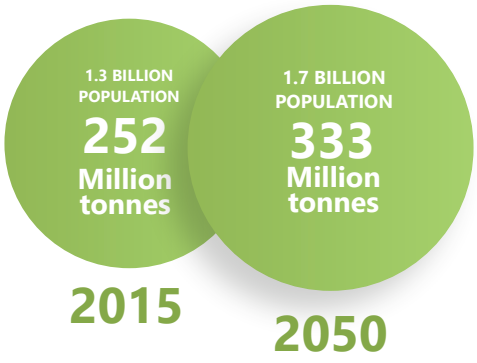
Centre for CIVIL SOCIETY
SOCIAL CHANGE THROUGH PUBLIC POLICY

GM Crops in India

What's a GMO?

Genetically Modified Organism (GMO) is defined as an organism in which the genetic material has been **altered** in a way that **does not occur naturally by mating**. Cross-bred organisms do not classify as GMOs.

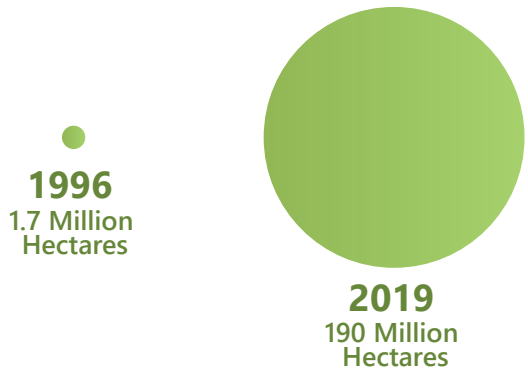
India's need for domestic food production



Global Hunger Index 2022 Rankings

This is based on nutritional parameters and GM crops in staples have enhanced nutritional values.

The Global Rise of GM Crops



107 Nobel laureates pitch for GM Crops

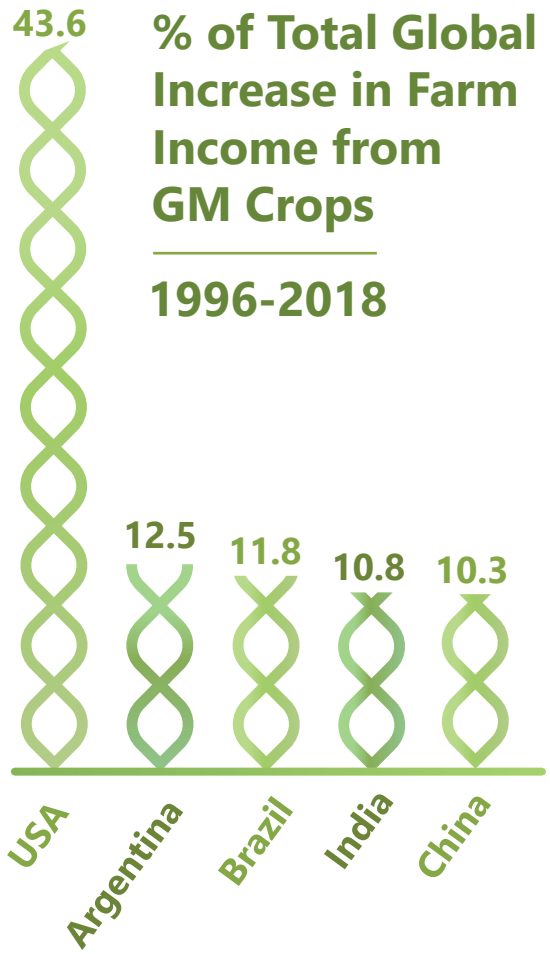
In 2016, 107 Nobel laureates signed a letter urging Greenpeace to revoke its anti-GM stance by citing the findings of various scientific bodies that suggest that GM crops are immensely beneficial to farmers and society at large.

WHO endorses existing GM foods

The World Health Organization (WHO) states that existing GM foods in the market have passed safety assessments and are unlikely to pose any health hazards.

