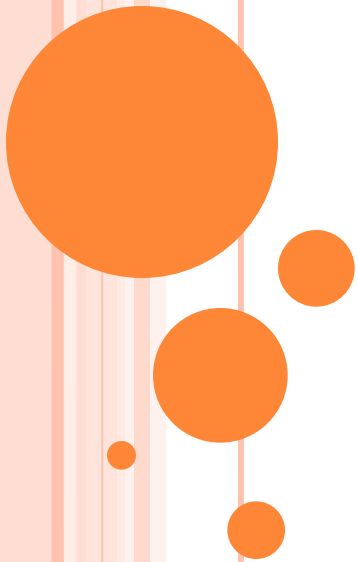


# **GENETICALLY MODIFIED CROPS**

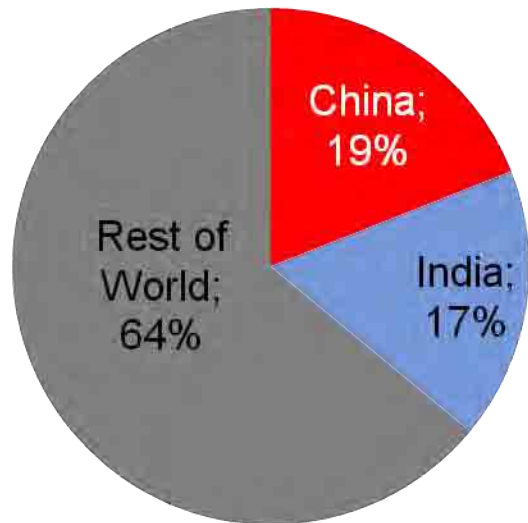
## **THE REAL STORY FROM INDIA AND CHINA**

**Rajesh Krishnan & Sree Devi  
Lakshmikutty**

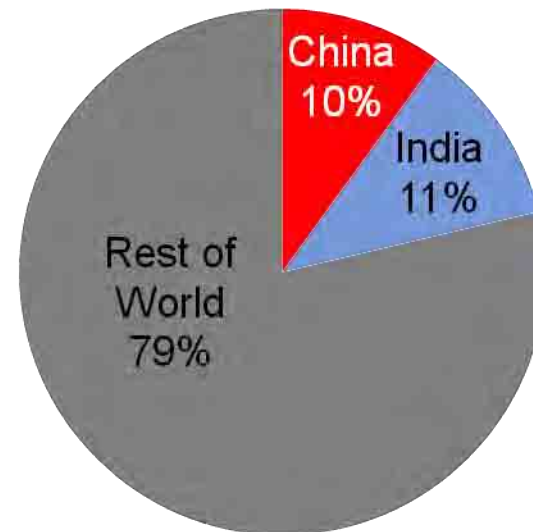


# WHY ARE INDIA & CHINA IMPORTANT IN GM DEBATE?

Population



Area under agriculture



As two leading agrarian nations with largest populations in the world, the debate in India and China is about

- Keeping the largest stretch of farm area in our world free from GMOs
- The largest percentage of global population having safe GM-free food.

**Policies here have an impact on the global agriculture policy discourse.**





# THE INDIAN GM DEBATE IN 3 ACTS

- I. Bt Cotton
- II. Bt Brinjal
- III. Bio-technology Regulatory Act of India (BRAI)

# COTTONING TO SOME FACTS

First and only GM crop approved for cultivation in India

Developed by  
Mahyco-Monsanto  
Biotech (MMB)  
Commercialized in  
2002



1,128 Bt hybrids  
approved in 10 years.  
MMB has licensed Bt  
cotton to 33 seed  
companies

Six different events;  
Four Bt genes - Cry1Ab,  
Cry1Ac, Cry2Ab and Cry1C.  
Single gene (Bollgard -1-  
Cry1Ac) and stacked gene (  
Bollgard-II- Cry 1Ac & Cry 2Ab  
) Bt cotton introduced by MMB

Bt cotton covers over 90% of area  
under cotton cultivation.  
Monsanto's Bt gene accounts for  
over 93% of the Bt cotton.  
Area under cotton 11.1 Million  
hectares; 9.5 m ha is Bt cotton

