

Biopiracy, GM Seeds and Rural India

"Over 100,000 farmers have committed suicide..."

By [Priya Kumar](#)

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Introduction

The reality for the average Indian remains the same: agricultural cultivation and the ability to farm is the bedrock of rural living. With its historical practices, values, and communal sentiments of respect, cultivation and the practice of farming has embedded roots. Farming for Indians is not only a source of income – it is a source of culture and identity. Since the late 1990s however, Indian governmental officials have wilfully compromised this sentiment for the 'bright lights' associated with the West.

After over a decade of trade liberalization and free market reforms, mainstream economic development has left rural India to fend for itself. Amidst great levels of industrialization and growth, the vast majority of Indians have been left behind. Agriculture is the primary source of livelihood for some 70% of Indians[1]. Considering the fact that only 1% of Americans and 2-3% of Europeans derive their livelihood from agriculture, this is a huge level of dependence[2].

India's desire to become a member of the World Trade Organization (WTO), and the adoption of the Trade-Related Aspects of Intellectual Property (TRIPs) specifically has compromised the livelihood of farmers. With the adoption of such neo-liberal policies, the sovereignty of rural India has been threatened. TRIPs in particular has created a gateway for agro-business conglomerates to engage in biopiracy and GM seed monopolization, effectively marginalizing rural communities. Through the manipulation of intellectual property rights (IPRs), conglomerates such as Monsanto have put rural farmers on the defensive. This paper highlights the manipulative nature and destabilizing affects of patents, IPRs and agro-business conglomerates in the context of rural India. Special focus is placed upon the infamous Basmati rice case, and Bt cotton, the first GM seed made available to Indian farmers.

Through these case studies, this paper will illustrate both the intent and impact of agro-business conglomerates and the associated costs incurred by farmers. Centuries of indigenous knowledge, tradition cultivation practises and sharing techniques are being compromised. Many farmers have lost their right to cultivate and control the agricultural production cycle. As a result, farmers increasingly find themselves indebt, disempowered and most alarming, suicidal. With approximately one in every four farmers globally being Indian, the rural lifestyle – the cultural origins of India are being threatened[3]. Agro-business conglomerates are promoting a cycle of dependence, which, if not stopped will carry with it disastrous affects for the entire country.

Key Events and Considerations in History

From its colonial roots to present day, India's history is chequered with multiple patent law structures and IPR debates. Dating back to 1852, under British rule, India adopted (unwillingly so), a specific patent-like structure within its legislative structure[4]. For rural India, these imposed patent laws represented the limits of their control over their resources. Overall, this marginalization became one of the sources for mobilization movements for independence and autonomy. In terms of IPR law, the 1911 Patent Act is regarded by many a crucial document which spearheaded the desire for emancipation and independence from the British[5].

From the time of independence in 1947, up until the 1960s, agricultural development was not a major focus for public debate. Rather, the population was still coming to terms with what it meant to be a sovereign state in the context of global affairs. It was only with the threat of famine in 1961 and severe droughts in 1965 and 1966 that officials recognized the agricultural hardships that plagued rural populations[6]. These hardships provided a justification for both the World Bank and the US to enter India with the promise of "miracle seeds", assistance and price incentives[7]. These "miracle seeds" were actually hybrid seeds, and resulted in huge yields of food grains. Indeed, the Green Revolution had entered India, and with it came an entirely new concept: non-organic farming.

During the late 1960s, debates focused on finding an appropriate balance between public interest, rural agriculture and India's desire to develop and industrialize at a steady pace. The 1970 India Patent Act internalized these debates. Critical questions emerged with regards to India's interest in limiting patent monopoly, promoting societal creativity, and stable rural agricultural production[8].

The Patent Act was hailed as a fair balance between investor and consumer interests, as it promoted industrial growth in an unrestrictive manner[9]. Plants and animals were restricted, so that they could not be patented, moreover food products, chemical inventions and drugs were eligible for only process patents[10]. Patents were deemed to be valid for 7 years after their date of application[11]. In terms of agricultural IPR legislation, and to the benefit of majority of Indians the 1970 Patent Act is regarded to be extremely restrictive[12]. However, this all changed as India entered a new phase of economic liberalization, in the hopes of being embraced as a viable international trading partner.

