

ANTH 276/SAST 219: South Asian Social Worlds  
Professor Sara Shneiderman

By submitting this essay, I attest that it is my own work, completed in accordance with University regulations. —Alina Aksiyote Bernardete

Unweaving the “Development Narrative”:  
Bt Cotton and Farmer Suicides in India

by Alina Aksiyote Bernardete

**AN UNCERTAIN GLORY**, *defining development.*

*“An agreeable picture of a country in rapid march forward towards development with justice would definitely not be a comprehensive, or even a balanced, account of what has been actually happening: indeed far from it.”*

- Jean Drèze and Amartya Sen

In *Uncertain Glory*, Amartya Sen and Jean Drèze define development as the “expansion of people’s basic freedoms, or human capabilities,” making it clear that India, the world’s second-fastest growing economy” with a rising GDP growth rate of 6%, is not developing so long as it does not use this GDP to increase the capabilities of its people—access to education, proper health care and sanitation, food security and nutrition. In this it has greatly failed. In the 2013 Human Rights report, living standards for “the bulk” of the Indian population were reported lower than those in Botswana, or the occupied territories of Palestine (“Globalisation of Inequality,” Sainath, 2013). India’s uncertain glory grows more uncertain by the day and the faster it moves forward, the greater the number of people it leaves behind.

Among those it is leaving behind are India’s poorest farmers. India’s glory is most uncertain when it comes to its land. Despite an impressive growth rate, there has been a “distinct slowdown in agriculture growth” in recent years and even though 70% of the workforce is somehow involved in the agriculture sector, its contribution to the GDP went down from 50% in 1950 to an incredibly low 13% in 2012 (Radhakrishna, 2009 and 37<sup>th</sup> Report, Committee on Agriculture, 2012). How can it be that 70% of the Indian populace forms only 13% of its “booming economy” narrative? As *India* sees the growth of a middle-class, an industry of technology, a growing economy, *Bharat*, the “largely rural, agricultural, poor” India sees virtually none of it (Sharad, 2010). In India’s Mumbai, 24 new water parks expend 50 billion liters of water a day. In Bharat’s Mumbai, women line up their buckets as

early as four in the morning in the slums, hoping to receive a meager water ration of 40- 50 liters (“Globalisation of Inequality,” Sainath, 2013). The “India-Bharat divide” is increasing; the rise in GDP is a “jobless rise” (Drèze and Sen, 2013). While the growth of agricultural wages was 5% in the 1980s, it was “virtually-zero” from 2000- 2005, (0.1%) (Drèze & Sen, 2013). Farmers’ yields may be increasing but their wages are not.

### **FARM SUICIDES, *the result of an Agrarian and Agricultural Crisis***

*“We have been undergoing the largest catastrophe of our independent history—the suicides of nearly a quarter of a million farmers since 1995.”*

—P. Sainath, *Institute of Development Studies, Kolkata.*

India’s narrative of “growth as development” is directly contradicted by 270,940 reported farmers’ suicides from 1995- 2009 (National Crime Records Bureau, 2009). That means one farmer has taken his life every half an hour since 2001 (“Farmer suicides soar,” Sainath, 2013). These however, are only reported suicides, and the number of unreported suicides could be tragically higher. The National Crime Records Bureau (NCRB) only counted “farmers” as those who own land, even though 30% of the total workforce in India is composed of land-less agricultural laborers (Ghosh, 2013). Even suicides of land-owning farmers go often unreported, for suicide is illegal and a “taboo subject” (Keck, 2013). According to India’s 2011 Census data, the rate of farmers’ suicides in 2011 was 16.3 for every 100,000 farmers, while that of the rest of the population was 11.1. (“Farmers suicide rates soar...” Sainath, 2013). This number is significantly and frighteningly higher. The numbers cited in different news articles however, do not always match up. One pro-GM National Post article cites a study that recorded farmer’s suicides was 7 deaths per 100,000 people, and 15 for the rest of the population (Abid, 2013). Even government statistics vary, with some states using the data of the NCRB, with its narrow definition for “farmer,” and others, Chhattisgarh (one of the big five) and Puducherry among them, declaring ‘zero’ farmer suicides, negligence towards the problem in its extreme, blatant denial (Sainath, “Farm suicide trends”, 2013).

