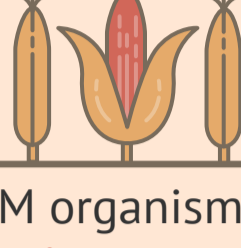


Genetically MODIFIED Crops



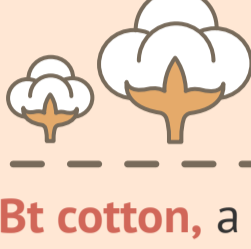
Why In News?

Recently leading agriculture scientist M.S. Swaminathan questioned the utility of GM crops as **"a sustainable agriculture technology"**



GM Crops

Crops or foods using GM organisms are referred to as **GM crops or Genetically modified crops**. According to **WHO**, GMOs or Genetically modified organisms are organisms in which the genetic material (DNA) has been altered in a way that does not occur naturally by mating and/or natural recombination



GM Crops in India

Bt cotton, a non-food crop, has been the only GM crop cultivated in India yet attempts have been made to commercially release **Bt Brinjal** and develop **DMH -11, a transgenic mustard**



GM Crops and Green Revolution

GM crops like Green revolution help to **increase productivity** of various crops e.g **cotton yields have almost doubled** in India over the years

Prior to the Green Revolution, India was the largest importer of food aid. GM crops can be a solution to achieve the goals of the **National food Security Act, 2013** i.e. to **enhance the India's food security needs**

GM crops have **greater resistance** to post Green Revolution challenges like new diseases, insects, climate change and **greater tolerance** to cold/heat, drought, flood, salinity, etc. without excessive use of chemicals

The **Green revolution reduced import** dependence with respect to **Rice and wheat**. GM crops can help to **eliminate import of edible oil, Pulses, etc.**

GM crops provide an opportunity to bring an **"evergreen" revolution** that benefits landless, marginal and small farmers in other corners of India. The same as Green revolution has brought **Socio-economic Development** in the Punjab-Haryana-Western UP belt

The Cartagena Protocol on Biosafety to the Convention on Biological Diversity (2003) aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity and human health.

Biological Diversity Act, 2002 aims at conservation of biodiversity, sustainable use of its components and fair & equitable sharing of benefits arising out of utilization of genetic resources.

Issues and Challenges with GM Crops

MONOPOLY patent laws give developers of the GM crops a lot of control over the food supply e.g. the **"terminator seeds"** allows farmers to use the seeds just once

OUTCROSSING the migration of genes from GM plants into conventional crops or wild species may have an indirect effect on food safety and food security

DECLINE IN YIELD after few years with respect to many GM crops which in turn leads to diminishing returns

RISK TO HUMAN HEALTH due to Gene transfer from GM foods to humans, particularly if antibiotic resistance genes were to be transferred

ALLERGENICITY remains a concern while no allergic effects relative to GM foods have been found yet

RESISTANCE DEVELOPED BY PATHOGENS to the toxins produced by GM crops. E.g the **pink bollworm** has grown resistant to the toxins produced by BT cotton seed of Monsanto

ENVIRONMENT CONCERNS like the susceptibility of non-target organisms (e.g. bees and butterflies), the loss of biodiversity of crop/plant species, presence of toxins (produced in GM crops) in every part of the plant may reach the soil/water table

CONCERNS REGARDING GEAC (GENETIC ENGINEERING APPROVAL COMMITTEE) such as adhocism in its constitution, criteria adopted for selection of its members, dominance of bureaucrats, no representation from civil society or states, possibility of data manipulation as the GEAC is solely dependent on the data provided to them by the technology developer

NEGATIVE PUBLIC PERCEPTION public attention has focused on the risk side of the risk-benefit equation owing to lack of transparency and ignorance about the scientific facts related to GM crops

Way Forward

Need for an independent authority -**the Biotechnology Regulatory Authority of India (BRAI)** to regulate organisms and products of modern biotechnology, **proactive patent regime** to prevent monopolisation of the GM seed market, **transparency** i.e. effective discussion with scientific community, civil society to allay their fears, **Consultation** with state governments etc.

The **Cartagena Protocol on Biosafety** and the **Biological Diversity Act, 2002** must be effectively implemented