In response to the balance of payment crisis, the New Economic Policy of 1991 (NEP 1991) introduced major changes in India[13]. With an emphasis on liberalization, privatization, and the overall globalization of national economic structures NEP 1991 meant a fundamental change for agriculture[14]. Reform policies were fixated upon enterprise expansion, and as a result, agricultural communities since then have continued to suffer. To this day, agricultural development policy, necessary for sustainable industrialization within rural Indian communities, remains absent. With an increased desire to 'catch-up' to international economic powerhouses, deep-rooted industries such as the agricultural sector have taken for granted since 1991. The complete abandonment of rural India has been facilitated by the openness associated with NEP 1991. This process has been exacerbated through India's hoop jumping into the WTO.

Transformation through TRIPs

The transition to the WTO from the GATT marks a crucial time when the rights and sovereignty of rural communities in developing countries was institutionally compromised. This has been accepted by officials as a consequence of increased international economic

engagement. In comparison to the WTO, the GATT provided countries with far more freedom to develop and follow their own IPR laws. The GATT was not specific with regards to patent law. A key distinguishing factor of the WTO is the TRIPs agreement. In order for countries to be accepted as members of the WTO, they must adhere to all of its laws, including those of TRIPs. Thus, in order to be given clearance to join the WTO, countries had to amend any national patent law that contradicts TRIPs[15].

India signed into the WTO in 1995 and has since taken many steps forward to be fully embraced by the international community as an excellent trading partner[16]. Since 1 January 1995 for example, India's Patent Office has been accepting all applications for agro-chemical invention product patents[17]. However, this process of patent reformation was not a smooth process. A constant criticism of developing countries has been that they have taken far too long to adopt TRIPs. India's sluggish TRIPs adoption process was criticized by the U.S, who took action by notifying the WTO. In 1998 the WTO publicly ruled that India's failure to fully amend its patent law was in violation of TRIPs, and was overall illegal[18].

In response to such criticisms, the Indian government has undergone multiple IPR legislative changes, the first of which being the 1999 Patent(Amendment)Act[19]. This was a serious legislative amendment, as exclusionary clauses of product patents in areas of food, drugs and medicine were removed[20]. Moreover, in order to be fully recognized by the WTO, Indian officials altered IPR legislation to allow for the patenting of life forms, living organism derivatives, gene patents and components[21]. National IPR law had to also be changed to allow for patents to be valid for 20 years[22]. Reforms took place again in 2002 and by 2005; India was officially following conditions of TRIPs.

The balanced approach of the 1970 Patent Act has been forever lost. India's desire to become a member of the WTO has come at a very high price: its legislative sovereignty. However, this loss of autonomy has meant a gain for some, namely the U.S. TRIPs has essentially globalized the American understanding of IPR law[23]. The institutional weakness of countries such as India, along with the desire to engage in global trade has capped sovereign thought. TRIPs has put a limit on the capacity to effectively ensure biodiversity, and provide both basic medicine and food to populations[24].

In the context of agricultural cultivation techniques, TRIPs has institutionalized a predictable scheme of 'winners and losers'. Specifically, powerful countries such as the U.S have the knowledge and resources to use TRIPs and IPR law to their advantage. Moreover, such advantages have allowed for western based agro-business conglomerates such as Monsanto to benefit as well. To the dismay of rural farmers, Indian governmental infrastructure cannot effectively compete with the west. Moreover, in some cases government officials have often taken a stance of 'benign neglect' due to the severity of negative externalities emerging from IPR conflicts. The innovations and seed developments of rural India were once priceless - this is no longer the case.

Case Studies - Basmati Rice & Bt Cotton

The following case studies were selected on the premise that they best highlight the self-serving and manipulative nature of agro-business conglomerates. TRIPs has provided the legal apparatus necessary to 'legitimately' engage in biopiracy and seed monopolization. In the context of IPR, India's only other option would be to formally leave the WTO, which for its industrialists and the most powerful is not an option. The actions and techniques of agro-business conglomerates have not gone unnoticed. As, in the words of Vandana Shiva, both

conglomerates and TRIPs are “not just for new inventions but for the knowledge of our grandmothers”[25].