The data unfortunately is muddled, and the causes of these suicide, even more muddled. These suicides are not the result of a singular event, but a deeply rooted agrarian and agricultural crisis. While several studies focus on aspects of the “agrarian crisis” linking volatile market prices, anti-farmer policies, India’s “negative subsidy,” corporate monopolies and lack of institutional credit for farmers to these suicides, others focus on the “agricultural

crisis,” linking the suicides to the costs of inputs, the droughts and dependence on monsoons, soil-nutrient deficiency, erosion, the dwindling groundwater resources, pests, cropping patterns, decreased money for research, etc... While most of these problems are readily accepted as contributing to the thousands of farmer suicides and the dire state of agriculture in India, there is one ‘causality’ that is highly controversial: Genetically Modified Crops. GM Crops, particularly Bt Cotton, the first commercial genetically modified crop in India and as of recently, Bt brinjal, the first genetically modified food crop in India, and their role in the “development” of agriculture, their effect on the capabilities of farmers, and the food security of a population of 1.5 billion by 2050, is a matter of high debate. The arguments for and against GM crops are impassioned, ardent, and there are few published articles and studies that take a neutral stance. GM Crops are presented as either India’s only hope: “In due course of time... we must make use of genetic engineering technologies to increase the productivity of our agriculture” according to Prime Minister Singh, or India’s greatest enemy: “genetically modified foods have no place in ensuring India’s food security” according to Environmental Minister Natrajan (Bagla, 2012). It is not surprising then that the introduction of India’s first GM crop by U.S. biotech corporate giant Monsanto in 2002 resulted in a whole host of studies, public statements, governmental and non-governmental reports, journalistic objections, media headlines, even local “Seed Tribunals”— spaces for farmers to draft their own rules for seed sovereignty and voice their own personal narratives.

These narratives however, are being muffled by a larger narrative of national “development.” A narrative of a less than 10-year-old production increase in cotton from .02 million hectares in 2002 to 9.33 million in 2011, of 1,100 hybrid varieties of Bt cotton accounting for 93% of these hectares, and of India as a global power, the world’s second largest producer of cotton (Bagla, 2012). How can the narrative of a farmer with less than an hectare of land to his name (the average size of holding is currently 1.23 hectares, an “area too small to provide adequate livelihood”) and debts with interest rates of over 30%, demanding that Monsanto “quit India,” at a Seed Tribunal in Bangalore, compete with such compelling “development” optimism (Reddy and Mishra, 2009, Assadi, 2000)? These individual narratives from “small and marginal farmers” are often seen as just that, small and marginal, as narratives of a single particular case, as anecdotes. “The evidence for the scale of Bt crop failures is anecdotal, as is any causal connection with farmer suicides,” Qaim argues (Sheridan, 2009). Anecdotal *evidence* however, is exactly that: “evidence”. These stories are evidence and they

are being ignored. Why are they not evidence enough? “When is the data going to catch up with the stories? Why don’t the scientists come and listen to people who actually work with the rain?” asks NGO worker Alka Awasthi (Renton, 2011). Though my argument will develop through the questioning and analyzing of data, it is easy to forget that these numbers are people. Being “effective overall in India” is not a strong enough argument for Bt cotton if it has “disappointing results in some particular districts and seasons” (IFPRI Report, 2008). These “disappointing results” are the livelihoods of real people, and their particular struggle may be enough to scrap Bt Cotton altogether.

Returning to Drèze and Sen’s telling definition of “development,” it becomes clear that increasing yields are not a measure of development if they do not increase the human capabilities of those that yield them. If a farmer takes out a loan from an informal moneylender at an interest rate of 30% (40% of all informal finance loans have interest rates of 30% or higher, and more than 40% of all credit options for farmers are informal) to buy Bt seeds which are 10x, even 20x more expensive than regular cotton, because he was convinced by a dealer that its high yields will lift his family out of poverty, he may be limiting his capabilities rather than expanding them (Shetty, 2009). His capabilities are limited by high-interest loans, high costs of seed, increased dependence on monsoons or irrigation (water that may or may not be available), the words of a dealer (who if part of the black-market may be selling him spurious seeds, and if aligned with Monsanto, may be selling him seeds he knows will not work in his region). These new limitations can be detrimental to the small and marginal farmer, who constitutes 70% of all Indian farmers (37<sup>th</sup> Report, Committee on Agriculture, 2012). The risks of Bt Cotton are too high. According to Ron Herring, an agrarian politics and economics professor at Cornell, “the lure of white gold is strong... cotton is the only cash crop that has real potential to change a family’s financial circumstances, but at considerable risk. Without water, cotton fails, [the] risks are very high” (Abid, 2013).

This is where I believe the link between Bt cotton and the staggering number of farmer suicides comes about. “The Big Five”- Andhra Pradesh, Maharashtra, Karnataka, Madhya Pradesh and Chhattisgarh, accounted for 1/2 of all farm suicides in 1995, but 2/3 of them in 2011, and four of these five states have the highest percentages of area under Bt Cotton (Census of India, 2011). As the “suicide belt” of India, the Big Five have the environmental and socio-economic conditions least suited for the risks of Bt cotton and yet show the highest adoption of Bt Cotton. India’s “suicide belt” overlaps with its “cotton belt.” The volatility of

market prices, the dependence on monsoons, the cost of inputs, the high interest loans, all the causes of the deeply rooted agrarian and agricultural crisis translate into one thing for a farmer—risk management. While Bt Cotton isn't the root cause of farmer suicides, it exacerbates the environmental and socio-economic causes already in place in the Big Five—it heightens their risk, and is therefore incompatible with the Big Five and farmers in similar contexts. It is also agriculturally unsustainable for India as a whole, and its private management rids farmers of their sovereignty and freedom, further limiting their human capabilities, their “development” as Sen and Drèze define it. The compelling Bt Cotton narrative of “development,” of higher yields (which some studies claim are not as high as Monsanto reports) is just not worth the risk.

