IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Biotechnology And Its Role In Sustainable Development

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Abstract:

In order to preserve a sufficient resource base for future generations, sustainable development necessitates the most efficient and conservation-minded use of resources. There is no one best approach to accomplish it, nor is it a concept that can be readily described. However, the environment is emphasized because it provides the resource base for all of society. Biotechnology is one of the more recent scientific advancements that has a wide range of uses that can optimize resource use. It entails genetic engineering, which is the manipulation of organisms to carry out particular processes.

In relation to the environment, In recent years, the "modern biotechnologies" of molecular biology and gene technologies—which contain ecological, social, and economic requirements—have grown significantly in importance in the grains sector.

Other environmentally advantageous aspects of biotechnology include resource recovery and recycling as well as the disposal of hazardous waste. Due to the expansion of the resource base, these are equally important to sustainable development. In this situation, biotechnology serves as a means of better controlling biogeochemical cycles.

However, using biotechnology may have some very serious downsides. Future potential for biotechnology are therefore being constrained by the high rates of extinction that are now occurring in plant and animal species.

Keywords: Biotechnology, Sustainable development, Environment

INTRODUCTION

The population of the world is projected to increase by roughly 75 million people annually from now until the year 2030, reaching 8.1 billion. The majority of population growth will take place in emerging nations, which can ill-afford further population pressures (FAO 2000). In order to advance toward the SDG, tools and policies must be improved, and biotechnology is unquestionably a crucial component of such improvements. The biotechnology industry will provide answers for the eradication of hunger, the treatment of diseases, improved responses to public health emergencies, food safety, greenhouse gas reduction, and food safety.

Modern biotechnology's advent has sparked a significant global debate over the future of global agriculture. The discussions around this issue have frequently been driven by the interests of rich nations and have paid little regard to the needs of emerging nations, particularly those concerns relating to the food demands of the low-income population.

ROLE OF BIOTECHNOLOGY

The successful operation of the cereal industries now heavily depends on the implementation of technologies in these sectors. The integration of the agricultural production and food processing sectors has been aided by technologies. Technology plays a critical role in the creation of novel, high-value food items. In today's agri-food sector, technology is vital to all enterprises. Technology offers the primary, and frequently the only, means of achieving the following goals:

- cost reduction;
- creation of new business prospects;
- facilitation and support of strategic change
- Differentiating items
- Matching culinary offerings to customer demands

Over many years, biotechnologies have been a significant factor in the evolution of food products. The "modern biotechnologies" of molecular biology and gene technologies have grown significantly in importance in the cereals industry in recent years. Integrated ecological, social, and economic objectives for sustainable development. Additionally, biotechnology should be viewed as one tool in a larger toolbox of technological possibilities, to be used when and where it is most suited to address a given issue.

THE SUSTAINABLE DEVELOPMENT GOALS AND BIOTECHNOLOGY

It has been several years since 193 nations, including Spain, vowed to support the 2030 Agenda's Sustainable Development Goals (SDG). The development of biotechnology provides various solutions for 11 of the 17 goals.

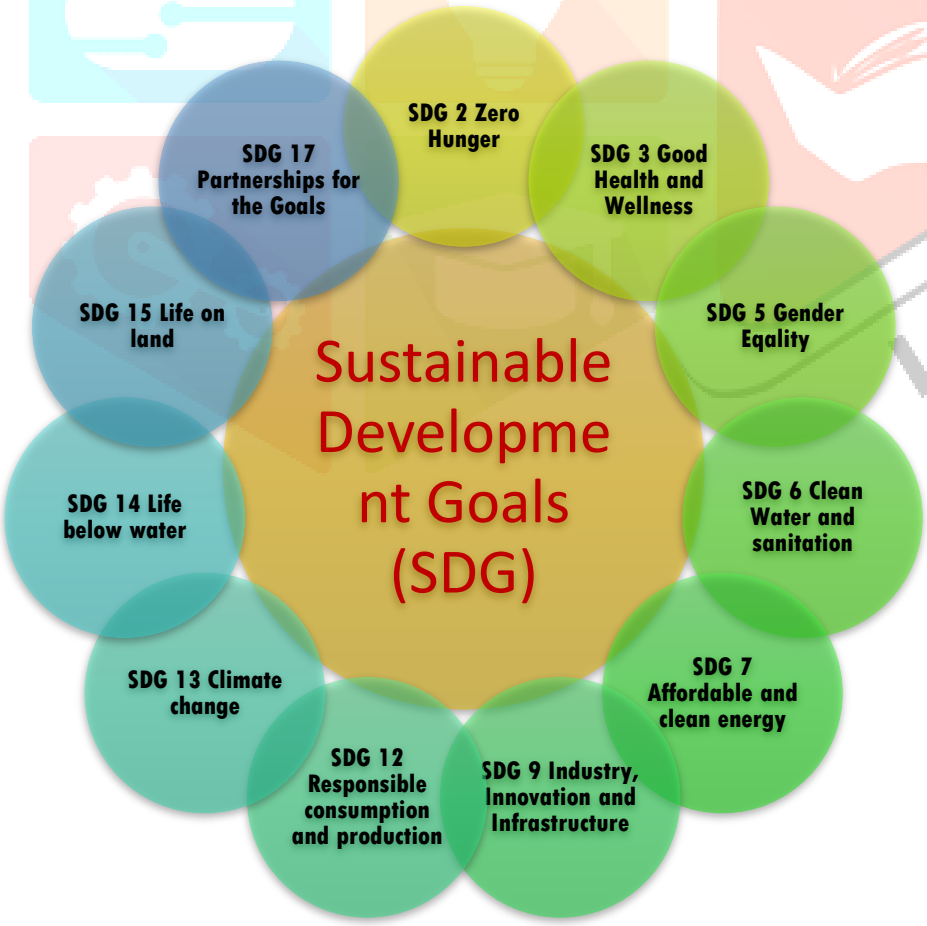

Figure 1: The Sustainable Development Goals And Biotechnology

SDG Goal 2

By adopting methods like genetic engineering to make crops more productive and nutrient-dense, biotechnology has made it possible to contribute to the elimination of hunger. Foods are additionally made even healthier by biotechnology by adding probiotics and prebiotics. In addition, food pollutants and poisons can be found using biotechnology methods, enhancing food safety. Achieve food security, increase nutrition, and advance sustainable agriculture to end hunger.