The Case of Basmati Rice

Basmati rice, known for its aroma and long grains has its origins in the Indian subcontinent[26]. Across the world, these special rice grains are a staple of South Asian cuisine and history. Basmati meaning “queen of fragrance” and “fragrant Earth” is embedded in Indian folklore and religious practices, in which they often symbolizing growth[27]. According to Haryana Agricultural University, one of the earliest references to the rice was made in poet Varis Shah’s 1776 Heer Ranjha[28]. There are approximately 27 distinct documented varieties of Basmati rice[29]. These varieties cover 10-15% of the total rice cultivation area within the county[30]. Geographically speaking, the cultivation of Basmati is partial to the lands of Punjab, Haryana and Uttar Pradesh[31]. Collectively, Indian grows approximately 650,000 tonnes annually, 400,000-500,000 tonnes of which are exported[32]. With an embedded history and economic ties to specific regions, it is interesting how an agro-business conglomerate could ever mistakenly question the origins of Basmati.

Biopiracy “refers to the use of intellectual property systems to legitimize the exclusive ownership and control over biological resources and biological products and processes that have been used over centuries in non-industrialized culture”[33].

On 2 September 1997, Texas based RiceTec Inc. was granted patent number 5663484, for the genetic lines of Basmati rice, by the U.S Patent and Trademark Office(USPTO)[34]. Immediately, RiceTec began to develop hybrids using various blends of Basmati. Promoted as an, ‘American type of Basmati rice’, RiceTec developed a new plant variety cross between American long-grain and Basmati[35].

Criticism from Indian rice farmers logically ensued, as many were forced to pay royalties to the conglomerate[36]. The production and cultivation of Basmati has with it a history dating back to centuries ago. For farmers, the grain is an entity that is constantly evolving. In the context of India, Basmati rice has always been considered a common resource dependant upon word of mouth knowledge and transfer. Using this logic, RiceTec alleged that the ‘Basmati’ name was in public domain, and that by patenting it; they were in actuality protecting its name and origins[37]. RiceTec soon came out with hybrid versions: Kasmati, Texmati, Jasmati, which for rural farmers clearly illustrated the profit based interest of the conglomerate[38]. Through its acquisition, RiceTec patented some 22 varieties of the rice[39]. One of which being Basmati 867, a rice grain which was very similar to original Basmati but was advertised to have a less chalky more refined taste[40]. With the livelihood of approximately 250,000 farmers in jeopardy, the Indian government finally reacted[41].

In April of 2000 Indian officials publicly pleaded with USPTO to review the RiceTec Basmati case, as Indian exports were beginning to be threatened[42]. Government officials were armed with hundreds of pages of scientific data proving that the distinguishing characteristics of RiceTec’s rice were also found in Basmati[43]. Moreover, the use of the name ‘Basmati’ itself was misleading for customers considering that the product was a hybrid grain[44]. The name ‘Basmati’ carries with it a reputation of culinary excellence, and RiceTec was benefiting from it. Under Article 23 of the TRIPs agreement, using words such as “kind”, “type”, and “style” is illegal, and RiceTec had used such words numerous times in advertising schemes[45].

Moreover, considering the geographical indicators clause of TRIPs, the entire process of approval and acquisition of RiceTec's Basmati patent can be deemed to be illegal. Article 22 of the TRIPs agreement, (the geographical indicator clause) prohibits the use of both direct and indirect uses of a goods geographical origin[46]. In this respect, Basmati is to the India what Champagne is to France, part of the regional identity.

On 14 August 2001 USPTO overturned a large amount of claims held under Patent No.5663484[47]. Amidst great public scrutiny and criticism, RiceTec lost the right to use the 'Basmati like' advertising slogan. At the discretion of USPTO, out of 20 Basmati patent claims, 15 were withdrawn[48]. RiceTec was able to keep their Indian-American hybrids Texmati, Jasmati and Kasmati[49]. To the dismay and outrage of citizens and farmers, after the patent withdrawals, the Indian government publicly stated they were very satisfied and wished to drop all other charges.