# Bt cotton Hype Vs Reality

Stagnant yields

Evolution of secondary pests

Target pest is developing resistance

Pesticide usage increases after initial dip

More irrigation & chemicals required

Adverse effect on soil fertility

Non-Bt cotton seeds not available in the market

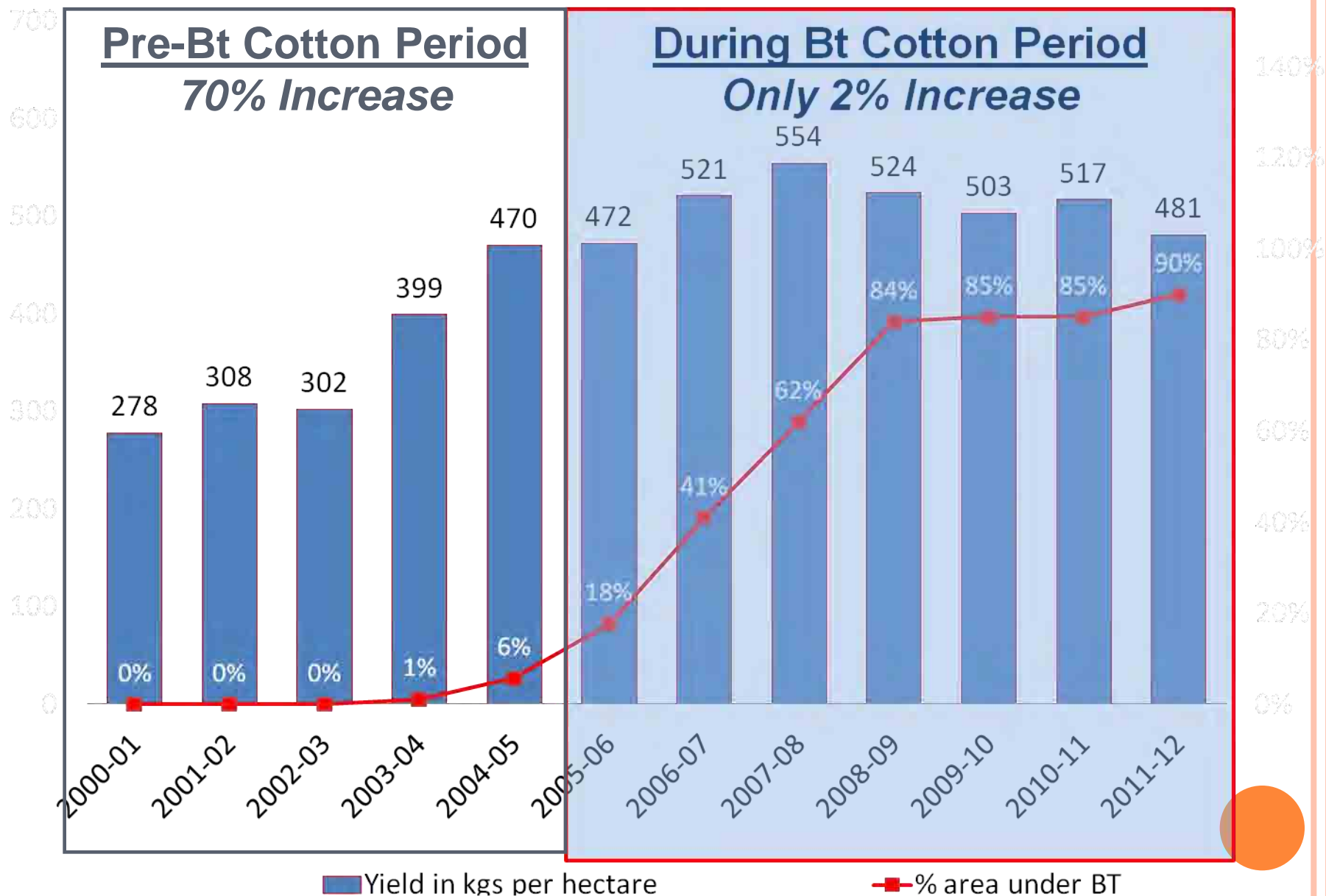
Monopolistic control by one company

Aggressive marketing and media manipulation

Farmer suicides continue



# Increase in Cotton Yield: The Full Picture



Data for % area under BT for 2010-11 and 2011-12 are estimates and for 2005-06 is interpolated