### **THE COTTON CONNECTION, *Bt Cotton in “context”***

*“You cannot separate the technology from the context. That doesn’t work at all. Any seed that is sold to a farmer is sold on the basis that it will work for them within their specific ecological and socioeconomic contexts.”*

- Vadana Shiva

As scientist and activist Vadana Shiva argues, the technology of Bt cotton cannot be separated from the context where it is introduced, and in the case of India, Bt cotton technology is being introduced most in the ecological and socioeconomic contexts where it will work least. Lets take a closer look at the four “cotton states” of the Big Five.

Andhra Pradesh, which from 2003 to 2011 went from 1% area under Bt cotton to 99%, suffers from the fragility of resources, particularly groundwater, and has unsustainable cropping patterns, which are causing the nutrient deficiency of its soil. Karnataka, whose area under Bt cotton went from 1% to 74%, has the lowest irrigated area to rain-fed area ratio in the country, as well as repeated monsoon failure, zero counseling resources for farmers, and bad cropping patterns. Maharashtra, which went from 1% to 96% area under Bt cotton, suffers from uncertain weather, volatile markets, lack of new agricultural technology and institutional credit for farmers (Kranthi, 2012 and Reddy and Mishra, 2009). If Bt cotton requires more water and more nutrients than regular seeds, why is it being introduced in ecological contexts with limited or unpredictable water and nutrient resources? If the cost of Bt cotton seeds is 10 to 20x greater than regular seeds why are they being introduced in the poorest socio-economic

contexts with the lowest sources of institutional credit for farmers? Can small and marginal farmers compete with a world market of heavily subsidized cotton and a price of cotton that is one-twelfth of what it was 30 years ago (Keck, 2013)? And if Bt cotton is really as effective as pro-GM writers argue, then why haven't states with an area of 99% or 97% Bt cotton seen a drastic *decrease* in suicides? If, in fact, the suicides had been constant since 1997, that still raises a big red flag regarding the use of Bt cotton.

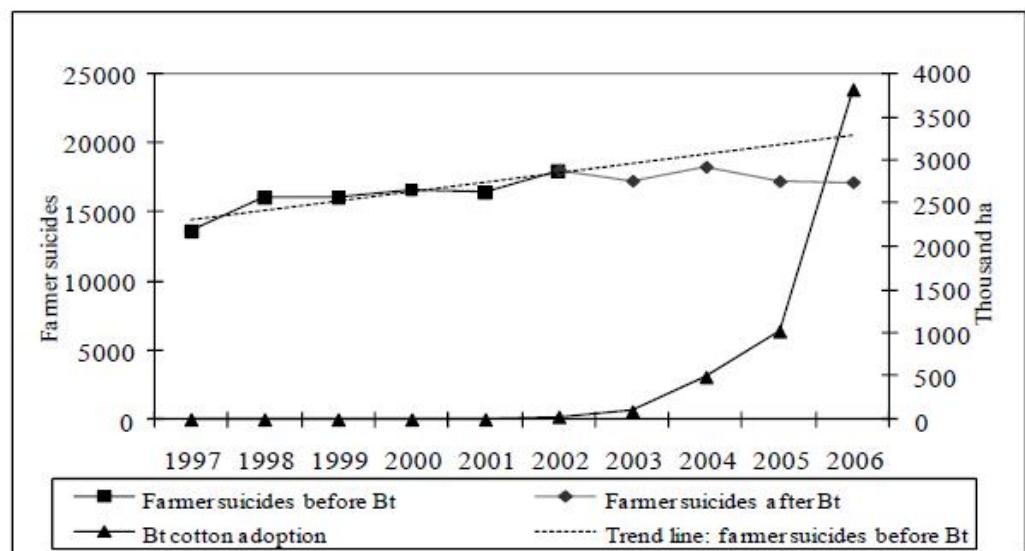
The Big Five and regions of similar economic and socio-economic contexts are too deep in the agricultural and agrarian crisis to take on these risks. A failed monsoon is detrimental enough, a failed monsoon for a farmer who took out a loan he cannot repay without the promised "increased yields" of Bt cotton, is ruined (Renton, 2011). By risking current yields for higher yields, Bt cotton is risking lives.

