



## Mains Practice Question

**Q.** Examine the challenges related to transgenic crops in India and how are they significant in view of food security. (250 words)

01 Mar, 2019 GS Paper 3 Economy

### Approach:

- Write a brief about the transgenic crops
- Examine the challenges related to transgenic crops in India
- Mention how they are significant in view of food security.
- Give a way forward for better management of technology.

### Introduction

- A transgenic crop plant contains a gene or genes which have been artificially inserted instead of the plant acquiring them through pollination. The inserted gene sequence (known as the transgene) may come from another unrelated plant, or from a completely different species.
- GM technology involves direct manipulation of DNA instead of using controlled pollination to alter the desired characteristics. Genetic modification is one of the approaches to crop improvement, all of which aim at adding desirable genes and removing undesirable ones to produce better varieties.
- Currently, India has the world's fourth largest GM crop acreage surpassing China's 3.0 million hectares (mh), while equaling that of Canada's 11.6 mh, according to the International Service for the Acquisition of Agri-Biotech Applications (ISAAA) mostly on the basis of GM Cotton, the only genetically modified crop allowed in the country.

### Body

#### The challenges related to transgenic crops-

- **Illegal seeds, illiteracy and lack of awareness:** It is found that the high cost of official seed of Bt cotton, illegal seeds and scarcity of the seeds as well as delay of release varieties among cotton growing farmers in different Indian states have led the farmers to increase supply of illegal seeds.
- **Lack of regulatory system in India:** India still has a huge problem of biosafety enforcement. Government in the Parliament admitted that since 2007, GM soybean and canola oils are being imported in India without the approval of FSSAI, which is tasked to regulate food to ensure that it is safe for human consumption.
- **Changed cropping pattern:** GM seeds entail a specific kind of cropping pattern. For example, in the case of Bt cotton, farmers are supposed to follow resistance management plans, i.e., planting non-Bt cotton in at least five rows surrounding Bt cotton, or in 20 percent of the total sown area, whichever is more.
- **Public concerns:** Scientists, politicians, and the public have also expressed concern about aspects of cloning, genetic testing, and gene prospecting, etc. This demands a clearer understanding of public concerns as well as attention to issues of institutional structure and representation in decision-making processes
- **Food and human safety challenges:** One of the fears about the introduction of GM crops is that they will become invasive, or that GM elements will transfer into wild plants, which will then

become an invasive irritant.

- **Impact of gene alteration:** The long term effect of alteration of genetic material is still unknown and may prove disastrous for environment, biodiversity and human health.

### **Their significance in the view of food security in India—**

- **Human Health and nutrition:** Address malnourishment among children with high protein GM food, for example Golden Rice to address Vitamin A deficiency. Lower instances of pesticide in food and water among Bt farmers, and low levels of mycotoxins in Bt corn
- **Environment:** Sustainable agriculture practices by lowering chemical fertilizers, pesticides, weedicide consumption. Adaptation to effects of climate change facilitated by technology.
- **Increased yield and production:** We have already seen the success of Bt cotton in our country, as India from being an importer a few years ago has now become a major exporter. The other potential GM crop to help the farming community is GM mustard.
- GM technologies could make food crops higher yielding and more robust to biotic and abiotic stresses. This could stabilize and increase food supplies, which is important against the background of increasing food demand, climate change, and land and water scarcity.

### **Way forward**

- Focused GM research agenda vis-a-vis agriculture development priorities
- Capacity building on GM research, development and regulation
- Increasing public awareness with reliable evidence based information on GM crops and products
- Science based and consistent regulatory policy
- Simplified modules for risk assessment and management

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