# REALITY OF BT COTTON YIELDS

*“The main issue... is the stagnation of productivity at an average of 500 kg (lint) per hectare for the past seven years... **unaffected by the increase in area of Bt cotton from 5.6% in 2004 to 85% in 2010.**”*

- Dr. Kranti, Director, Central Institute for Cotton Research

- **So How did yield and national production increase in the last decade?**
  - Moving from varieties to cotton hybrids
  - Expansion of irrigated area
  - Bringing new, fertile lands under cotton
  - Good rainfall, low pest incidence years



# NEW PESTS, DISEASES AND MORE.....

## **Emergence of secondary pests and new pathogens :**

*“Other concerns relate to the enhanced problems of sap-sucking insects...new pathogens...started affecting the new Bt hybrids. Insect populations of mealybugs, miridbugs...hitherto unknown as pests, suddenly emerged as concerns after the introduction of the new Bt-cotton hybrids.”*

- Dr. Kranti, leading cotton scientist, Central Institute of Cotton Research

## **Target pests develop resistance**

- Bollworm developing resistance to Bt cotton
- Monsanto admitted that pink bollworm has become resistant to single gene Bt cotton

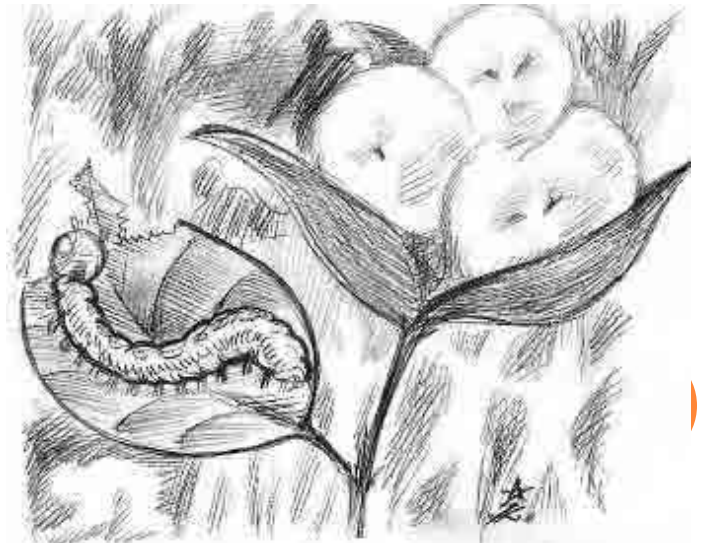
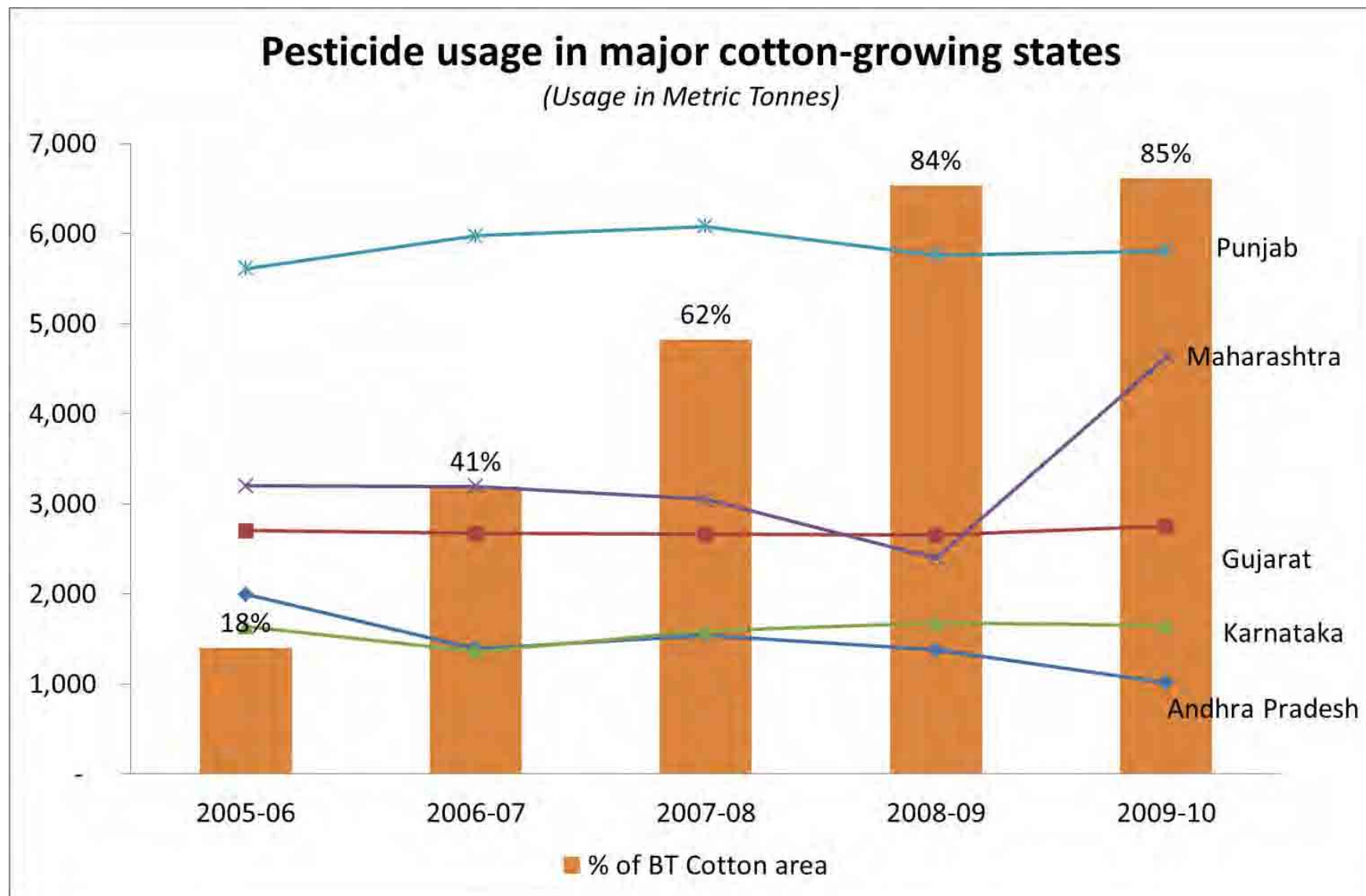


