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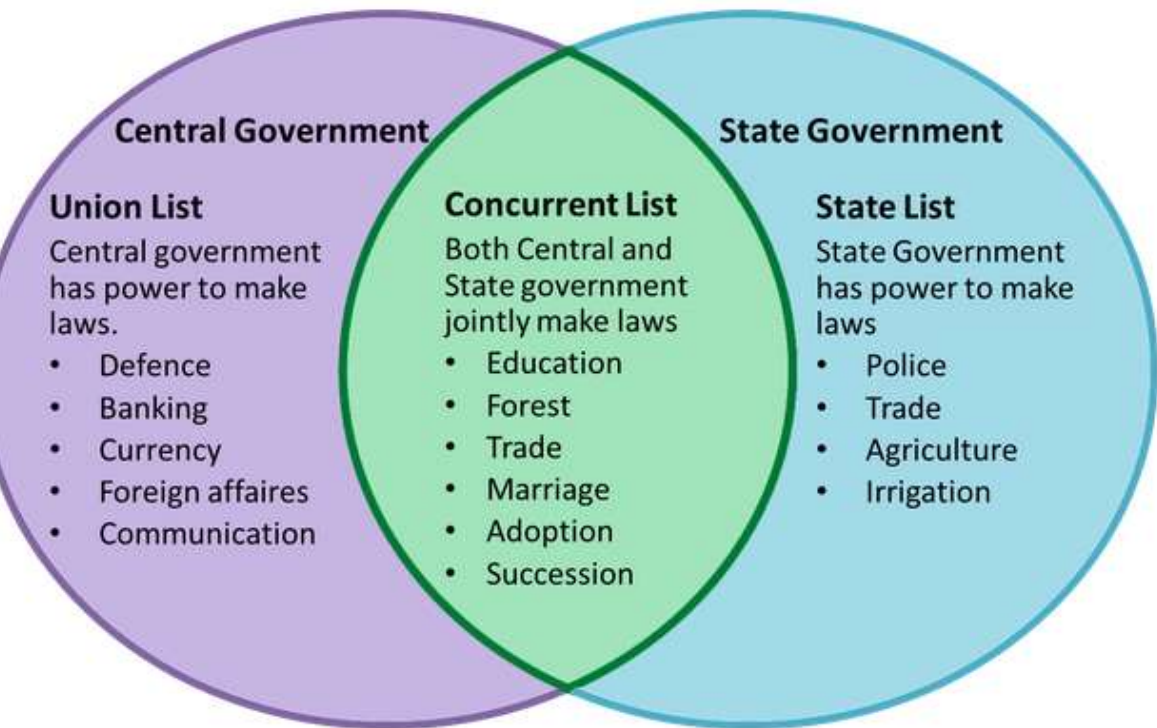
Transgenic Crops



Why in News?

- Recently, **Gujarat, Maharashtra and Telangana**, have **postponed** a **proposal**, approved by the **Centre's Genetic Engineering Appraisal Committee (GEAC)**, to **test** a new kind of **Transgenic Cotton Seed** that contains a gene, **Cry2Ai**.
- Gene **Cry2Ai** purportedly **makes cotton resistant to pink bollworm**, a major pest.