Overall, the most appalling aspect of this infamous case is not the manipulative nature of RiceTec. Rather it is the lack of immediate government response. As previously stated, officials only became concerned after Basmati exports were felt to be in jeopardy. The overstressing nature of patent No.5663484 was not really a concern for Indian officials. It was only when citizen groups filed a Public Interest Litigation (PIL) claim to the Supreme Court, that the Government of India were compelled to act against RiceTec[50]. Moreover, the claims made to USPTO against RiceTec, concentrated on the actual Basmati grain (exports) and neglected areas of seed and plant biopiracy[51]. Unfortunately, the concerns and losses incurred by rural farmers were not a concern for officials. The 15 withdrawn patent claims granted by USPTO are the result of many letters contesting the patent, citizen protests and large-scale rural movements[52].

Understanding Basmati Biopiracy

Vandana Shiva makes it clear, that yes "[w]e have won the Basmati biopiracy battle, though the war for defence of farmers' rights, indigenous knowledge and biodiversity still needs to be won"[53]. Although the battle for Basmati rice is in relative terms, over, there remains a great amount of uncertainty as to how such a blatant act of piracy could occur with minimal opposition from officials. Beyond biopiracy, RiceTec's Basmati patent is a case of resource piracy as a natural resource (Basmati rice) was taken from a specific country without any sort of granted permission or public recognition[54]. It is a case of economic piracy as RiceTec used the term 'Basmati', to advertise their hybrid rice, in the hopes of appealing to customers looking for an aromatic product similar to the original Basmati[55]. Finally, it was a case of both intellectual and cultural piracy as RiceTec through its acquisition of Basmati, patented a key heritage piece of rice producing rural communities without permission[56].

Based upon the above legal inconsistencies, it is clear that the TRIPs agreement promotes a rather unfair, biased one-sided pro West framework. Developing countries like India have the choice of either conforming, and as result turning the blind eye on their population, or being blacklisted from international organizations. In the face of trade, Indian officials have consistently chosen to deny their population of basic sovereign rights. The externalities of which threaten the core characteristics of what it means to be a farmer in a rural Indian agricultural community.

The severity of RiceTec's biopiracy cannot be underestimated, as the conglomerate was claiming to have invented the physical characteristics of Basmati such as the plant height and grain length[57]. By claiming ownership of the rice plant itself, RiceTec was directly

threatening rural farming communities. Throughout centuries of development, Indian farmers have produced some 200,000 varieties of rice[58].Therefore, if RiceTec were to own the Basmati rice plant itself the autonomy and ability of farmers to engage in common sharing techniques, (a fundamental of rural communities), would be compromised. To the dismay of farmers, in the eyes of both IPR law, and the TRIPs agreement, it would be considered illegal to share cultivation techniques. “Of all the IPRs contained in the TRIPs agreement, the patents provisions may be the most significant in terms of economic implications, especially for developing countries”[59]. For rural farmers, patents stand to compromise what is known as ‘the commons’.

Agricultural knowledge and cultivation techniques passed down from older generations carry with them inherent seed adaptations and innovations[60].Therefore, any sort of seed patenting is limiting indigenous common knowledge. The ability to work the land and use the surrounding environment is compromised for monopolistic like conglomerate seed promotion. Biodiversity is inherently threatened, as farmers no longer have the rights to freely work their crop. Moreover, agro-business conglomerates have no real responsibility to ensure that farmers from developing countries are taken care of[61].Ultimately, governing bodies are held responsible for their rural populations, and in the case of India, this is not being done. Indeed, with concerns over export levels, official did intervene and put an end to RiceTec’s overarching patent.

Institutional Realities

Marginalization and destabilization of rural Indian farmers has been institutionalized through the acceptance of TRIPs. Moreover, all previous “equitable benefit sharing” as envisioned by the UN Convention for Biological Diversity (CBD) have been permanently undermined[62].Taking place in 1992, in the Rio de Janeiro the CBD advocates for conservation, sharing and state sovereignty over resources[63].Promoted primarily by developing countries like India, the CBD attempts to integrate and protect indigenous traditional knowledge. Concretely, the CBD called for the sovereign rights of rural resources[64].