Image Courtesy: The Hindu



# PESTICIDE USAGE REMAINS HIGH



Source for both graphs : 10 years of Bt cotton: False hype and failed promises, Coalition for a GM-Free India.

# MEDIA MANIPULATION

Misleading “Consumer Connect” item appeared in a leading newspaper. Originally appeared as a news item in 2008 (trip sponsored by company), repeated verbatim in 2011 as a full page advertisement!



# FALSE ADVERTISING

*Bollgard boosts the Indian cotton farmers' income by over ₹31,500 crores*

India's farmers choose to plant hybrid cotton seeds with insect-protection Bt technologies on 80 per cent of India's cotton acres. The benefit of Bollgard technologies' in-built plant protection in high yielding hybrid cotton seeds helped create ₹31,500 crores\* additional value for 80 lakh cotton farmers by significantly reducing insecticide usage, and boosting their yield and income. This yield increase had a positive cascading impact on the growing cotton seed sowing and textile industry, exporters, and the Indian seed industry.

\*Rural Marketing India for Bt cotton sowing; Mahyco-Monsanto Bt cotton (MWR)

Farmer's Pride. India's Pride.

  
Bollgard II

  
Mahyco-Monsanto  
BIO-TECHNOLOGICALS

Mahyco-Monsanto advertisement in national dailies claiming Bt cotton boosted farmer income by €4 billion Euros, company asked to drop ad!

# POLICY MAKERS WAKE UP AFTER A DECADE

- Maharashtra State Agri Minister questions suitability of Bt cotton in rain-fed areas
  - Ordered socio-economic evaluation of Bt cotton
- CICR initiates pilot projects with non-Bt cotton;
  - Admits Bt cotton has spread too much and there are too many hybrids
- Parliamentary Committee recognises farmer distress due to Bt cotton

