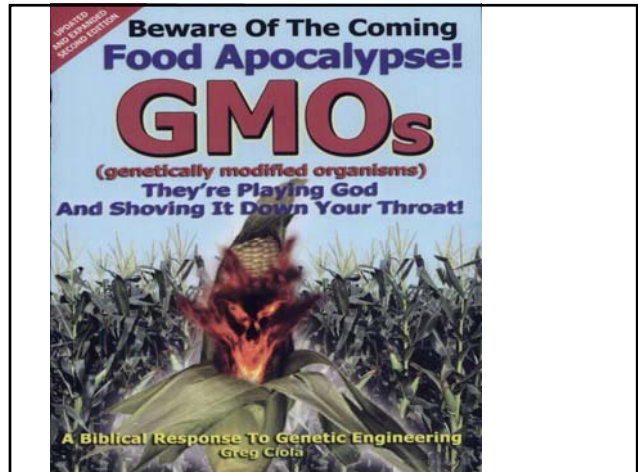


Playing God? Monsters, Miracles and “GMOs”

Ron Herring
Cornell University
Steve’s Class OSU 09



Puzzle: The Double Diffusion Dynamic

- Transgenic crops: rapid adoption globally
 - Caveat: Official data understate diffusion
- But... diffusion of resistance is likewise global
- Questions
 - How do social scientists understand diffusion?
 - Specifically, why do some framings of technology have power?
 - Is the framing of transgenics conjunctural and therefore ephemeral?

Puzzle: A Persistent Global Cognitive Rift on Biotechnology



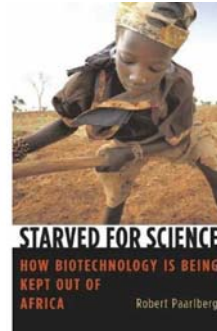
http://www.worldproutassembly.org/archives/2008/05/global_famine.html

Global Famine

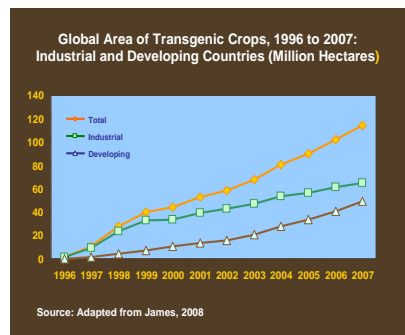
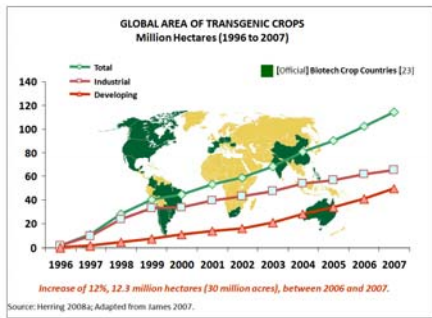


Moralists of the world - unite!

With the widespread adoption of GMO seeds, a major transition has occurred in the structure and history of settled agriculture since its inception 10,000 years ago. ... This destructive pattern – invariably resulting in famine – is replicated in country after country leading to the Worldwide demise of the peasant economy.
- Michel Chossudovsky Global Research, May 2, 2008



Global Diffusion of Transgenic Crops, by Area: 1996-2007





Reciprocal Diffusion of GMO-free Zones

European Regions to Sign a "GMO-free Resolution" by political unit, 2007 & 2009

	2007	2009	% Change
Region ¹	167	196	14.8
Provinces, Prefectures & Departments	53	93	43.0
Local Governments	4,278	4,567	6.3
Individuals	27,100	30,370	10.8

Source: www.gmo-free-regions.org. Accessed April 2009

¹ As defined by the Assembly of European Regions (AER)



GMO-free Zones: Europe 2007



GMO-free Zones: Europe 2009

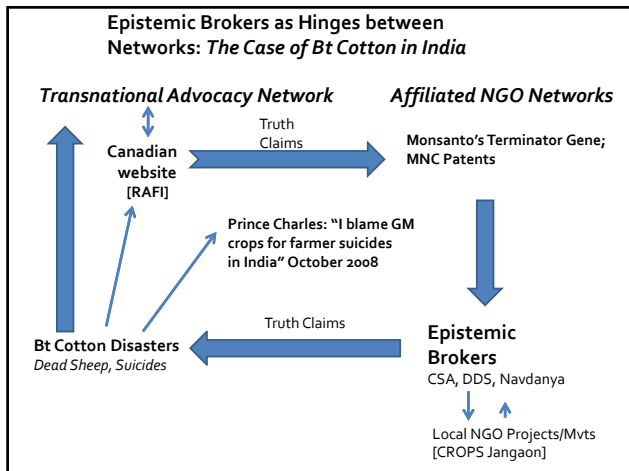


Interest Realignment: Market Restructuring

- European regulation cemented the GMO cognitive rift
- Opposition to genetic engineering globally was however selective and interest-driven.
 - Only some products of rDNA technologies have been targeted by transnational advocacy networks: crops, or “green” biotechnology.
 - The so-called “white” and “red” biotechnologies [industrial and medical respectively] have been normalized, just as the United States Food and Drug administration has normalized “GMO” foods as “substantially equivalent” to their non-GMO counterparts.
- SEAsia and Africa: EU effects substantial – eg 2002
- Jumping ahead: is Europe still relevant?