Developing countries take particular issue with the TRIPs agreement’s lack of prior art protection. Many calls have been made for complete disclosure in the context of granting patents based on novelty (Article 27.1)[65].Opponents of TRIPs advocate for an amendment, which would institutionalize a prior art clause forcing patent applicants to divulge full information and history of their ‘innovation’[66]. The support of such an amendment has sparked much controversy, and in the name of traditional knowledge, many developing countries have remained fearless in their pursuits.

This however has not been the case for governing Indian officials. In fact, continuous efforts have been made to further integrate with international economic powerhouses such as the U.S. The U.S is the number one supporter of TRIPs and does not advocate in any way for the CBD[67]. Furthermore, due to the fact that the CBD is a framework and not legally binding per say, TRIPs has continued to remain a priority for developing countries that wish to gain international economic acceptance.

In an effort to conform to TRIPs, in 2001 India enacted the Protection of Plant Varieties and Farmer’s Rights Act (PVP)[68].To allow for plant breeder’s rights (PBR), a community gene fund was set up however it has since been cut, only to resurface as a responsibility of the

Biological Diversity Act[69]. The lack of care for rural communities is evident in the inability of governing officials to fully set up an agricultural policy to the benefit of farmers. Although PBR promotes seed saving, exchange and selling, seed varieties must be protected[70]. In reality most rural farmers do not have the resources to legally protect their varieties. Moreover, such an imposition of a legal structure debilitates the fundamentals of common knowledge exchange. In fact, PBR, as a legal apparatus is ensuring the rights of large-scale breeders, not small-scale farmers.

As illustrated in the above case analysis of Basmati rice, Indian officials have not been entirely negligent. However, the social realities spawning from GM seed has been consistently avoided. This is especially visible when considering the affects of Bt cotton, as discussed below.

The Case of BT Cotton

Prior to colonization, cotton was traded in the Indus Valley as mainly a Luxury good[71]. It was only in the 19th century, after colonization that cotton cultivation followed a more mass production like structure[72]. Multiple attempts have been made by various outside actors (namely the British and agro-business conglomerates) to standardize cultivation techniques. In the 1970s, through the introduction of hybrid cottonseeds, the reality for rural farming communities has continuously been characterized by a struggle for sovereignty and control.

Cotton production is a staple of the Indian agricultural economy. Some 7 million farmers depend on the crop for sustainable living, and overall 21% of all cotton produced globally comes from India[73]. However, cotton is a very expensive crop to cultivate. Over half of India's total pesticides (40,000 tonnes) are used in the upkeep of cotton cropland[74]. The prices of inputs such as pesticides have continued to increase. Average expenditure for cotton crop pesticides has increased from Rs. 99 per acre (1972-3) to Rs. 5,934 per acre(1996-7)[75]. For agro-business conglomerates, the related expenses of cotton production are the ideal platform to sell, innovate, and develop their seed monopolies.

Conglomerates have taken advantage of the hardships associated with cotton production, and in the context of India, uneducated desperate rural communities who are merely looking to improve their standards of living are at their mercy. Rural India has been duped. Specifically, the introduction of Bt cotton has compromised the sense of sovereignty felt by farmers and completely destabilized rural communities. It is estimated that in only one growing season, Bt cotton with its massive failures costs farmers a total of Rs. 1.3 billion, over 105,000 acres[76]. The self-serving nature of conglomerates is fully visible when considering the exploitive and destabilizing effects Bt cotton has had on rural India.

Monsanto developed Bt cotton in 1995; the plant was genetically engineered to include insecticide to fight the common bollworm[77]. The seed includes toxins, which Monsanto alleges will reduce costs for farmers. In 1998 Monsanto began a series of Bt cotton trial tests in India, albeit illegally[78]. Monsanto did not apply for trial testing clearance, and was not given any sort of formal approval to conduct studies on rural land. Thus from its origins, in the eyes of scorned farmers, Monsanto's "concern" for rural communities is an outright facade.

