

Day / Date

Q3) How can biotechnology, bioengineering and the increasing use of genetically modified organisms help us to deal with increasing food demands. [20]

1) Introduction : Biotechnology; The silver bullet for Global Hunger Woes

Exposed to the whirlwind of technological revolution, the 21st century world is experiencing scientific advancements at a swift speed. In these advancements emerge innovations that completely revolutionise human lives, providing easy yet effective solutions to tackle challenges that have remained unabated since the genesis of human kind. Among these breakthroughs, the concept of Biotechnology has taken the world by storm.

2) An Overview of Biotechnology, Bioengineering and Genetically Modified Organisms :

2.1) Biotechnology

Biotechnology is a field of science and technology that revolves around the usage of living organisms,

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biological systems, or their derivatives to develop and create new technologies, products for various applications.

2.1.1) Environmental Biotechnology:

Is a sub-field of Biotechnology. It refers to the usage of living organisms and biological processes to produce products or technologies aimed at addressing environmental problems.

2.2) Bio Engineering:

Bio engineering encompasses a broad spectrum, using engineering principles to address and improve disease prevention, disease treatment, medication, or the most suitable category in this context - agricultural development.

2.3) Genetic Modified Organisms:

GMO refers to the plants, animals or microbes that have undergone genetic alteration. Genetic Modification allows scientists

to modify certain traits of the organism ~~and~~ or delete it altogether.

3) Ways in which Biotechnology, Bio engineering and Genetically modified organisms can help us deal with increasing food demands

3.1) Tolerance to Abiotic Stress :

Genetic Modification allow better tolerance to Abiotic stress in plants. Food and Agriculture Organisation (FAO), indicates that nearly 70% of yield reduction is associated with Abiotic stress. By making plants tolerable to such elements, the ~~get~~ yield can be drastically increased.

3.2) Transgenic Crops :

Transgenic crops refers to the crops that have been integrated with genome of other plants. This is a revolutionary concept that increases the variety of crops. This suggests that ~~consumers~~ locals ~~can~~ choose from the variety what suits them leading to less food wastage.

3.3) Pest Resistance Crops:

Plants can be designed and modified to develop better immunity to pests. This means that there will be less infected crops, leading to increased yields that can go a long way in combating the increased food demand.

3.4) Higher yield Crops:

Genetic modification can help to develop plants that by default produce higher yield. Higher yield implies that local demands will be easily met, leaving surplus that could be exported to food insecure regions.

3.5) Improved Food Quality:

Certain types of foods, though in abundant quantity, are usually abstained from eating. This could be because they are high in constituents that are not healthy for people e.g. cholesterol, fats.

However, with genetic modification, plants can be designed in a way which strips them from these unwanted elements. This would lead to less wastage of food, which, in turn, can help offset the increasing food demand.

3.6) Growth time of crops reduces:

Reduced growth time, it goes without saying, can drastically increase the amount of food. Crops usually take a lot of time to grow. During this time they require great care and even then some damages cannot be prevented. By reducing growth time, the cycle can be accelerated that can also increase the annual yield.

3.7) Plants can be grown in All parts of the world:

This ~~is~~ factor is one of the most significant factors. With the success of in-door farming, crops can be grown in all parts of the world. This implies areas that were previously not

conducive for farming, can grow their own crops with the use of proper technology.

3.8) Reduced crop costs:

With the increased use of technology in the spheres of agriculture, the cost of crops is sure to drop soon. ~~The~~ The latest harvesting paraphernalia, coupled with pest resistant crops that saves money on pesticides, the cost is likely to drop. This suggests that bio technology will not only increase the yield but is it more affordable as well.

3.9) Reducing Pollution:

The process of Bio remediation can go a long way is helping to meet the increased food demand. By eliminating pollutants in ~~the~~ environment the number of animals dying from such contaminations also decreases. This suggests there will be more animals which can be used as a source of...

Food: For instance; more fishes in a lake ~~will~~ implies more can be fished for food.

4) Conclusion:

There remains no ambivalence that science has helped us in different domains of life. The use of Biotechnology is helping us meet the increasing food demand cannot be overstated. However, the need to use these technologies in the right direction is equally as important as using them in the first place.