



Mains Practice Question

Q. Critically analyse the role of biotechnology in improving the conditions of the farmers in India. (250 words)

11 Mar, 2020 GS Paper 3 Economy

Approach

- Introduction.
- Briefly explain biotechnology.
- Highlight the positive and negative impacts of biotechnology by giving examples.
- Conclude.

Introduction

The Green Revolution succeeded in tripling the food supply but yet it was not enough for the growing population. It was achieved by improved crop varieties, better management practices and agrochemicals (fertilisers and pesticides) which are too expensive for the farmers of developing countries. So, another sustainable solution like biotechnology was needed which could be afforded by all and raise the living standards of every farmer.

Body

- Under **biotechnology**, plants, bacteria, fungi and animals whose genes have been altered by manipulation (**Recombinant DNA Technology**) are called **Genetically Modified Organisms (GMO)**. GMO technology has brought **significant changes in agriculture** and areas related to it.
- Crops have been made **more tolerant to abiotic stresses** (cold, drought, salt, heat) so the farmers do not have to worry about the weather conditions and can help plants adapt to environmental stress and climate change.
- It has **reduced reliance on chemical pesticides (pest-resistant crops)** which is pocket-friendly for the farmers and eco-friendly for the consumer by eliminating harmful chemicals from the ecosystem.
- **Post-harvest losses have been reduced** by increasing crops' abilities to withstand the transportation period.
- **The efficiency of mineral usage by plants has been increased** by it (this prevents early exhaustion of fertility of soil) so a piece of land can be used for a long time for equally good yields.
- It has **enhanced the nutritional value of food** (like Vitamin A enriched rice) which increases the market value of the product profiting the farmers and improves human health.
- Plants developed using biotechnology **naturally resist specific insects, weed plants and diseases** so there is no loss of crop due to these reasons. (Like **Bt crops**)
- In addition, it has been **used to create tailor-made plants** to supply alternative resources to industries, in the form of starches, fuels and pharmaceuticals etc. which can boost the agricultural-industrial relations uplifting farmers.
- However, there are concerns that genetically modified crops **may transfer genetic material into natural, unmodified plants**. For instance, a crop that is herbicide-resistant may transfer some of its traits to a weed, which would result in a herbicide-resistant weed.
- Genetically modifies crops have a **higher yield** and the **overproduction** may lead to market

instability, reduced export income, fewer product varieties etc.

Conclusion

The benefits of biotechnology are especially meaningful at a time when our global population is growing and our demand for food is increasing, mainly in developing countries. However, it should be kept in mind that the long-term consequences of the genetic modification are still unknown so the technology should be used cautiously.

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