robust ecosystems reduce the risk of zoonotic disease outbreaks, while environmental degradation increases it. The EU's recovery

plan from the COVID-19 pandemic includes the Biodiversity Strategy, which is crucial for preserving both EU and global food security [4]. Protecting at least 30% of the land and 30% of the sea is one of its goals. Remarkably, in 2021, only 11% of the EU's seas and roughly 26% of its land area were protected [9,10].

Results

By 2030, the EU must plant three billion trees while upholding ecological principles, according to the EU Forest Strategy. Just 4 475 977 trees had been planted in EU member states by June 2022, which is less than 0.14% of the three billion dollar target that has been suggested. In order to meet this challenging goal by 2030, the EU will need to plant more than 427 million plants annually. These figures demonstrate that the lofty objectives outlined in numerous EU strategy papers necessitate precise and defined steps for their execution; otherwise, they may prove challenging to attain.

In addition, the EU ratified the Sustainable Development Goals (SDGs), which were unveiled by the UN in 2015. By 2030, the 17 Sustainable Development Goals (SDGs) and their 169 corresponding targets seek to eradicate extreme poverty, curtail inequality, and safeguard the environment. It has always been difficult to achieve the SDGs, and it now seems even less likely. The most crucial things that need to be done right now are to invest in people, create more resilient and sustainable food systems, strengthen national resilience against pandemics, and address inequality worldwide. Reducing food loss and waste is one of the UN's Sustainable Development Goals (SDG). Nonetheless, 14% of food produced worldwide is lost between harvest and retail.

The High Level Panel of Experts on Food Security and Nutrition (HLPE) of the UN Committee on World Food Security (UNCWS) has prepared the 15th Food Security and Nutrition: Building a Global Narrative Towards 2030 report, which highlights the importance of

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moving beyond the traditional four-pillar framework for food security, which consists of availability, access, utilization, and stability, to a six-dimensional framework that incorporates agency and sustainability. A strategy that promotes all facets of food security ought to be developed in order to strengthen the resilience of food systems.

Discussion

This is particularly crucial in situations like the present food crisis brought on by the hostilities in Ukraine. The COVID-19 pandemic brought attention to the need for global food systems to change. It is necessary to look for innovative ways in agriculture to raise output and lower food waste. During emergencies like pandemics or wars, information technology (IT) solutions are particularly crucial because they can be used to automate factories using smart sensors, minimizing human contact and communication with objects and allowing for remote monitoring.

When all households have the financial and material means to purchase food in sufficient quantity, quality, and variety to provide everyone—including disadvantaged people and groups—with a nutritious diet, food access is guaranteed. According to the legal, political, economic, and social structures of the community in which they reside, entitlements are the collection of all commodity bundles over which an individual can exercise authority (including traditional rights such as access to common resources).

In order to achieve a state of nutritional well-being where all physiological needs are satisfied, food use and utilization depend on knowledge and comprehension of an appropriate diet. It considers social settings, cultural considerations, health care, clean water, sanitation, and cooking, storing, and preparing skills.

The ability to guarantee food security in the face of cyclical events (such as seasonal food insecurity) or abrupt shocks (such as an economic, health, conflict, or climatic crisis) is referred to as stability. Therefore, the concept can be applied to both the food security's availability and access dimensions. The ability of people and groups to exert some degree of control over their own circumstances—to choose what they eat, produce, and how that food is produced, processed, and distributed—as well as to meaningfully participate in the governance processes that influence food systems is referred to as agency. In order to ensure that the food needs of the current generations are met, sustainability refers to food system practices that support the long-term regeneration of natural, social, and economic systems.

Conclusion

The EU's definition of genetically modified organisms does not yet include organisms created using novel genomic techniques, according to the EC's interpretation. Genome editing cannot reach its full potential if we move forward with a regulatory framework that ultimately results in a technology ban. Crucially, the results of novel genomic techniques are grown, produced, and consumed in other regions of the world. Africa, for instance, is currently the continent with the most potential for GM crop adoption, with Nigeria emerging as a leader and Kenya recently beginning to shape favorable attitudes toward GMOs. The US, Canada, and Latin American nations are pioneers in the development and production of genetically modified crops. Together with the nations of North America. In addition to North America, a number of Latin American nations, the Philippines, China, Japan, Australia, and China, among others, have already set standards for determining the NPBT regulatory statutes.

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