GMO: the Case of Bt. Brinjal

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• "Biotechnology" means any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.

• **Genetic engineering:** The direct manipulation of an organism's genome through the insertion of new DNA into the host genome.

• The host organism may or may not be related to the organism where the target gene/s come from.

• **Genetically Modified Organism:** an organism or microorganism whose genetic material has been altered by means of genetic engineering.

• **GM Food:** Crops created for human/animal consumption using the molecular biology technique to get desired traits.
Biotechnology, in the form of traditional fermentation techniques, has been used for decades to make bread, cheese or beer. It has also been the basis of traditional animal and plant breeding techniques, such as hybridization and the selection of plants and animals with specific characteristics to create, for example, crops which produce higher yields of grain.

The difference with modern biotechnology is that researchers can now take a single gene from a plant or animal cell and insert it in another plant or animal cell to give it a desired characteristic, such as a plant that is resistant to a specific pest or disease.
Arguments in favour
Insect resistance, less use of pesticides, more nutritious

Concerns raised/ignored
- Stagnant yields
- Evolution of secondary pests
- Resistance in target pests
- Increase of pesticide use
- Genetic contamination
- Adverse effect on soil fertility
- Development of “super weeds”
- Effects on human health

GMOs are not segregated and not labeled in most countries
CBD and Cartagena Protocol

- Discourage introduction of GM in centers of origin
- Seeks to ensure **an adequate level of protection** in the field of the safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health, and specifically focusing on transboundary movements.
The Precautionary Approach

- Article 10.6 and 11.8 states "Lack of scientific certainty due to insufficient relevant scientific information and knowledge regarding the extent of the potential adverse effects of an LMO on biodiversity, taking into account risks to human health, shall not prevent a Party of import from taking a decision, as appropriate, with regard to the import of the LMO in question, in order to avoid or minimize such potential adverse effects."
Centre of Origin: Undivided India
Laws of Bangladesh on Bio-safety

The Bangladesh Biosafety Rules, 2012

Bio-safety Guidelines of Bangladesh

National Bio-safety Framework
Rule 3. Restrictions on import or export of Genetically Modified Organism and products thereof

Rule 5. Identification or Labeling

Rule 7. Information regarding accident, negligence, administrative fine, etc.

Rule 9. Offences for Environmental Pollution and Damaging the Ecosystem.
The Case of Bt brinjal

- **Bt brinjal (48 varieties)**
  - The crop is a local variety of brinjal (aubergine or eggplant) that has been genetically modified to include a gene from the soil bacterium *Bacillus thuringiensis*. This gene produces the toxin cry1Ac that kills fruit and shoot boring pest (7 pests) when it ingests the plant.

- The Bt gene was developed by the **Maharashtra Hybrid Seed Company**, the Indian partner of the US seed giant **Monsanto** and later given to the public sector partners in **India, Bangladesh** and the **Philippines**.
• Bt brinjal was developed by the government-operated Bangladesh Agricultural Research Institute (BARI) with technical assistance from Cornell University in the US and funding from US Aid.

• Monsanto still owns the technology but has granted a royalty-free, not-for-profit license to BARI to test, produce and distribute the plants other than by sale. Farmers will be encouraged to save seeds and use them in future.

• India and the Philippines have said no to commercial release of bt. Brinjal (on ground of inadequate tests) that Bangladesh has allowed.
Approval given in three months (July-October, 2013)

- Biosafety committee of BARI and Biotech Core Committee of BARC on 14 July, 2013 recommended commercial release
- National committee on crop biotechnology in the MoA requested MoEF on 9 October, 2013
- On 20 October, 2013, MoEF requested DoE to have biosafety core committee meeting
- On 23 October, 2013, the BCC identified three major deficiencies
• On 25 October, 2013 BCC clearly mentioned total absence of tests about food safety and toxicity; expressed concerns over negative impacts on rodents and cows; serious concerns over gene flow and genetic contamination; emphasized on labeling.

• On 27 and 28 October, 2013 conditional permission was given although representatives of NIB, Fisheries and Livestock Department, Health Directorate objected and stressed on precautionary principle, environmental and health safety, and public consultation.

• All concerns overruled... BARI admitted absence of facilities in Bangladesh for testing food safety and toxicity.
Commercial Cultivation in Bangladesh

- In October 30, 2013 with approvals from MoEF and Agriculture MoA, BARI released four varieties of Bt brinjal for the 2013–2014 growing season: Bt Uttara, Bt Kajla, Bt Nayantara, and Bt ISD 006.
- Saplings were distributed to 20 farmers in January 22, 2014.
- Farmers complained less yield and 16 of them vowed not to cultivate Bt. Brinjal again.
- Despite this, the government claims to have distributed Bt. saplings to 100 farmers and subsequently to 1000 farmers.
- Government plans to release GM rice, potato and cotton anytime next year.
In Gazipur, farmer Abul Baten's Bt. brinjal crop died prematurely, causing huge loss. His farms grow vegetables that are exported abroad.

Source: www.theguardian.com/environment/2014/jun/05/gm-crop-bangladesh-bt-brinjal
Restrictive Approaches in India

- February 2020 - Minister for Environment and Forests declared an indefinite moratorium
- PIL played important role - SC asked GEAC to release all data
- SC in 2006-2007 ordered a halt to all new field trials for two growing seasons
- TEC appointed by the SC gave a majority report (2013) against Bt. Crops in general along with many other strong recommendations against GM crops
- In 2013, TEC recommended a moratorium for ten years on field trials of GM crops
- 6 out of 8 brinjal growing states say NO
• TEC recommendations
  • Prohibit all field trials of GM versions of crops for which India is a center of origin or a center of diversity
  • No GMO intended directly as a food has been commercially introduced into its center of origin; the TEC could not find any compelling reason for India to be the first to do so; there needs to be extraordinary compelling reasons …
  • Removal of conflict of interest in the regulatory body
  • A panel of scientists, qualified in evaluation of the biosafety data of GM crops to be engaged
  • Preliminary biosafety tests prior to field trials including sub-chronic toxicity in small animals
Twists in the Philippines

- The SC on 11 December ordered a permanent ban on field trials of GE eggplant and confirmed the Appellate Court judgment directing restoration of local environment subjected to such trial on the ground that existing regulations issued by the Department of Agriculture (DA) and the science department were insufficient to guarantee the safety of the environment and health of the people.

- SC on 28 July, 2016 it reversed its decision on the ground that the cases were mooted by the expiration of the Biosafety Permits and the termination of Bt. Talong field trials
Bt Talong in the Philippines
Bangladesh

- W.P No-7950 and 7710 of 2013 (Shishuk v. Bangladesh)- Not pressed
- W.P. No-11926 of 2013 (Ms. Farida Akter and Others v. Bangladesh)-Not pressed
- W.P. No-9843 of 2013 (SHISUK v. Govt. of Bangladesh)- order for independent research stayed on 2 October, 2013 for two months

- Approvals given meanwhile; commercial plantation done pending final adjudication