% of Total Global Increase in Farm Income from GM Crops

1996-2018



From the Beginning...

1994
FIRST GM CROP INTRODUCED

Named 'Flavr Savr Tomato'developed by the Californian company Calgene, later acquired by Monsanto

1995
BT COTTON INTRODUCED IN INDIA

Maharashtra based Mahyco gained permission to import Bt material from Monsanto

2000
TECHNICAL GO AHEAD FOR BT COTTON

The Review Committee on Genetic Manipulation (RCGM) gave technical go-ahead to Bt Cotton

2001
COMMERCIAL APPROVAL FOR BT COTTON DENIED

The Genetic Engineering Approval Committee (GEAC) denied commercial approval, requested Indian Council of Agricultural Research (ICAR) to step in & provide independent advice

2002
BT COTTON APPROVED FOR COMMERCIAL RELEASE

GEAC approved commercial release for an initial 3 year period in 6 cotton growing states, which was later extended

2009
BT BRINJAL COMMERCIALLY APPROVED

First ever GM food crop to be commercially approved in India. Developed by Mahyco & Monsanto

2010
INDEFINITE PROHIBITION ON BT BRINJAL

MoEF&CC in 2010 put an indefinite moratorium on Bt Brinjal after public consultations

2011
MANDATE TO OBTAIN NOC FROM STATE GOVTS

GEAC made it mandatory for applicants to obtain 'no objection certificates' from state governments prior to field trials

2014
11 STATES REFUSE TO ISSUE NOC

Gujarat, along with 10 other states, refused to issue NOCs for field trials of GM food crops

2017
RECOMMENDATION FOR APPROVAL OF GM MUSTARD

Developed by Dr. Deepak Pental & team, University of Delhi. Officially known as Dhara Mustard Hybrid-11 given technical clearance by GEAC

2018
APPROVAL FOR GM MUSTARD HALTED

After facing opposition from the bee keeping industry, MoEF&CC says they are "studying the issue with meticulous precision"

2019
APPROVAL FOR FIELD TRIALS OF BT BRINJAL

GEAC approved field trials in 8 states during 2020-23, provided the state govts grant NOCs for the trials

2022
APPROVAL OF GM MUSTARD

GEAC approved commercial cultivation of GM mustard in its 147th Meeting

2022
SUPREME COURT HALTS GM MUSTARD

Supreme Court ordered to halt the planting of GM Mustard within 1 week of GEAC approval

Farmers want Access to Technology

Many biotech proponents indicated the illegal cultivation of GM crops as a signal of farmers' willingness to embrace GM technologies.

15% of cotton farmers in major cotton growing states had **switched to the HtBt variant in 2017**

GUJARAT, 2001

11,000 hectares of illegal GM cotton worth **$30 million** discovered

MAHARASHTRA, 2021

Nearly **50% of cotton** cultivated in Maharashtra in 2021 was expected to be **HtBt Cotton**

Sales of **illegal HtBt cotton** have more than **doubled** during 2020 -2021 from **3.5 million to 7.5 million** packets

