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**DAILY EDITORIAL
ANALYSIS**

TOPIC

**Contested Harvest: On India
and Genetically Modified
Food Crop**

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CONTESTED HARVEST: ON INDIA AND GENETICALLY MODIFIED FOOD CROP

Context

- Recently, a two-judge Bench of the Supreme Court of India delivered a split verdict on the question of allowing Genetically Modified (GM) mustard in farmer fields.

About the Genetically Modified Crops

- Genetically modified crops, also known as **genetically engineered crops**, are plants whose genetic material has been intentionally altered using specific DNA sequences.
- These modifications aim to enhance desirable traits, such as resistance to **pests, tolerance to environmental stresses** (like drought or extreme temperatures), and improved yield.
- **Modification Techniques:** Scientists use techniques like **Agrobacterium-mediated transformation and particle bombardment** to introduce specific genes into crop plants. These genes may come from the same species or even other organisms.

Benefits of GM Crops

- **Reduced Waste:** GM crops can reduce waste by improving crop yield and minimising losses due to pests or diseases.
- **Less Reliance on Pesticides:** Pest-resistant GM crops can reduce the need for chemical pesticides.
- **Abiotic Stress Tolerance:** Some GM crops are engineered to withstand harsh environmental conditions like drought or extreme temperatures.

Global GM Crop Cultivation

- USA, Brazil, Argentina, India and Canada are five top GM growing countries, together accounting for approx. 90% area of the GM cultivation.
- Soybean, maize, cotton and canola with herbicide tolerance and insect resistance are the major GM crops grown around the world.

GM Crops in India

- Indian farmers began cultivating **Bt cotton**, a pest-resistant GM cotton variety, in 2002-03. Bt modification involves introducing a gene from the soil bacterium **Bacillus Thuringiensis** into the cotton plant.
- Recently, the GEAC approved the commercial cultivation of **genetically modified mustard varieties**.

Regulatory Framework in India

- India has a well-established regulatory framework for GM crops. **GEAC, under the Ministry of Environment, Forest and Climate Change**, assesses proposals related to the release of GM organisms into the environment.
- The evaluation includes health, environment, food, and feed safety assessments. Various committees review data generated during the development process of GM crops.
- Guidelines issued by the **Department of Biotechnology and the Ministry of Environment** ensure safety and proper monitoring.

Regulating GM Crops

- **Development, cultivation and transboundary movement** of GM crops is regulated so as to ensure the safety of animal health, human health and biodiversity.
- In India, such regulations are provided in the Rules for Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms (HM) Genetically Engineered Organisms or Cells, 1989 under the **Environment Protection Act (1986)**. The rules cover:

- ◆ All activities involving research and development of products containing GMOs including transgenic crops, pharma products, industrial products, food and foodstuffs.
- ◆ Field and clinical trials
- ◆ Deliberate or unintentional release
- ◆ Import, export and manufacture

Bodies on GM Crop Regulation

- **Recombinant DNA Advisory Committee (RDAC):** Monitors the developments in biotechnology at national and international levels.
- **Institutional Biosafety Committee (IBSC):** Approves low-risk experiments and ensures adherence to prescribed safety guidelines. Recommends high-risk experiments to the Review Committee on Genetic Manipulation (RCGM) for approval.
- **Review Committee on Genetic Manipulation (RCGM):** Reviews all ongoing projects involving high-risk and controlled field experiments. Approves applications for generating research information on GM plants.
- **Genetic Engineering Appraisal Committee (GEAC):** Approves activities involving large scale use of GMOs in research and production.
- **State Biotechnology Coordination Committee (SBCC):** Reviews the safety and control measures in various institutions handling GMOs. Acts as State level nodal agency to assess the damage, if any, due to release of GMOs and to take on-site control measures.
- **District Level Committee (DLC):** Inspects, investigates and reports to the SBCC or the GEAC about compliance or non-compliance of regulatory guidelines. Acts as nodal agency at District level to assess the damage, if any, due to release of GMOs and to take on site control measures.

Public Concerns and Debates

- **Segregation and Cross-Pollination:** There are worries about mixing GM crops with non-GM crops and the possibility of cross-pollination between GM crops and wild relatives.
- **Antibiotic Resistance Marker Genes:** Some GM crops use antibiotic resistance genes as markers during development. Concerns arise about the transfer of these genes to bacteria in the environment.
- **Allergens and Food Safety:** Ensuring that GM crops do not introduce new allergens into the food chain is crucial. Comparing the safety of GM and non-GM foods remains a topic of debate.
- **Public Perception and Industry Persistence:** Despite scientific evidence supporting the safety of GM crops, widespread hostility persists. It's essential for governments, scientists, and industry players to continue research and communication to address public concerns.

Crop in Question: Dhara Mustard Hybrid-11 (DMH-11)

- Developed under a publicly funded project at **Delhi University's biotechnology department**, this mustard variety boasts genes that make it attractive to private seed companies for creating newer hybrid varieties.
- For any crop to be approved under India's agricultural system, it must undergo rigorous testing across different agro-climatic zones over three seasons. DMH-11 passed these metrics, according to trials conducted by the **Indian Council of Agricultural Research (ICAR)**.

Environmentalist Concerns

- Environmentalists raised red flags, **labelling DMH-11 as a 'herbicide-tolerant' crop**. Essentially, it's genetically coded to work well with specific pesticides.
- Critics argue that this forces farmers into using those particular pesticides, with potentially harmful environmental consequences.
- **Transparency** also became a bone of contention.

Supreme Court on Issue

- The Supreme Court judges had differing opinions. One judge in the two judges bench of the Supreme Court, believed that the **GEAC violated the 'precautionary principle'** which suggests that any new organism or modifying technology should be treated cautiously unless its consequences are thoroughly deliberated upon.
- **Another Judge**, on the other hand, seemed satisfied with the process. The case now **heads to a larger Bench led by the Chief Justice of India**.

Bigger Picture: Ideology vs. Yield

- The dispute over GM crops transcends mere agricultural metrics like yield and farm economics. It's fundamentally ideological. India's history with hybrid seeds and synthetic fertilisers — once hailed as panaceas — has also brought environmental challenges.
- While hybrid seeds improved yields, they also unleashed unintended harm on the environment.

Conclusion

- GM crops represent a powerful tool for addressing agricultural challenges, but responsible regulation, transparent communication, and ongoing research are vital to navigating this complex landscape.
- In the end, the Court ordered the Centre to evolve a policy on GM crops. The battle rages on, with proponents and opponents locked in a tug-of-war between science, ethics, and practicality.
- As India grapples with its agricultural future, the GM crop saga remains a contested harvest indeed.

Mains Practice Question

[Q] What are the potential benefits and risks associated with the adoption of Genetically Modified (GM) food crops in India? Highlight the regulatory framework.