Biotechnological remedies

- Personalized nutrition for improved diets that ensure optimal health
- Personalized nutrition for improved diets that ensure optimal health
- Gene editing methods like CRISPR for sustainable agriculture
- Probiotics and prebiotics in foods to increase their nutritional characteristics
- Feeds, probiotics, treatments, and illness detection for healthy livestock production;
- Biosensors and technological methods to ensure food safety;

SDG Goal 3

350 million individuals worldwide receive therapeutic benefits from biotechnology, which is also used in 69% of all medications now under development worldwide. The focus of about half of biotech companies is on human health. The biotech industry is still fighting diseases like cancer and Alzheimer's by creating biodrugs, developing vaccinations, and using other biotechnology tools to detect and diagnose ailments more quickly and accurately.

SDG Goal 5

Excellent female researchers, executives, and business owners work in biotechnology. Since more than ten years ago, the biotechnology industry has had the greatest proportion of women working in R&D. Nearly 60% of R+D employees in enterprises in the biotechnology sector are women, compared to a national average of 30.7%. In contrast to the 2.9% of IBEX-35 firms, the executive teams of biotechnology companies have a 24.4% female representation.

SDG Goal 6

Through the use of production techniques and crops that assist lower the demand for water, biotechnology promotes more environmentally friendly water use. By cleaning wastewater and locating impurities, it also makes sure that water is clean and readily available.

Solutions provided by biotechnology include:

- Water purification and chemical contamination removal using microbes, microalgae, or cyanobacteria; and
- Drought-resistant crops produced by genetic engineering.

SDG Goal 7

Biotechnology provides possibilities for creating clean energy and ensuring more effective power use, as well as for recycling forestry and urban waste and byproducts from specific industries, lowering their environmental impact. For the production of clean, renewable energy, alternative biomass sources from forestry and agriculture are increasingly exploited.

Biofuels and biomass made from waste or byproducts are examples of biotechnology solutions.

SDG Goal 9

The biotechnology industry is very innovative, and innovative thinking is used in all of the activities carried out by biotechnology businesses. Additionally, the number of businesses grows yearly, and there are already almost 800 biotech businesses in Spain. With fewer than 10 employees, 51% of businesses are micro-SMEs, while 45% are SMEs. The majority of biotech companies are located in Catalonia, Madrid, and Andalusia. The industry boasts outstanding talent and creates high-quality jobs.

SDG Goal 12

Applications of biotechnology encourage responsible consumption and production. The circular economy benefits from the reuse, recycling, conversion to energy, and composting of biological products.

Solutions provided by biotechnology include:

- Recycling garbage to create new materials including bioplastics, biomaterials, nutritious foods, and eco-friendly cosmetics.

SDG Goal 13

By substituting biological products, like bioplastics or biopesticides, for those based on fossil fuels and resulting in a decrease in CO2 emissions, biotechnology helps to alleviate the effects of climate change.

Biotechnological remedies

- Items made from biomaterials that cut CO2 emissions.
- Microalgae that reduce emissions of greenhouse gases

SDG Goal 14

By employing methods to monitor maritime environments and purifying tainted water utilising microbes, microalgae, and cyanobacteria, biotechnology aids in the preservation of marine ecosystems.

Solutions based on biotechnology include:

- Bioremediation, which employs living organisms to remove and degrade ocean contaminants like plastic; and
- Biotechnology applied to fish farming, which enhances fish health and productivity.

SDG Goal 15

Products made with biotechnology are preserving life on earth and reducing the loss of biodiversity. In reality, data from the ISAAA show that biotechnology crops have conserved 231 million hectares of land in recent decades and that the environmental impact quotient has decreased by 18.4%.

Biotechnological crops that prevent soil erosion and the demand for arable land are two examples of biotechnology solutions.

SDG Goal 17

Complex solutions are necessary to achieve the Sustainable Development Goals, making partnerships with other system stakeholders crucial. Biotechnology has had a significant social, environmental, and economic impact for decades now thanks to public-private partnerships and global objectives. For research and development, clinical development, field testing, or product distribution, our companies formed 246 agreements in 2020. Additionally, this year, the majority of those alliances were formed to work together to combat the Covid-19 outbreak. Additionally, this year, the majority of those alliances were to work together to combat the Covid-19 pandemic. These relationships included 54 with a biotechnology-using company, 88 with another biotechnology company, and foundations or technological centres for the majority of them (close to 50%).

CONCLUSION

Recent developments in biotechnology have made it possible to treat diseases, respond to health emergencies better, ensure the safety of food, reduce greenhouse gas emissions, and find ways to end hunger.

Impact assessment becomes a crucial tool for addressing potential socioeconomic and environmental costs and benefits when these innovations are used more widely. The ability of standard economic impact analyses to handle the specific needs of a rural population in a developing country is a crucial topic, though.

The sustainable Livelihoods Framework takes into account institutions, links between these elements, a community's portfolio of assets, policies, and the context of vulnerability. It is ideally suited to address the limitations of traditional socioeconomic impact assessment approaches when examining underdeveloped communities.

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