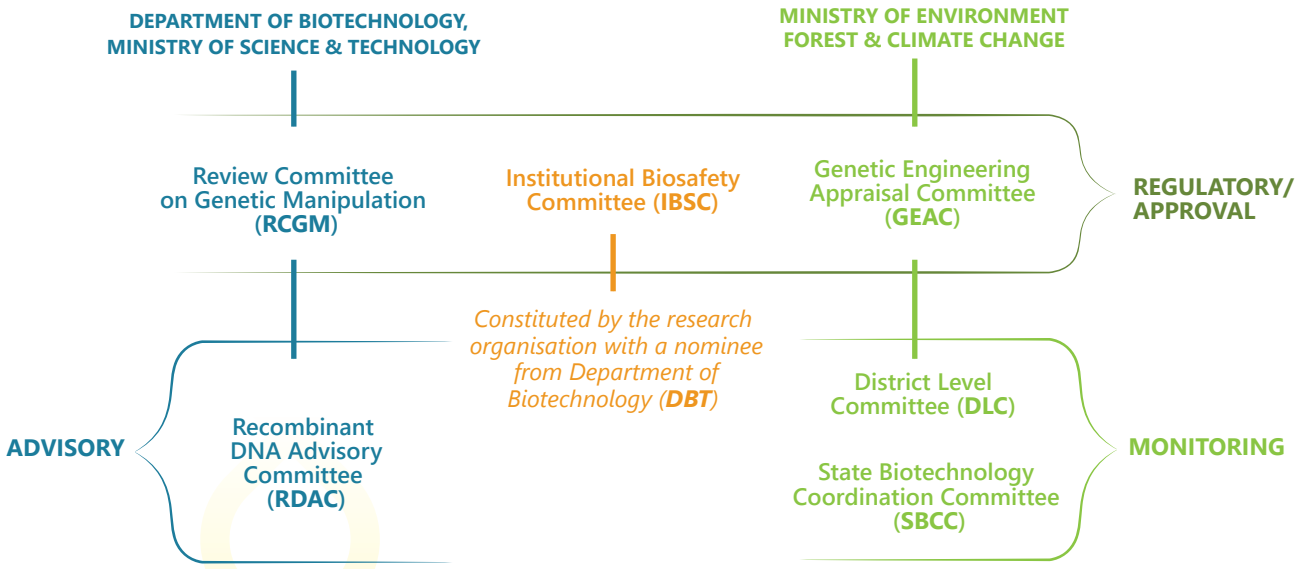
AKOLA, 2019

1,500 farmers led by Shetkari Sanghatana, a **pro-GM farmers union,** gathered to plant HtBt cotton in protest of the regulatory logjam

How GM Crops are Regulated in India

In India, genetically modified organisms (GMOs) are broadly regulated under ***Rules for the manufacture, use, import, export & storage of hazardous microorganisms, genetically engineered organisms or cells, 1989*** notified under the Environment Protection Act, 1986 (EPA, 1986).

SIX AUTHORITIES IMPLEMENTING THE 1989 RULES



Words Matter

It is interesting to note how...

The **1989 Rule** on GMOs by definition regards GMO as **Hazardous** **(** *...hazardous microorganisms of genetically engineered organisms...***)**

GEAC changed its name from Genetic Engineering **Approval** Committee to Genetic Engineering **Appraisal** Committee in 2010. The name change was deemed to be more "psychological" and grounded in a "mindset change"

GM Crop Approval Process

1 Laboratory

APPLICANT

Containment

SAFETY TRIALS
- ✓ Food Safety
- ✓ Feed Safety
- ✓ Environmental

DATA for BIO SAFETY

2 Field Trials

RCGM GEAC

Review of Primary Data

Biosafety Research Level (BRL)

BRL I

- RCGM Initiated
- GEAC Approved

Biosafety data from 2-3 locations

> 0.4 ha per trial per location for 2 years.

Where Trials are Not Allowed
- ✗ Not to be Conducted in Farmer's Field

Where Trials are Allowed
- ✓ Applicant's premises
- ✓ Research farms
- ✓ Long-leased land
- ✓ Designated research institutions such as ICAR

BRL II

Purview of the GEAC

Covering at least 8-9 locations

3 Environmental Release

GEAC approval in consultation with RCGM & ICAR

4 Commercialization

GEAC approval if Safe for Humans

Product vs Process

Regimes across the world either treat GMOs as a 'Product' or a 'Process' before creating a regulatory set up

GMO AS PRODUCT
Examples: US, Argentina, Canada

Development → Testing → End Product

REGULATED

GMO AS PROCESS
Examples: India, Brazil, China

Development → Testing → End Product

REGULATED

Global Acceptance of GM Crops

Over the years, many countries who previously held a conservative opinion on GM crops have realised its benefits of GM crops and have approved its cultivation.