Diffusion Puzzle: Interests and Authoritative Knowledge

- **Steep technology diffusion curve explicable**
 - **Material-interest-based market ties among agriculturalists**
 - **Permeable state-surveillance and control => stealth seeds globally**
- **Effective ideational opposition less self-evident**
 - **Epistemic brokers mediate authoritative knowledge**
 - TANs supply authoritative risk narratives/data
 - NGOs supply confirming risk narratives/data
 - **Choke Points empower contentious knowledge**
 - Cartagena Protocol [2000/2003] on bio-safety enables choke points in every nation





India's Version of a Global Narrative

- **Lok Swaraj Movement (2006)** : "Giant seed companies like **Monsanto** **enslave farmers** and drive them to **suicide** by introducing seed that forces farmers to use their chemicals. Seed corporations like **Monsanto** are unleashing genetically-engineered seeds like **Terminator, Bt Cotton**, genetically engineered rice varieties, which could ...**totally destroy agriculture** and **food security**. Together, we can halt this **catastrophe**."
- **Bija Yatra (2006)**: "Protect Seed Sovereignty and Community Rights to Biodiversity"
 - "...resist globalisation and assert people's sovereignty"
 - Declare your region a **Freedom Zone** - make agriculture in your area 'patent-free', 'chemical-free' and 'free from genetic engineering'."
 - Form **seed sovereignty watch committees** to prevent the **entry of hybrid** and genetically-engineered seeds in your area.

Frame: The Suicide-Seed Coalition

- **Vandana Shiva** (2006, 86): "These seeds kill biodiversity, farmers, and people's freedom—for example, Monsanto's Bt cotton, which has already pushed thousands of Indian farmers into debt, despair, and death. Bt cotton is based on what has been dubbed "**Terminator Technology**," which makes genetically engineered plants produce sterile seeds.
- "Pushed into deepening **debt and penury** by Monsanto-Mahyco and other genetic-engineering **multinationals**, the introduction of Bt cotton heralds the death of thousands of farmers. High costs of cultivation and low returns have trapped Indian peasants in a **debt trap** from which they have no other escape but to take their lives."
- "More than 40,000 farmers have committed **suicide** over the past decade in India—although the more accurate term would be homicide, or **genocide**."
- His Royal Highness Charles, Prince of Wales October 5, 2008 "**I blame GM crops for farmers' suicides**."



Operation Cremate Monsanto Fails

Rapid and universal spread of Monsanto's specific Bt technology (Cry 1 Ac)
 Illicit appropriations of Bt technology by farmers [Robin Hood],
 Agrarian Anarcho-Capitalism around Bt seeds: "cottage industry" in Gujarat
 New Bt technologies, indigenous and foreign (Fusion from China, eg) > 107 legal hybrids, uncounted dozens of stealth hybrids.

The Science Problem

- "Bt cotton" as political construct: isogenic tests?
 - Phenotypic variations unrelated to Cry gene
- Authenticating the Transgenic
 - Stealth Seeds
 - Spurious Seeds
- Regional Variation





Implications of the Local for the Global: Back to Origins of the GMO Frame

- Co-production of the frame around rDNA tech
 - 1973 rDNA emerges; scientists respond with risk concerns
 - 1980 bioproperty [patents] and venture capital > corporate interests : “novel and useful”
 - Advocacy networks mobilization: “novel and scary” and corporate-dominated
 - State interests – node of control, market competition, dev state
- The Euro U-Turn: Late 1990s
- Lumping and Splitting: Threats and Promises
 - Lumping: All crop products of rDNA technology are GMOs: ie determination by how the trait enters the organism
 - Splitting: “red” and “white” biotechnologies
 - > FrankenFoods but no FrankenPills

Alternative Frame Compatibility for rDNA Bred Crops?

- Substantial Equivalence [USDA]
- Developmental Toolkit > disaggregation [WHO; FAO; UNDP; CGIAR]
- Organic
 - D. Roy: To Bt or Not to Bt
- Sustainability
 - Pesticide Action Network and Bt plants
 - Traits vs Breeding Technology

Splitting over Lumping

- The Agbios data base [<http://www.agbios.com/main.php>] lists as already commercialized globally 14 traits; 45 different transgenes representing 117 unique genetic events have been inserted into 22 crops.
- The permutations of these variables are huge.
- There is an alternative construction based on disaggregation for assessing transgenic crops: disaggregate by traits, events, crops, agro-ecology in terms of benefits, risks, regulation.

Is This Sensible Movement Feasible?

- Strong path dependency from the European U-turn on molecular plant breeding in 1999 was a conjunctural lucky hit for anti-“GMO” politics
 - Bhopal and Chernobyl resonated with the metaphor of “release,” [of genes] coupled with mad cow, and other instances eroded trust in state and science.
 - Bio-pharmaceuticals even in this period escaped stigma: => interests and utility may overcome framing.
 - Utility calculation and diffusion patterns favor rDNA crops
- Does Europe still matter?
- If framing conjunctural, then ephemeral?
- What will drive higher utility rDNA research?