## **FLAWED STATISTICS**

In 2008, a study commissioned by the Indian Government and conducted by the International Food Policy Research Institute (IFPRI) an "alliance of 64 governments, private foundations, international and regional organizations," sought out to find whether there was a connection between Bt Cotton and the high numbers of farmer suicides (Abid, 2013). It has inarguably shaped the debate regarding the future of GM crops in India, and is cited in every pro-GM article I came across while researching. The study concludes three things, 1) that there has been no "resurgence" of farmer suicides, 2) that Bt cotton has "been very effective overall in India" although generating disappointing results in "some particular districts and seasons" and 3) that Bt cotton is "neither a necessary nor a sufficient condition for the occurrence of farmer suicides" (IFPRI Report, 2008). In this IFPRI graph for example, high numbers of farmer suicides

predated the introduction of Bt cotton and this number has decreased from its initial trend despite the dramatic rise in

**Figure 11. Farmer suicides and Bt cotton area in India, 1997-2006**



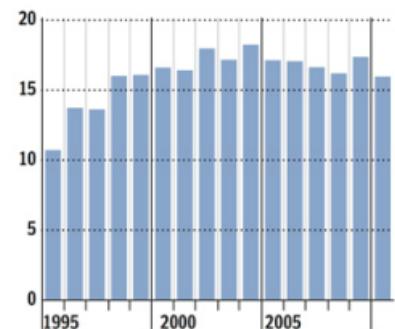
hectares of Bt cotton.

It is important to remember however, that while the number of reported suicides may have remained fairly constant; there is no guarantee that this is the same trait followed by unreported suicides. A farmer is only defined as a farmer by the NCRB if he owns land, and while the population of farmers in India has gone down, the population of land-less agricultural laborers has increased by 26.5% from 2001 (Ghosh, 2013). For all we know, the decrease in suicides from the 1997- 2002 trend line (dotted on the graph) is not a decrease in suicides, but a decrease in the number of land-owning farmers, a decrease in the number of reported suicides that “count” as farmer suicides. In fact, in government statistics there *has* been a clear decrease in the number of suicides that “count” (Sainath, 2008). They are called “eligible suicides,” and only the families of these suicides can receive compensation. While 69% of suicides were eligible in 2002, only 40% were eligible in 2006. There also has been a more than substantial decrease in India’s land-owning farmers, a decrease of 15 million farmers since 1991, about 2,035 fewer farmers every day, according to the 2011 Census (Sainath, “over 2,000 fewer farmers every day,” 2013). The number of farmers committing suicide in India may be fairly constant, but it is constant in a rapidly decreasing population! This is also why, as award-winning journalist P. Sainath points out, any statistic focusing on farm suicides as a percentage of total suicides is misleading. The percentage of farmer suicides is decreasing because the population of farmers is decreasing. The percentage of non-farmer suicides is increasing because the population of non-farmers is increasing (“Farm suicides: A 12-year saga” Sainath, 2010). Which is why authors using the same NCRB data will reach different conclusions, and graphs like this one (“India Farm Suicides”), published in the National Post and circulating among news articles and blogs, are much too simplistic.

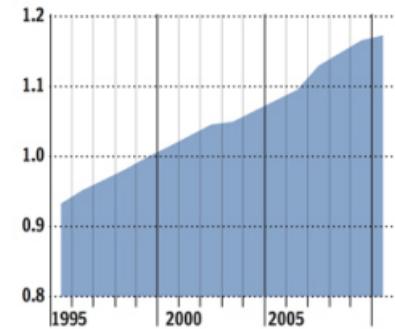
There is also a flaw in what P. Sainath calls the “all-India perspective”. Two-thirds of farmer suicides are occurring in the Big Five, and four of these five states have the largest percentages area under Bt cotton in the country (Kranthi, 2012). If there is a link between farmer suicides and Bt Cotton it would be occurring in the Big Five, and analyzing the

### INDIA FARM SUICIDES

NUMBER OF FARMERS IN INDIA COMMITTING SUICIDE, IN THOUSANDS



POPULATION OF INDIA IN BILLIONS



SOURCES: NCRB DATA, CIA WORLD FACT BOOK, TRADINGECONOMICS.COM  
ANDREW BARR / NATIONAL POST

data of farmer suicides in the entire country in relation to the entire country's uptake of Bt Cotton, dilutes the statistics. The fact that the percentage of farmer suicides occurring in these states increased from 1/2 of the total in 1996 to 2/3 of the total in 2011, indicates that the problem is increasingly focused on these five states, not necessarily India as a whole.

Vidharba, for example, a small region of Maharashtra under 98% Bt cotton, had 168 farmer suicides in just the first three months of this year (Buch, 2013). The “disappointing results in some particular districts and seasons,” can be very harmful even if perhaps Bt cotton has “been very effective overall in India” (IFPRI Report, 2008). In Andhra Pradesh for example, a farmer is three times more likely to commit suicide than any other man, of any profession (“Suicide rates soar,” Sainath, 2013). In Maharashtra, 29.1 suicides happen for every 100,000 farmers. (“Suicide rates soar,” Sainath, 2013”).