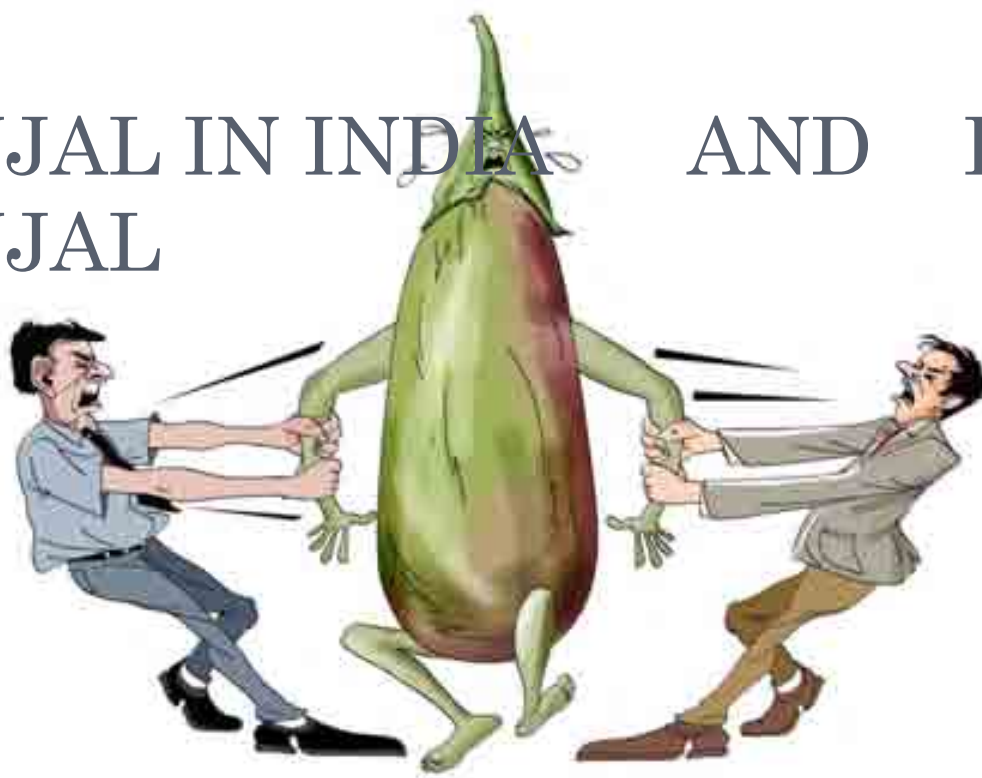
“The [Parliamentary Standing] Committee have found there have been **no significant socio-economic benefits to the farmers because of introduction of Bt. cotton.** On the contrary, being a capital intensive agriculture practice, investments of the farmers have increased manifold thus, exposing them to far greater risks due to massive indebtedness, which a vast majority of them can ill afford. Resultantly, after the euphoria of a few initial years, **Bt. cotton cultivation has only added to the miseries of the small and marginal farmers** who constitute more than 70% of the tillers in India.”





● *India's battle for Brinjal*  
( A.K.A AUBERGINE , EGGPLANT)

# BRINJAL IN INDIA AND Bt BRINJAL



- Second most popular vegetable in India
- Accounts for 9% of vegetable production, 8% of vegetable growing land
- Eight states account for most of the production
- Bt Brinjal is the first genetically modified crop to 've reached commercialisation stage.
- Developed by Mahyco (Monsanto has minority stake in Mahyco)
- Bt brinjal developed using a fusion Cry1Ac / Cry1Ab protein
- Supposed to confer resistance to Brinjal fruit and stem borer (BSFB)



# Bt BRINJAL- TIMELINE

- **2000- 2002 – Breeding and preliminary green house evaluation by Mahyco**
- 2006- Civil society seeks biosafety data in public domain;**
- **2007- SC asks GEAC to put raw biosafety data in the public domain**
- **2008 – Public protests & civil society campaigns begin; GEAC puts biosafety data in public domain**
- **2009 EC-II and then GEAC recommend release of Bt brinjal; Minister for Environment & Forests puts EC-II report in public domain & decides to hold public consultations**
- **2010 Jan-Feb- Public consultations**
- **February 9<sup>th</sup> 2010 - Minister for Environment & Forests declares an indefinite moratorium on Bt brinjal**



# India says no to Bt Brinjal

- **Ongoing PIL against GM**
- **Right To Information Law used**
- **Independent scientific experts opine**
- **Large scale public involvement**
- **In 2008 December the then Union Health Minister endorses concerns stall the approval.**
- **In 2009 October Minister for Environment & Forests responds to concerns - announces public consultations and seeks feedback**
- **States weigh-in on Bt brinjal release**
- **Extensive media coverage**