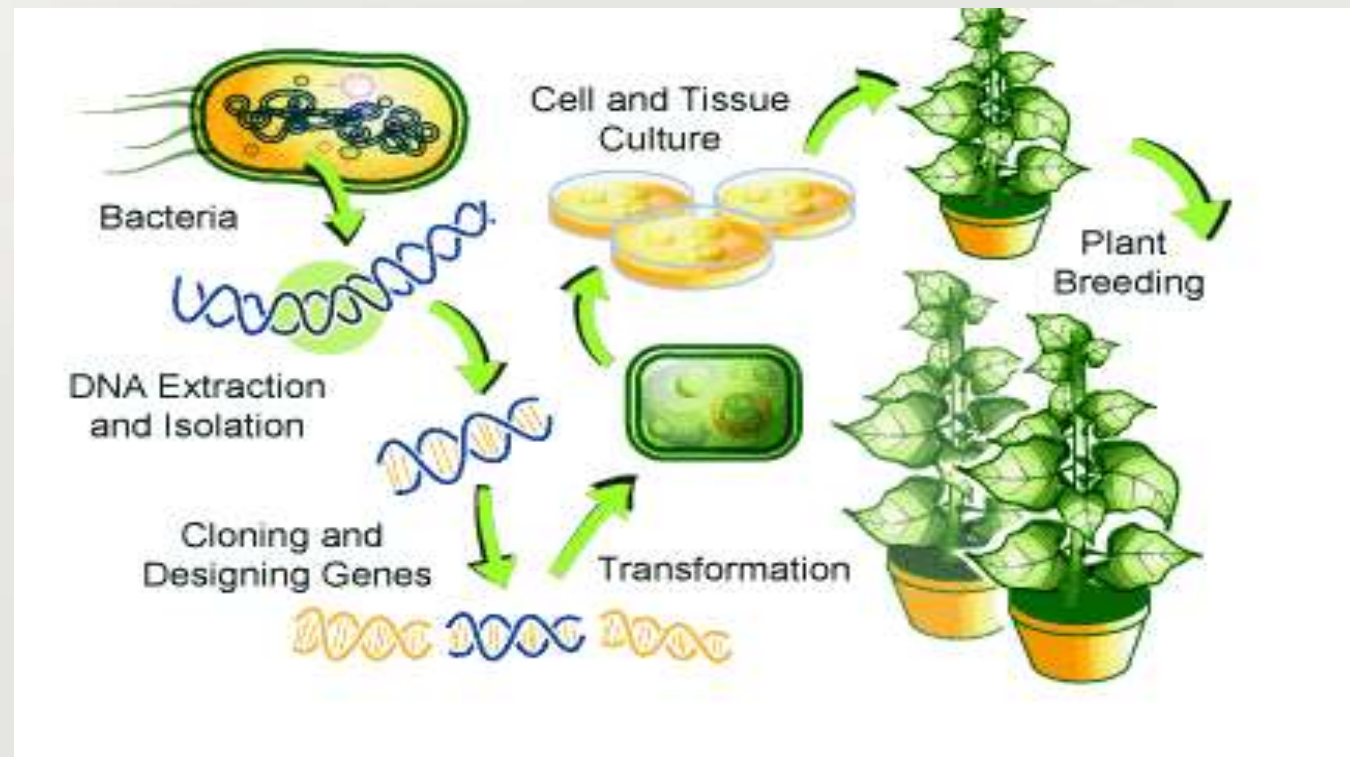




- **Agriculture** being a **State subject** means that, in most cases, **companies interested in testing their seeds need approvals from the States** for conducting such tests.
- Only **Haryana** gave permission for such tests.
- **Telangana** requested an extension to consider the proposal and **later responded that trials would not be allowed** in the current cropping season.
- **Gujarat**, on the other hand, simply stated that the proposal was **unacceptable** without furnishing reasons.