While the IFPRI report does address single states, when it does so its data’s variance seems to problematically increase. “To be brutally honest,” professor of sustainability and development Stephen Mores commented, “there was nothing in [the report] which was significant, given the scatter [of data] you had. If they had done a proper [statistical] analysis they might have picked up something” (Sheridan, 2009). In data presented on Andhra Pradesh, Maharashtra and Karnataka’s net returns of Bt cotton over net returns of non-Bt cotton, for instance, Andhra Pradesh had a loss of -142% in net returns as a minimum but a gain of 380% as a maximum. Maharashtra had a minimum of 14% gain and a maximum of 112% gain, and Karnataka has a minimum of -30% loss and a maximum of a 172% gain. The percentage of net returns of Bt-cotton over net returns of non-Bt cotton were too varied. No real conclusions can be drawn from this data.

## **THE ECOLOGICAL CONTEXTS:**

*terminator seeds, water and nutrients, resistance of bollworms*

As we’ve seen before, Maharashtra and Andhra Pradesh are 99% Bt Cotton, Maharashtra is 96%, and Karnataka is 74%, even though their ecological contexts are not suited for the short-term or long-term success of Bt Cotton. All four of these states are “rain-fed regions with marginal soils” where, as Ph.D Kshav Kranthi, director of the Central Institute for Cotton Research (CICR) admits, “the performance of hybrid cotton is not satisfactory” (Kranthi, 2012). In his CICR published book of questions and answers regarding Bt Cotton, he continues, “Farmers often incorrectly attribute such poor performance [the performance of

hybrid cotton] with Bt cotton technology” (Kranthi, 2012). And as I would argue, rightfully so! Bt technology is *only available* in India in the form of hybrids! The book’s and therefore the CICR’s main argument, that the “major criticisms” of Bt cotton “have nothing to do with Bt technology,” but are the result of its “sucking-pest susceptible Bt hybrids,” which need “more insecticide, … are long duration, are unsuitable for rain-fed regions, cause water and nutrient wastage… and do not perform well in marginal soils,” separates the technology from its context (Kranthi, 2012). The sad fact is, *all* Bt cotton in India is hybrid. Until that changes, talking about the benefits of non-hybrid or pure Bt cotton technology, and using statistics of pure Bt cotton to support the adoption of more Bt *hybrids* in India is both dangerous and deceiving. Pure Bt-cotton does not exist in India, and while Kranthi’s argument is in favor of that changing, it is deceiving to talk about the benefits of pure-Bt cotton in India, when it does not exist in India and therefore has no reported benefits. This is one of the strongest criticisms of the IFPRI report. As Qaim of Gene Campaign argues, “the statements they made weren’t completely wrong” in fact, Qaim had similar findings in his own studies, “but they weren’t completely representative” (Sheridan, 2009). “When failures did occur the IFPRI report blames the conditions in which the technology ‘was introduced, sold and used’ rather than the technology itself” (Sheridan, 2009). This is unfortunately a very common way of talking about Bt cotton.

I am not arguing that “the technology itself,” pure Bt-cotton, is environmentally sustainable or the golden ticket for India, in fact I would strongly argue it isn’t, but “the technology itself” cannot lead to any adequate conclusions on the impact of Bt cotton, nor its potential connection with the suicides. Only hybrids are available in India and these hybrids are not ecologically compatible with the Big Five (and similar regions) nor sustainable for India. Here are three reasons why:

**“Most of the Bt hybrids are of 180- 200 day duration”** (Kranthi, 2012). Also called “terminator seeds”, unlike regular seeds these hybrids are genetically modified to “expire” after a certain number of days, and can no longer produce new seeds. The very beauty or magic of a seed is that it is renewable, a world onto itself, life that brings new life, and these private companies have destroyed it, forcing farmers to buy new seeds every year for a “renewable” profit. The reason only “sucking-pest susceptible” hybrids exist in India is because “the technology providers such as Monsanto… preferred Bt hybrids in India as a means of ‘value

capture,” since farmers must continually re-purchase their seeds (Kranthi, 2012). In my opinion this basic violation of a farmer’s resources, his “seed sovereignty,” is reason enough to ban Bt hybrids all together. “We will not obey any patent law or plant variety protection law which treats seeds as MNC [multi-national corporations] property” writes the Bangalore Seed Tribunal in their resolution. “Monsanto should ‘quit India’” (Assadi, 2000). It is a “suicide economy” writes Vandana Shiva in the Huffington Post, “transforming seed from a renewable resource to a non-renewable input” (2009). Regular cottonseeds cost 7 Rs/kg. Monsanto’s cottonseeds can be 17,000 Rs/kg, and these “must be bought every year at high prices” (Shiva, 2009). As the world is turning toward renewable resources, Monsanto is turning to renewable profits, making renewable seeds, un-renewable.