After going public with the results of their trial tests, Monsanto promoted Bt cotton as the perfect cost-cutting crop for rural India. It was claimed that yield output would increase to 3,300 pounds per acre[79]. Moreover, Bt cotton would need to be sprayed approximately 2.6

times less than both organic and hybrid cotton[80]. Even though inputs were more expensive, the genetically engineered seed would be sprayed sparingly, ultimately reducing the cost of cultivation by 30% to 40% at least[81]. With promises of higher yields and lower costs, the Indian government officially approved three Bt cotton hybrids (MECH 12, MECH 162, MECH 184) for clearance in 2002[82].

This clearance was given to Monsanto in conjunction with the Maharashtra Hybrid Seed Company (Mahyco), which conveniently enough, Monsanto has a 26% stake in[83]. Bt cotton was the first GM seed to be given clearance by the Indian government and is now viewed as the example of how agro-business conglomerates impact vulnerable rural communities. As highlighted below, pockets of rural Indian communities have been completely marginalized to the point of despair due to crop failure, resulting in unfathomable consequences.

The “success” of Bt cotton is a fabrication by Monsanto-Mahyco. It is unrealistic to assume that such conglomerates would publish data that contradicted their associated financial interests of seed monopolization. A 2004 Monsanto study predictably claimed Bt cotton to considerably improve cotton farmer crop yields returns. The countrywide study claimed that yields increased by 58% resulting in an increase in farmer incomes by 60%[84]. Just two years prior, (23 October to 2 November 2002), the Research Foundation for Science, Technology and Ecology (RFSTE) undertook a survey study in the attempts to highlight the real affects of Bt cotton on yields. Firstly, it was discovered that in reality bollworm pests attacked Bt crop far more often than compared to simple hybrid and organic cotton crops[85]. Secondly, the claim of 3,300 pounds of yield per acre was never realized, with the highest yield being 880 pounds per acre[86]. Finally, the RFSTE survey concluded that organic and hybrid cotton producing rural communities produced an average yield of 1,000 pounds per acre[87].

The Cycle of Destabilization

Once Bt cotton is planted, the cycle of systematic destabilization begins, and not much can be done at that point to mitigate the losses that will soon be incurred by the farmer. Conglomerates are aware of the domino like effect Bt cotton can have within rural communities. Nearly, 90% of all bollworm larvae leave the fields[88]. Cross-pollination is inevitable, and is a preferred tactic to gain new “customers”. Bt crop is supposed to be surrounded by a 5 row deep sanitary organic band, essentially producing a cultivation ratio of 80:20[89]. Many farmers are unaware of this principle, as conglomerates stand to gain new business from cross-pollination mistakes and do not fully divulge GM cultivation techniques. In 2004, Bt cotton crop occupied 1.3 million acres of Indian land, approximately 7% of the total land allocated to cotton production[90]. By 2006, Bt cotton cropland had increased to almost 3.8 hectares[91].

Even though it is a serious problem for farmers, not all increases can be attributed to cross-pollination. In promoting Bt, the rhetoric used by Monsanto is extremely enticing. Advertising campaigns often use notable public figures that appeal to the public, especially rural farmers. The promise of less input costs has been the primary means through which Bt cotton has gained government support and approval. As a result, the utter failure of the crop is a major surprise for governing bodies, which, at the present time do not know how to react.

Resistance & Crop Failure

Monsanto has publicly admitted that resistance levels of the genetic pesticides in Bt seeds do wear down after the first few harvested seasons [92]. The failure of Bt cotton in this sense is real, and depending upon the farmer, can lead to multiple negative consequences. At the most basic level, all farmers incur the financial cost of the actual seed. This is significant considering that Bt cotton seeds are approximately four times more expensive than both organic and hybrid seeds [93]. Also, with the purchase of the Bt seed farmers must give up the right to harvest their own seed, which they have evolved over the years.