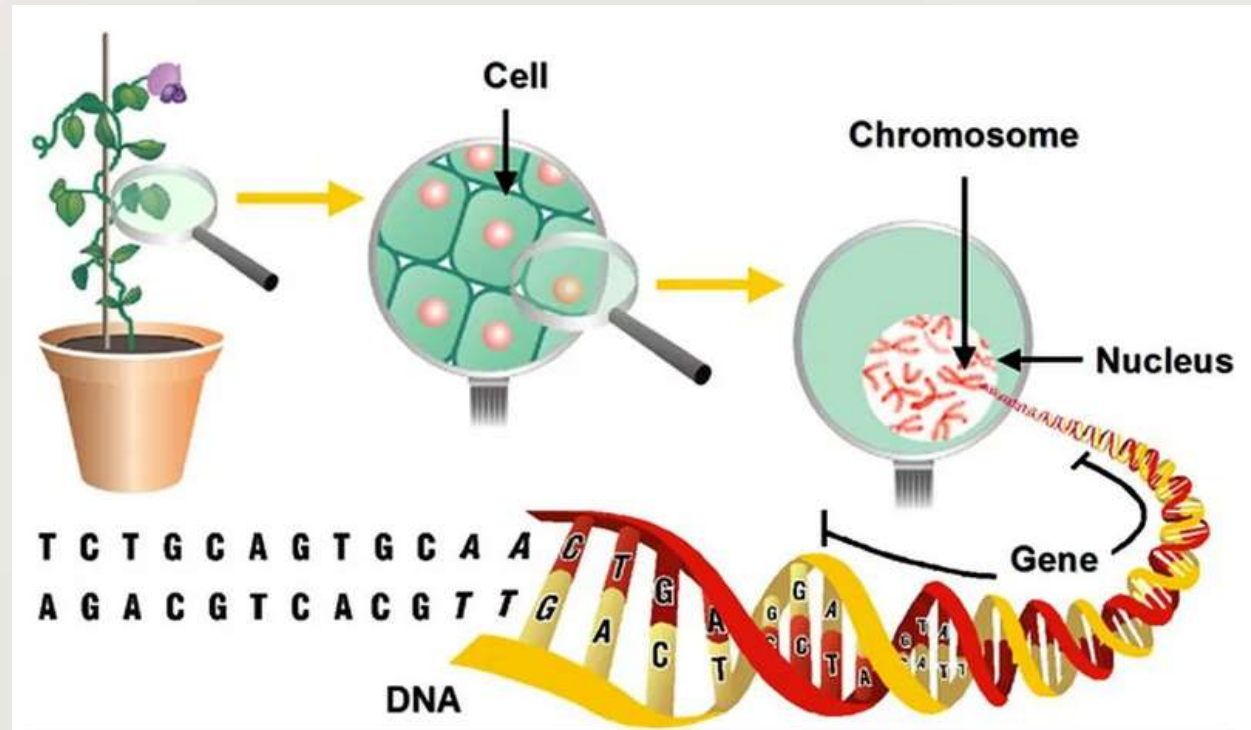
Transgenic Crops

- **Transgenic crops are plants that have been modified through genetic engineering techniques.**
- **These crops have had specific genes inserted into their DNA to give them new characteristics or traits that are not naturally found in the species through traditional breeding methods.**



A close-up photograph of a hand holding a green plant stem. The hand is positioned at the bottom left, with fingers wrapped around the stem. The stem is thin and green, with several large, oval-shaped green leaves attached. The leaves have a smooth texture and prominent veins. The background is a plain, light-colored surface. Three black dots are visible in the upper right corner of the image.

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- The diagram illustrates the hierarchy of genetic organization. It begins with a plant in a pot, which is magnified to show a single cell. The cell is further magnified to show the nucleus, which contains chromosomes. A chromosome is shown as a coiled DNA molecule. A specific segment of the DNA molecule is labeled as a gene. Below the DNA molecule, the sequence of nucleotides is shown: T C T G C A G T G C A A A G A C G T C A C G T T. The DNA molecule is labeled 'DNA' and the gene is labeled 'Gene'.



Regulation of Genetic Modified Crops in India?

- In India, the regulation of all activities related to GMOs and products are **regulated by MoEFCC**-Ministry of Environment, Forest and Climate Change **under** the provisions of the **Environment (Protection) Act, 1986**.

Genetic Engineering Appraisal Committee (GEAC) under MoEFCC is authorised to review, monitor and approve all activities including import, export, transport, manufacture, use or sale of GMO.

GEAC recently approved commercial cultivation of genetically modified mustard.

- **GM foods** are also subjected to regulations by **FSSAI - Food Safety and Standards Authority of India** under the Food Safety and Standards Act, 2006.