**“The boll retention is high in Bt-cotton plants and therefore there is need for continuous supply of soil moisture and nutrients”** (Kranthi, 2012). A continuous supply of soil moisture and nutrients is only possible with irrigation, and “most of the hybrids... are not suited for rain-fed conditions” (Kranthi, 2012). In a country with 16% of the world’s population and only 4% of its available freshwater,” the idea of introducing a crop that requires continuous irrigation as a technological advancement, is slightly if not entirely absurd (Reddy and Mishra, 2009). Groundwater sources are over exploited in dry regions, and they are dwindling. It is not just that India doesn’t have the infrastructure for nationwide irrigation (though that much is true) it also doesn’t have the water. As Vaidyanathan points out, deepening wells and installing more powerful pumps, “such investments barely help maintain availability [of groundwater]” (2006). And 60% of all land sown in India in 2004 didn’t even have these most basic sources of irrigation (Reddy and Mishra, 2009). This explains then, why “70% of India’s farmland depends on monsoon,” and why Bt cotton hybrids, whose “performance depends crucially on the availability of adequate and reliable irrigation” are fated for low productivity in 70% of farmlands (Vaidyanathan, 2006 and Ghosh, 2013). Of course, the farmers are not warned of this by their dealers, “Any seed that is sold to a farmer is sold on the basis that it will work for them” (Shiva in Sheridan, 2009).

Take Vidarbha, in the eastern region of Maharashtra, for example. “Protective and supplemental irrigations for cotton are not possible in 97% of the area in Vidarbha” (Kranthi, 2012). The region is almost entirely rain-fed, and of very scarce groundwater resources. According to Sainath, “almost every human being you see [in Vidarbha] between 6-10am in

the morning... is collecting or searching for water" ("The colour of water" Sainath, 2010). Despite all this, Vidarbha was 60% Bt cotton in 2006 and 98% in 2008-9 (Kranthi, 2012). The number of suicides in Vidarbha soared, data reported in 6 of its districts, shows 105 suicides in 2002, but 1,447 in 2006 (Sainath, 2007). According to Vaiyanathan, it was when rainfall fell below normal for a couple of years that "the losses [became] unmanageably large (2006). Kranthi argues that the suicides cannot be linked to Bt cotton, presenting increased cotton yields as evidence. He later admits, however, that "productivity of cotton in rain-fed regions including Vidarbha... is low" (2012). Sainath goes even further by questioning reported yields, claiming that the original "record 350 lakh quintal" for the Bt cotton harvest of 2006 was corrected by agencies to be less than 180 lakh quintals. This is lower than their 250 lakh quintals in 2003, a "non Bt-cotton year" (Sainath, 2007). The connection seems clear: Vidarbha is one of the regions with the lowest groundwater resources, the highest acreage of Bt cotton, and the greatest number of suicides. This pattern can be seen throughout the Big Five—low groundwater resources, and lots of water-needy Bt cotton. In Andhra Pradesh, a 2004 socio-economic survey found that "tenant farmers who grow non-food crops and depend on groundwater sources for irrigating the crops are more prone to commit suicides" (Galab, Revathi, Reddy, 2009). Bt cotton is not the root of the problem, but by depending on more water when there is none, it is definitely exacerbating it.

**"It is reasonably certain that bollworms, especially the cotton bollworm *Helicoverpa armigera*, will respond to the intense selection pressure through a decline in susceptibility"** (Kranthi, 2012). According to Kranthi, "Bt-technology was supposed to control bollworms," the pest Bt cotton was genetically modified to resist, "and it did splendidly" (2012). This raises another question of sustainability and protection for crops however. Will it continue to "splendidly" do so? According to a 10-year monitoring study by the CICR, the cotton bollworm is still very much susceptible to the gene, but declining in susceptibility, with some populations showing a 51-fold decrease in susceptibility. "Refugia," one of the Genetic Engineering Approval Committee (GEAC) encouraged techniques for maintaining the susceptibility of bollworm to Bt cotton, asks farmers to border every acre of Bt cotton they sow, with 5 border rows of non Bt cotton. Needless to say, it was not very popular. Farmers with less than 2 acres of land cannot give up 20% of their land as pest-bait, and other farmers feared that the bollworm in their "refugia" would attack their Bt cotton (Kranthi, 2012).

Furthermore, while bollworm pests may not currently be a problem, sucking pests (as well as pink bollworm) have been increasing in their absence, and while insecticide usage for the bollworm decreased by 4,248 metric tones from 2002- 2011, the insecticide used for sucking pests increased by 4,262 metric tones (Kranthi, 2012). Several pro-Bt cotton articles cite the decrease in insecticide thanks to Bt cotton, but they fail to mention it has been equaled by insecticide for sucking-pests. One Huffington Post article even claimed “farmers [were] using 13x more pesticides than before” to control the new pests resistance to Bt cotton “created” (Shiva, 2009). Farmers also purchase insecticides they don’t need, simply because their dealer didn’t teach them how to best farm Bt cotton. “The cotton seed market” according to Tripp, has “wrecked the ‘agricultural skilling’ process” of farmers (Stone, 2010). They are no longer taught the new skills they need for their crop.