This is why Bt cotton is especially debilitating, by giving up their indigenous cottonseed; the farmer becomes locked into a cycle of agro-business conglomerate dependence. Farmers have limited control over the Bt seed, as the cycle of production becomes more of a scientific chemical mixing game. Bt cotton cropland is sprayed as many as 30 times a year due to increased bollworm resistance [94]. Such an increased level of chemical use has killed off many natural 'enemies' of bollworm pests including certain wasp and spider species [95]. It took some \$500 million (U.S) to develop specific pesticides that fight the bollworm pest, and it took only 5 years to develop resistant bollworms [96].

Moreover, such a high level of bollworm resistance has allowed for other sucking pests, such as spider mites, leaf hoppers and beet worms to increasingly attack Bt cotton fields [97]. The Bt pesticide does not have the genetic characteristics to effectively fight off these pests. Thus, farmers are forced to purchase inputs in the form of pesticides, herbicides and insecticides on a continuous basis. Bt cotton has developed a cyclical like purchasing scheme where farmers constantly have to salvage their crop through inputs. This has put majority of Bt cotton farmers in debt, as they cannot afford the endless array of necessary inputs. If they do not upkeep their crop, their livelihood is threatened, resulting in greater poverty and conglomerate dependence. With the interest rate of loans between 36% and 50%, farmers in these communities are increasingly becoming indebted [98]. These loans are not coming from officials; rather they are from private rural lenders and agro-business conglomerates.

The above has been disastrous within India's entire cotton belt, however due to biophysical realities, it has severely affected the states of Andhra Pradesh (AP) and Maharashtra. In the case of AP, cropland has not reacted well to the genetic characteristics of Bt. Non GM seeds need approximately 3,000 litres of water to produce one kilo of crop, anything else (including Bt seed) needs at least 5,000 litres of water to produce one kilo [99]. AP often suffers from drought, and as a result, Bt cotton crops within the state has caused massive destabilization.

Bt Cotton farmers in AP spray fields more often, have lower yields and as a result obtain less profit than farmers in other states. All three approved Bt cotton varieties have not been able to survive and overcome the extreme nature of AP droughts [100]. In 2003, Mr. V.S Rao, Agricultural Minister of AP commented that in the case of Bt cotton, "farmers have not experienced very positive and encouraging results" [101]. Cotton from Bt fields is characteristically very dry and small, and produces low levels of crop yield, ultimately limiting its market value [102].

Moreover, AP farmers cannot afford to properly irrigate Bt cotton crops, further diminishing their returns. With lower associated income returns, AP cotton farmers are more likely to fall into debt because no matter what, they must purchase the necessary inputs if they wish to sustain the Bt cotton crop. Roughly 80% of all loans given to AP farmers come from non-official sources [103]. These third parties, spare nothing, and benefit from the fragile nature

of rural farmers. For many farmers, Bt cotton is truly a nightmare with no real end in sight. The despair felt by these farmers has manifested itself in both increased levels of debt and most alarming, increased levels of suicide.

Farmer suicides in AP have increased after Bt cotton was both approved and promoted by governing officials. The financial stress associated with Bt cotton, has indeed been grave. Moreover, with the adoption of such GM seeds and subsequent failure, many rural farmers have increasingly felt deep remorse. This sentiment of loss is a result of much regret associated with leaving cultural farming techniques, which carried with a sense of community and family[104]. The loss of control over crop in both the indebted and sovereign sense is simply too much for many farmers.

A similar trend is visible in Maharashtra, which is home to some 3.2 million cotton farmers[105]. Farmers using Bt cottonseeds have continuously complained of wilting crops[106]. Better known as 'rot root', Bt cotton is not accustomed to the biophysical environment of many regions in India. Moreover, in all cases of Bt failure, farmers have been unable to compensate for the natural environment in which they are cultivating the seed. The scientific regulatory environment needed for successful Bt returns, in reality is not feasible for farmers who are used to working their land. This frustration has taken its toll on farmers. The state has confirmed that over 200 farmer suicides occurred between July 2005 and February 2006 alone[107]. As in the case of AP, many of these farmers were indebted. Some 60% of the farmers who took their lives during this time were indebted, between \$110 and \$550 dollars[108].