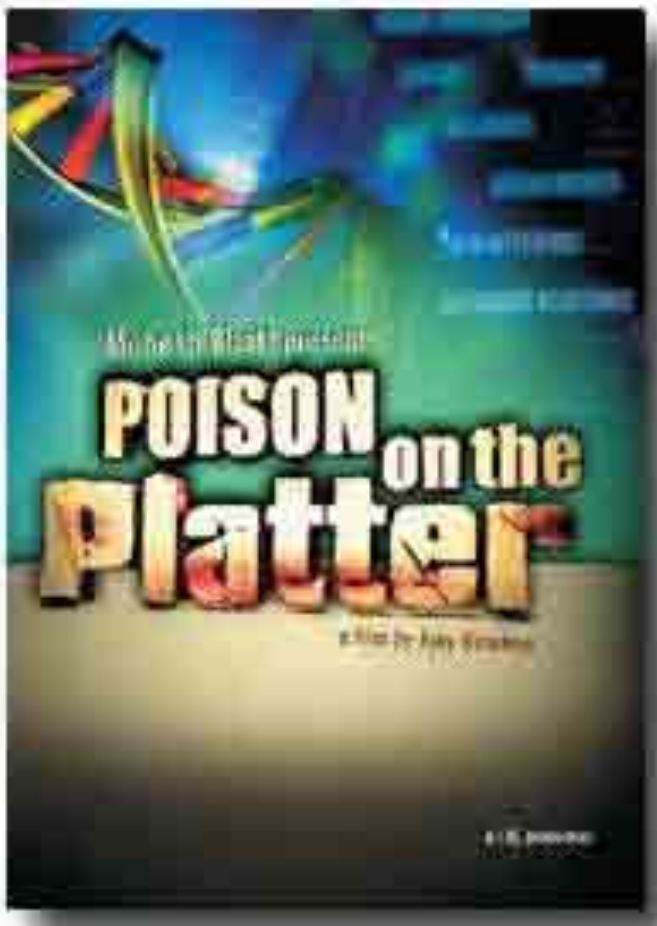




# Bt BRINJAL BECOMES METAPHOR FOR GM FOOD!



Campaign leads to Union Health Minister saying NO to Bt



Documentary films, street events- rural & urban





**BRINJAL FOOD FESTIVALS DISPLAYED DIVERSITY**



# Bt brinjal debate on the boil

**How safe are GM crops**

**FOOD SYSTEMS** Worldwide, 80 per cent of the world's population are facing food shortages. 12 billion in the country for every five years.

**THE 2010** Indian study of the economic impact of Bt brinjal and also change in its traits and nutritional value. Specific data on nutrition levels are sparse also and the impact of the pest control are being conducted as well of bio-safety studies.

**UNSAFE BY DESIGN** The GM Bt brinjal was first grown in 2005 and for further 2006 complete and even a slight increase in

GM crops answer to food shortage, says govt; not safe, say critics

**By Anand**  
New Delhi, May 4

**Special**

GENETICALLY MODIFIED (GM) crops are the answer to food shortage, says the government. It says GM crops are safe and will help increase food production. However, critics say GM crops are not safe and will harm the environment.