## **THE SOCIO-ECONOMIC CONTEXTS:**

*Volatile prices, debt, and the black market*

**“The more the dependency of farmers for the inputs on the markets and the more the market volatility in output prices, the greater is the probability of farmers committing suicides”** (Galab, Revathi, Reddy, 2009). This statement comes from a survey examining the socio-economic causes of farmer suicides in Andhra Pradesh. Cotton, unlike many food crops and even other cash crops, has “no tariff protection against import competition from countries where it is heavily subsidized” (Vaidyanathan, 2006). Countries like the U.S. whose export prices of cotton from 1998- 2002 were “lower than their cost of production by more than 50%” have the power of subsidies, and therefore the power of dumping: exporting a crop to a country at prices lower than those in its home market. Cotton subsidies total \$4 billion in the US annually (Shiva, 2009). In Maharashtra and Vidarbha for example, “the rain-dependent cotton growing farmers are faced with declining profitability because of dumping by the USA [and] low import tariffs” (Mishra, 2009). In Karnataka, “exposure to a fluctuating agricultural commodity market” is cited as a cause of suicides (Deshpande, 2009). Cotton is a risky crop for India in general— its price is one-twelfth of what it was 30 years ago, and its prices are volatile (Keck, 2013). In Andhra Pradesh an average farmers net income over their total cost, went from 639 Rs in the early Mid 1990s, to 227 Rs in the early 2000s, and was predicted to be -1,304 Rs. in 2004-5 (Galab, Revathi, Reddy, 2009). Why is there such a drastic drop in net

income when the yields and gross returns of farmers are increasing? Galab, Revathi and Reddy's study blames the vulnerability of cotton in the global market economy. Cotton prices are steadily increasing while prices are unsteadily decreasing, forcing a farmer to maintain not just a good yield as is the case with most food crops, but a "competitive edge internationally" (Kranthi, 2012). How can these small and marginal farmers in India compete if their cotton has not been subsidized since 1997? One may argue that subsidized or not, a majority of cash crops will have difficulty competing in a global market, but as Reddy and Mishra explain, the "liberalization of trade and reduced tariffs has particularly gone against cotton farmers" (2009). Becoming the world's second largest producer of cotton in less than 10 years due to Bt cotton may be more of a curse than a blessing. It is a crop of heavy subsidies and dumping, vulnerable to the "volatility of world markets".

**"Farmer suicides all over India are mainly the result of chronic indebtedness—the inability to clear debts and pay interest accumulated over years"** (Sharad, 2010). All articles and studies I have come across, whether pro-Bt cotton or not, cite debt as one of the principal causes for suicide in India. One of the few exceptions to this is the IFPRI report. As Vandana Shiva points out, "Nothing in that paper is addressing the issue of debt which is the prime cause of suicide" (Sheridan, 2009). In a survey on risk factors contributing to farmer suicides in Western Vidarbha, 87% of families attributed their family member's suicide to indebtedness. As we have seen, this is an area with very low groundwater resources, and for some reason more suicides were attributed to "debt" than "crop failure". The study found that for every increased 1000 Rs of outstanding debt per acre of land, the chance of suicide increased by 33% (Mishra, 2007). As Sharad, President of farmers' organization Shketkari Sanghatana, explains in his book "Down to Earth," 2009 was a good year for Vidarbha, "the cotton crop was good," "prices were good... soyabean crop was plentiful," and still there were hundreds of suicides. *Why?* "... the recovery officers must have smelt a great opportunity to force recoveries," he argues, and farmers with higher yields were harassed to pay back loans with money they did not have (2010). Though Sharad provides no data to support these general statements (was cotton crop really "good"? Sainath would argue otherwise), even in years where cotton yields and prices have been higher than usual, the suicides in Vidarbha have continued increasing (Mishra, 2007).

In India as a whole, 58% of all outstanding debt is tied to agriculture (Shetty, 2009). Why are Indian farmers so buried in debt? Many sources argue that it is India's lack of institutional credit for farmers. India has a "heavy dependence on informal finance," such as private moneylenders, particularly in agriculture where more than 40% of finance is informal (Shetty, 2009). While Sharad warns us against "presuming private lenders are villains and organized sector banks are paragons of virtue" it is clear that 74% of *informal* credit has interest rates of more than 20%, (40% of informal debt had interest rates of 30% or more) while 99% of *formal* credit had interest rates below 20% (Sharad, 2010 and Shetty, 2009). Good credit at low interests rates is rare for an Indian farmer. The share in bank credit for formal loans to "small-borrowers," was 21.9% in 1992 but only 7% in 2001 (Reddy and Mishra, 2009). From 1990- 2003, instead of expanding rural bank branches to grant greater opportunities for credit to farmers, 2,481 rural banks were closed. It is no surprise then that by 2003, 79% of rural farmers had no access to credit from a formal source (Reddy and Mishra, 2009). These changes in the availability of institutional credit unfortunately overlapped perfectly with the introduction of Bt cotton in 2002. As Sigh and Sukan argue, there is a "cost dimension" to insuring farmers of Bt cotton (2006). Their returns may be 46% greater, but their costs are 106% greater (2006). Bt-cotton seeds can cost 10- 20x more than regular cottonseeds and as we have seen, they must be purchased every year. Although some sources argue that the decreased costs of insecticides and high yields balanced out seed costs, as we saw before, insecticides purchased for sucking pests have replaced bollworm insecticide, and high yields do not directly transfer into net income. These increased costs of Bt cotton lead to an increase in loans, 79% of loans for farmers are informal, and 74% of these have interest rates greater than 20%. These numbers do not bode well. While Bt cotton may not be the principal cause of debt, it is exacerbating it with unaffordable increased input costs (2010).