USA

Approved the GM purple tomato in September 2022.

China

Approved 12 GM corn and 3 GM soybean varieties in 2021 after coronavirus outbreak added to food security concerns.

Philippines

Recently approved the commercial cultivation of Bt Brinjal in October 2022.

Kenya

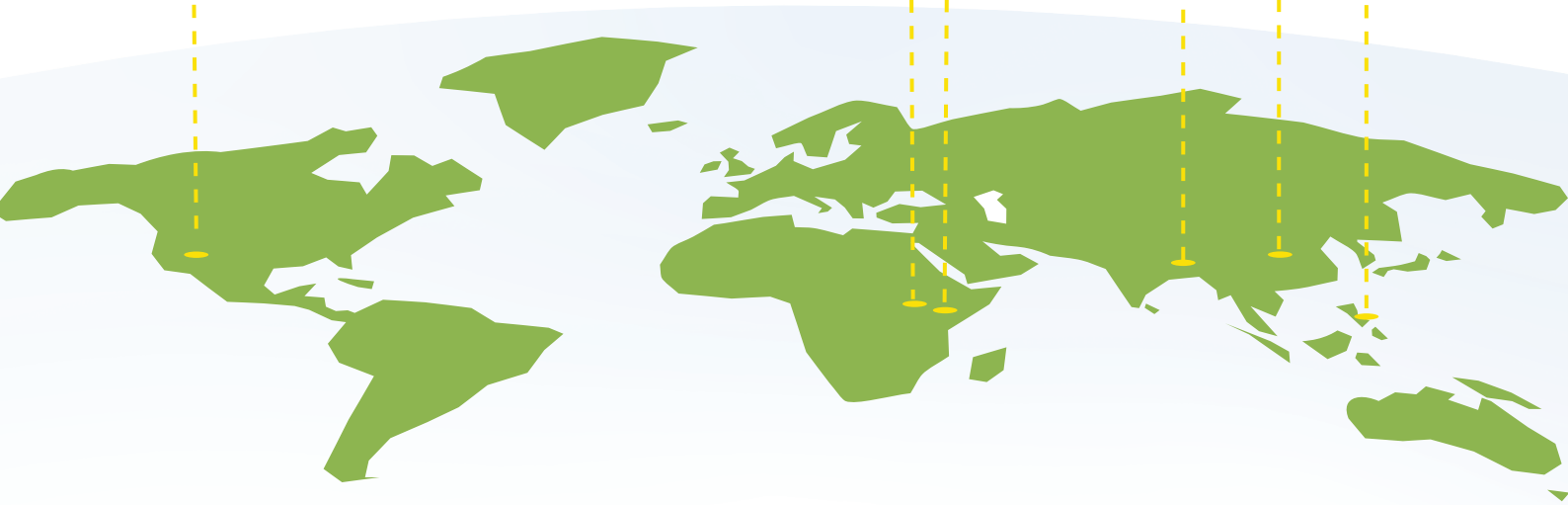
Lifted a 10-year ban on GM crops to combat droughts by reducing its dependence on water intensive agriculture and to provide food relief in times of environmental stresses.

Bangladesh

Approved Bt Brinjal in 2013 and managed to cut pesticide use by 61% and increased profits six-fold.

Ethiopia

Historically opposed GM crops, approves the field trials for fungal resistant GM potato in 2022.