Status of GM crops in India:

- In India, **only Cotton** is currently **commercially cultivated** as a **GM crop**.
- The **GEAC** approved the environmental release of **GM mustard hybrid DMH-11**, bringing it closer to full commercial cultivation.
- However, Supreme Court has put a stay on **GM mustard**, citing concerns about farmers using banned herbicides.
- Trials are underway for other crops like **brinjal, tomato, maize, and chickpea** using transgenic technology.

Acts and Rules that Regulate GM Crops in India:

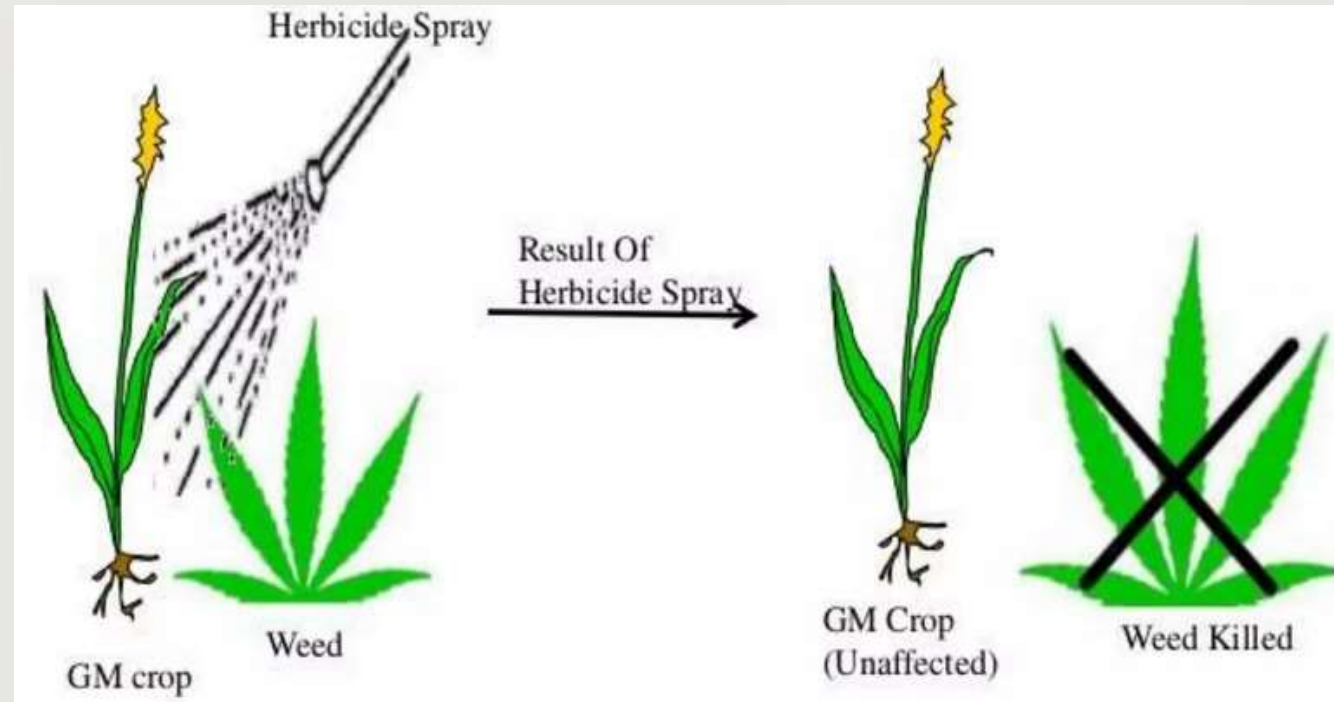
- **Environment Protection Act, 1986 (EPA),**
- **Biological Diversity Act, 2002,**
- **Plant Quarantine Order, 2003,**
- **GM policy under Foreign Trade Policy, Food Safety and Standards Act, 2006,**
- **Drugs and Cosmetics Rule (8th Amendment), 1988**



Significance of Genetic Modification (GM) Technique?