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Feasting & Fasting



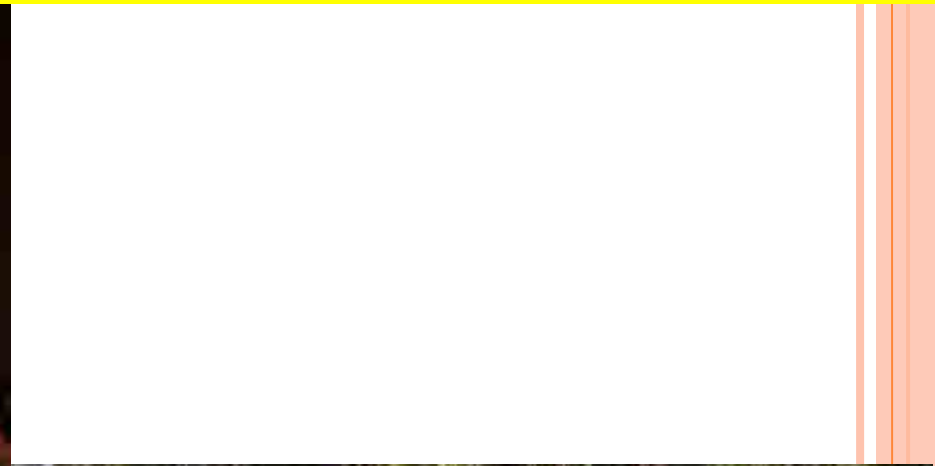
# State govt.s say No to Bt Brinjal

- 13 state governments say NO
- **Kerala, Chhattisgarh, Karnataka, Bihar, West Bengal, Orissa, Andhra Pradesh, Uttarakhand, Tamil Nadu, Madhya Pradesh, Himachal Pradesh, Gujarat, Delhi**
- 6 out of 8 main Brinjal growing states say NO





Public consultations in 7 cities , more than 8000 people & extensive media coverage



Protests, banners, colourful displays outside

Arguments and anxiety to be heard ....attended by heavy wts and ordinary citizens



# MORATORIUM ON BT BRINJAL

On Feb 9th,2010, the Minister for Environment&Forests, Mr.Jairam Ramesh declared a moratorium : *It is my duty to adopt a cautious, precautionary principle-based approach and impose a moratorium on the release of Bt brinjal till such time independent scientific studies establish, to the satisfaction of both the public and professionals, the safety of the product from the point of view of its long-term impact on human health and environment, including the rich genetic wealth existing in brinjal in our country*

States were against Bt brinjal

No independent testing was done ; no long term studies done

No consensus even among scientists about its safety

The regulatory body did not inspire confidence

No over-riding need for Bt brinjal

Concern about Monsanto controlling the food supply

No labelling laws in place





# Bt BRINJAL 2 YEARS ON

- Minister in charge changes but the Moratorium still in intact.
- The Parliamentary Committee in its report “Cultivation of Genetically Modified Food Crops: prospects & effects”: *upholds the moratorium and also recommends a thorough probe into the Bt Brinjal approval processes by the regulator to bring out the nexus between the regulatory bodies- industry and policy makers*





**BRAI- BIOTECHNOLOGY REGULATORY  
AUTHORITY OF INDIA**

*Past Imperfect Future Tense!*

# GM REGULATION IN INDIA- PAST IMPERFECT, FUTURE TENSE!

- Bt Brinjal debate exposed the failure of the current regulatory system
- The current regulatory system
  - Does not adopt a Precautionary Approach
  - No Need assessments.
  - No long term independent assessments of biosafety of GMOs
  - Transparency is not a norm but has to be forced.



# GM REGULATION IN INDIA- PAST IMPERFECT, FUTURE TENSE!

- Public participation in decision making completely absent – Bt Brinjal public consultation was a political decision.
- No deterrent liability mechanisms.
- Biased and fraught with conflict of interest.
- Monitoring system, be it for field trials or post commercial release, is in shambles.



# GM REGULATION IN INDIA- PAST IMPERFECT, FUTURE TENSE!

- Feb 9, 2010: Bt Brinjal canned !
- March 2010: BRAI surfaces
  - BRAI - single window clearance system for GMO approvals.
  - Provision to circumvent all the opposition that Bt Brinjal was facing
- The leaked version besides proposing a centralised, non-transparent, biased single window clearance system was also draconian going to the extent of imposing penalties(Fine and imprisonment) for those who oppose GMOs without 'evidence or scientific records'



# GM REGULATION IN INDIA- PAST IMPERFECT, FUTURE TENSE!

- Various public campaigns join hands, criticise the Draft Bill.
- Debate within the cabinet. Bill goes silent.



# BRAI VS BIOSAFE



# BRAI VS BIOSAFETY

- Resurfaces during the 2011 monsoon session [July-August] of the Parliament.
- Opposition inside the Parliament –
  - Several Members of Parliament send letters of formal opposition
- Public opposition mounts and takes a new form –
  - Making the World's Biggest GM Free Eggplant Dish [Baingan ka Bartha] in the National Capital and takes it to the Prime Minister.





# BRAI VS BIOSAFETY



# BRAI VS BIOSAFETY

- The same in the Winter session and the Budget session.
- Voices within the ruling coalition and even the ruling party joins the fight against BRAI.
- State Govts oppose BRAI
- Editorials in media from eminent persons opposing BRAI
- Objections from various segments including retired judges, lawyers ..