**"In 2003, 69% of Bt cotton brands and seeds from markets were illegal brands and spurious"** (Kranthi, 2012). As this paper comes to a close, the last issue I will address is the rise of a Bt-cotton black market, and the lack of quality control for GM crops. According to Sheridan, there are four categories of Bt-cotton in India: "legal, illegal, fake legal and fake illegal" (2009). However, all numbers, yields, and evidence of success for Bt cotton refer only to one of these categories: legal Bt cotton. Some even, only refer to pure Bt-cotton which does not exist in India. This ignores the numbers and yields of "illegal, fake legal and fake illegal"

Bt cotton, that have emerged because of the introduction of Bt cotton, and according to Kranthi accounted for 69% of all Bt cottonseeds in 2003. Although the “Bt Express test” was marketed and developed for farmers to test the quality of their seeds, the agriculture department still registered 60 cases of spurious seeds in 2012 (Kranthi, 2012 and Rao, 2012). Also, a farmer would only be able to test his seeds once he had already purchased them. Many of these are “packaged in attractive sachets” and “sold at a cheaper rate,” giving farmers yet another risky dilemma. Should one take out a loan to purchase the more expensive Bt cotton at the risk that it may be “fake legal” or should one purchase the cheaper Bt cotton even though it is “illegal” and likely spurious?

There are even flaws in the quality regulation of legal Bt cotton. Just last year there was huge scandal regarding the introduction of BN Bt cotton, a type of “non-terminator” Bt cotton introduced by Indian Council for Agricultural Research (ICAR) and developed by the CICR. It was “withdrawn from the market after the first season” due to “poor performance” and “reports of contamination” (Jishnu, 2012). This contamination (the presence of Monsanto gene MON 531) happened before commercialization but went undetected by the Genetic Engineering Approval Committee (GEAC), who Kavitha claims “had not even read the data” (2012). The contamination was “blatant and easily discernible” and the GEAC according to Kavitha, had a “conflict of interest” in approving their own product (2012). Whether purposeful or not, however, this event reveals the “gross inadequacy... of the Indian GM regulatory apparatus... to ensure biosafety” (Kavitha, 2012). Biosafety is the most basic requirement of any new technology, and if the government cannot ensure the safety of Bt cotton it should not be allowed on the market. The “poor performance” of this BN Bt cotton is no small mistake, it had a direct and tragic effect on the farmers who adopted it.

## **CONCLUSION**

*“There is a connection between Bt cotton and farmers’ suicides.”*

*- Committee on Agriculture, 37<sup>th</sup> Report (2012)*

I chose this as my final epigraph, not because of what it says, for it is what I have already said and repeatedly put forth in my paper, but because of *where* it was said—in the 2012, Standing Committee on Agriculture 37<sup>th</sup> Report on the Cultivation of Genetically Modified Food Crops, Prospects and Effects. Things may be looking up. Commissioned by

the Supreme Court and written by 31 technical experts over the course of two-years, this 492-page report acknowledges the harms of Bt cotton (as well as Bt brinjal) to farmers (Bagla, 2012). With thorough evidence (including a case study in Vidarbha) they agree with the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) doubts on “the sustainability and productivity of GMOs,” and agree with the “conclusion that neither costs nor benefits [of GM crops] are... equally shared, with the poor tending to receive more of the costs than the benefits” (Standing Committee on Agriculture, 2012). The panel recommends a 10-year moratorium for all GM crops, demanding that trials “be discontinued forthwith” and research be done only “under strict containment” (Bagla, 2012). As this paper has put forth, there is much evidence to show that Bt cotton exacerbates the root causes of India’s agrarian and agricultural crisis, increasing the risk for farmers and the occurrence of farmer suicides. I addressed six principal problems regarding Bt cotton, three of an ecological context (terminator seeds, necessary supply of nutrients/water, and growing resistance of bollworms) and three of a socio-economic context (volatile prices, debt, and deficiencies in quality control). There are, however, many more. If a moratorium on Bt cotton is adopted, we must remember that this is only a beginning. The causes of India’s agrarian and agricultural crisis run much deeper. Agriculturally sustainable technology needs to be developed, and the narratives of farmers must be heard over the generalized, oversimplified statistics, over India’s general narrative of “development.” We must begin to address the uncertainties of India’s *Uncertain Glory*.

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