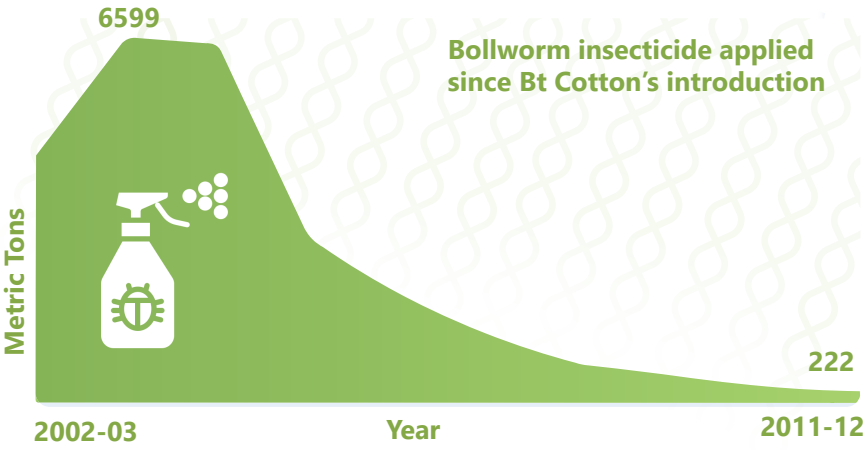
The GEAC recommended the environmental release of genetically modified (GM) mustard (Brassica juncea) variety DMH (Dhara Mustard Hybrid)-11 in October 2022 for the advancement and development of a new generation hybrid, laying the foundation for the commercialization of the nation's first GM food crop. However, within a week, the Supreme Court ordered to halt the planting of GM Mustard as long as the matter remains subjudice.

Bt Cotton in India

Bt - Bacillus thuringiensis

Since its introduction in 2002, Bt Cotton saw a rapid adoption.

7/8 Million Cotton Farmers have adopted Bt Cotton in India



Bt Cotton is the **only approved GM crop in India** and accounts for **6% of global acreage** of GM crops, putting India in 5th place globally for GM cropland.

The need for GM mustard in India

65%

of India's edible oil requirements are **imported from other countries**

2x

Edible oil prices in India have **more than doubled** in the last decade

Plot-level trials of GM mustard have shown that its yields are **28% higher** than the non-GMO Varuna variety

Australia's approval of Indian GM mustard

In October 2022, the OTGR granted the licence to BASF Australia Ltd and authorised the commercial release of Indian GM mustard genetically modified (GM) for herbicide tolerance & male fertility restoration.

> *GM Indian mustard poses negligible risk to the health and safety of people or the environment. General conditions have been imposed to ensure that there is ongoing oversight of the release.*
>
> — **Office of the Gene Technology Regulator (OTGR)**, Australian Government Department of Health and Aged Care

5

Risk scenarios were postulated during the approval process. The level of risk for each scenario was considered negligible in relation to both the seriousness and likelihood of harm both in the short and long term.

The licence holder must also provide an **annual report** to the regulator which shall contain information about GMO grown for commercial and non-commercial purposes, and any and all information about the **GMO's adverse effects**.

Concerns to be addressed

Gridlock of Bureaucracy

The ever growing, micromanaging bureaucracy of GM crops in India hinders economic growth.

Decoupling of Politics & Science

Vested interests influencing government policies for the sake of vote bank.

Seed Monopolization through Stringent Intellectual Property Regime

Notable GMO critics argue about the lack of autonomy for the farmer when only a few corporations have IP rights over seeds.

CENTRE FOR CIVIL SOCIETY

Founded in August 1997 on the 50th Anniversary of India's independence, Centre for Civil Society (CCS) is a leading public policy think tank today, ranked 5th in India and 83rd in the world by the TTCSP 2021 report.

CCS champions individual choice and institutional accountability by shaping India's public policy, using evidence-based research, outreach programs, and policy training. Our areas of work include education, livelihoods, governance, environment, agriculture, and science & technology policy.

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Centre for CIVIL SOCIETY
SOCIAL CHANGE THROUGH PUBLIC POLICY

25 YEARS & BEYOND

Principal Investigator:
Prashant Narang, Centre for Civil Society

Contributors:
Manickam Valliappan, Tarini Sudhakar, Astha Pandey, and Arjun Krishnan

Designer:
Prabhava Kini

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