Control Weeds:

- GM technology has also played a crucial role in developing herbicide-tolerant crops.
- Crops like soybean, maize, cotton, and canola have been genetically modified to withstand specific broad-spectrum herbicides, allowing farmers to effectively control weeds while preserving the cultivated crop.



Ensuring Food Security:

- GM crops are being developed to adapt to changing environmental conditions.
- Researchers are working on strains of rice, maize, and wheat that can tolerate longer droughts and wetter monsoon seasons, ensuring food security in challenging climates.
- **Solution for Growing Crops in Salty soils.** GM has also been used to create salt-tolerant plants, offering a potential solution for growing crops in salty soils. **By inserting genes that remove sodium ions from water and maintain cell balance,** plants can thrive in high- salt environments



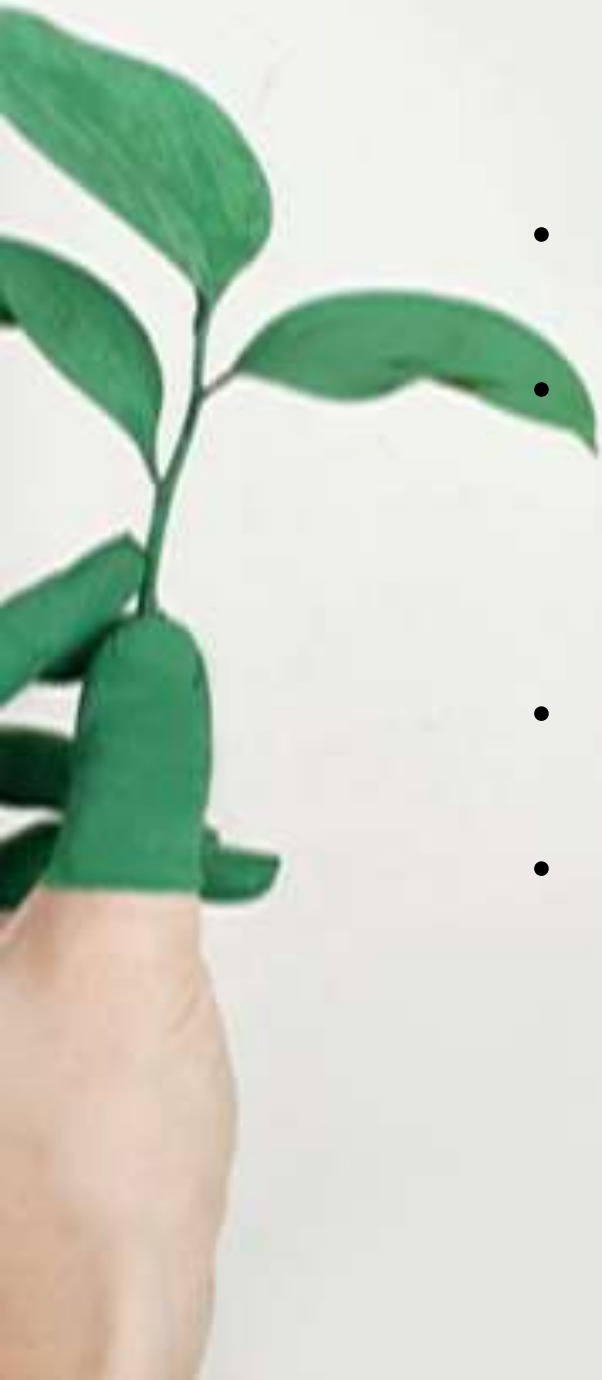
Concerns related to Transgenic Crops

Risks to Ecosystems:

- GM production can also pose risks to ecosystems and biodiversity.
- It may disrupt gene flow and harm indigenous varieties, leading to a loss of diversity in the long run.

Trigger Allergic Reactions:

- Genetically modified foods have the potential to trigger allergic reactions since they are biologically altered.
- This can be problematic for individuals accustomed to conventional varieties.



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