# BRAI VS BIOSAFETY

- Political opposition builds up – the Parliamentary Standing Committee on Agriculture in their report on 'GM Food crops - Prospects and Impacts' highlights the flaws in the proposed BRAI and recommends that govt put in place a Biosafety Protection Authority to safeguard the health of the citizens, biodiversity and farm livelihoods in the country.
- BRAI stalled and the fight for a progressive biosafety protection authority with a precautionary approach towards GM crops continues...



# THE EVOLUTION OF THE GM DEBATE IN INDIA

- From stopping of commercialisation of GM crops to preventing indiscriminate open releases. Almost all the field trials stopped in the at least 3 seasons except in just 3 states.
- From being seen as an issue pushed by select farmer unions and select civil society groups to a multi-stakeholder debate with involvement of various segments of society
- From saying no to a technology to one that proposes a change in paradigm with real solutions to real problems, both on the ground and in research.
- From being discussed in civil society conclaves to being debated in all walks of life and highest policy circles including the parliament , within state governments and the Supreme Court.



# THE PARLIAMENTARY STANDING COMMITTEE ON GM CROPS

- The Parliamentary standing committee on Agriculture had *suo motto* taken up the issue of GM crops towards the end of 2009.
- The standing committee is a 'mini-parliament' in itself with 31 M.Ps across party lines including 17 members from the ruling coalition.
- The committee after detailed deliberations and stakeholder consultations over 2.5 years tabled its unanimously passed report in the Parliament on the 9th August 2012.



# THE PARLIAMENTARY STANDING COMMITTEE ON GM CROPS

- The committee challenged the govt's haste in pushing India towards a transgenic revolution in agriculture and equivocally stated that techno-fixes like GM crops have no role to play in ensuring food security for the country.
- Highlighted the concerns on impacts of GM crops on human health, livestock, biodiversity and seed sovereignty.
- Points out the flaws in the current and proposed regulatory systems proposed a biosafety protection authority.
- Recommended that further research and development only in strict containment and no field trials under any garb



**How China stopped GM rice?**



# The Chinese GM scenario

- Bt cotton commercialised in 1996
- GM Papaya - only in one province in South China
- GM Tomato – approval period expired with no renewal
- GM rice illegally
- GM rice and GM corn biosafety approval





# Bt cotton in China

- Increase in secondary pest attacks and increase in pesticide usage
- Bt cotton seed 2 to 5 times more costly than non GM cotton
- No yield advantage, increasing diseases.
- Unavailability of Non Bt seeds, farmers switching over to other crops



# Building the Chinese Wall against GM Rice

In April 2005 GM rice expose in Hubei Province.

- Provincial govt wakes up, orders cleaning up of the seed supply system and investigates clandestine releases
- Illegal Chinese GM rice Bt 63 appears in European markets
- Chinese rice exports under threat



# Building the Chinese Wall Against GM Rice

- GP china takes the battle to consumers
- Releases consumer guides, asks food Brands and super markets to clean up their rice products.
- More than 500,000 no of consumers join the online mobilisation asking food brands to go GM free.



## Building the Chinese Wall Against GM Rice



# Building the Chinese Wall Against GM Rice

- Pressure builds on brands leading to GM free commitments
- Food brands - Cofco and Yihai Kerry goes GM free
- Followed by Supermarket giants – Carrefour, Auchan, Huapu and Nonchong





# Building the Chinese Wall Against GM Rice

- Scientific opposition builds up against GM crops.
- Father of Chinese hybrid rice Dr. Yuan Longping comes forward against GM rice.
- Several Chinese scholars signed a petition urging caution on GE rice and submitted it to the annual parliament meeting.



# Building the Chinese Wall Against GM crops

- Greenpeace China releases the patents report showing how even public sector GM crops are trapped in patents.
- Sections of the Govt also concerned about the possibility of foreign multinationals taking control over Chinese food and Agriculture through seed patents.
- Mao Ze dung's daughter comes out against GM rice.



# Building the Chinese Wall Against GM crops

- 2011 China decides to suspend the commercial release plans of GM rice and GM corn.
- 2012 January – The new draft National Grain law stresses on the need for grain cultivation that suits the ecology, local climate resources, water supply etc and **bans the application of transgenic technology in staple crops like rice, wheat and maize.**



# China builds a wall against GM rice!



Thank You!