Insect-resistant seeds such as Bt cotton are the only transgenic varieties, which have been widely adopted by small-scale farmers[109]. Moreover, some 75% of cultivatable Indian land exists in dry areas[110]. There exists a large population of rural farmers who are experiencing problems with Bt cotton crop, due to their reliance on natural rainfall. For conglomerates and respective shopkeepers, they are the perfect demographic. This is exacerbated by the fact that these farmers have minimal control over their land. Rural farmers have experienced a "deskilling" of cultivation techniques, which carries with it severe social and ecological consequences [111]. The cultural importance of knowledge sharing is being lost to scientific IPRs. Due to the rule-based scientific formula techniques of cultivation associated with GM seeds like Bt cotton farmers can no longer work their land. Through massive debts and depression, GM seeds such as Bt cotton have increased levels of rural bankruptcy and suicide[112].

Movements Against Destabilization

Overall, since 1997 over 100,000 farmers have committed suicide nationally - 86.5% of which carried an average debt of \$835[113]. The Indian government has continuously attributed these suicides to mental illnesses and domestic problems, effectively avoiding the epidemic[114]. This level of despair must be addressed, as the consequences are becoming increasingly burdensome for rural inhabitants.

The majority of rural Indian farmers inherit small and median scale farms and small and marginal farmers account for over 70% of all Indian farmers [115]. India has a patriarchal system and men are the head of the household. The majority of individuals who take their lives are male, who through their actions leave the responsibility of an entire family to the eldest female. As in the aftermath of the suicide, remaining family members carry the burden of the unpaid load. If the loan cannot be paid the farm is shamefully confiscated by

third party lenders[116]. Under a great deal of harassment, loans may be paid off, in which case children characteristically must drop out of school, and work to gain income [117].The widow's burden has been the source of much social upheaval in rural communities.

In response to such devastation, many social movements have emerged in hopes of mitigating the damaging effects agri-business conglomerates in conjunction with IPR manipulation have had. Self Reliance Education and Employment (SEEE), is one of these movements. SEEE, mainly focuses upon the outward mobility of rural women, who are most severely impacted by suicide. Some 25,000 women from impoverished rural communities have received vocational training in hopes of moving beyond the despair associated with farming[118]. The Navdanya, a seed movement promoted by Vandana Shiva is another example of rural community mobilization in the face of farm failures. Navdanya, focuses upon protecting Indian seed biodiversity, and has over 16 community seed banks in place in over 6 Indian states[119].Patent law is treated as an illegal entity[120]. Again, moving beyond the status quo, a focus is placed upon ensuring that the rights of farmers are maintained.

With the above crisis in mind, it appears as though the government has abandoned rural populations. A weak institutional framework has left minimal outlets of recourse for farmers. The Indian government has continuously compromised rural populations for the industrial benefits they have realized through the 'free markets' associated with both NEP 1991 and the WTO. Liberalization has forced farmers to "distress sale" tactics, and most worrisome, has pushed many inhabitants to work outside rural communities[121]. It is estimated that by 2020, some 70% of Tamil Nadu, 65% of Punjab, and 55% of Uttar Pradesh migration will come from rural communities[122]. These, agricultural refugees 400 million strong, are a reality which governing officials will have to address[123]. The majority of the industrial growth taking place in India is concentrated in urban centres. This growth will be seriously undermined if rural communities continue to be neglected.

Concluding Remarks

The above case studies highlight the manipulative nature of both agro-business conglomerates and current realities of IPR law. Developing countries such as India have few options; either comply with international agreements like TRIPs and engage in forward moving trade at the cost of rural communities or be blacklisted from the WTO for not following prerequisites of open borderless free markets needed for enrolment. Indian officials have chosen the latter, which has altered seed production from a need driven agricultural cycle to a supply and profit driven industry. This industrialization of agricultural production has stripped away the identity associated with indigenous farming and rural communities - the idea of rural self-sufficiency has been compromised[124].

This paper has highlighted the real abilities of agro-business conglomerates such as Monsanto, Mahyco and RiceTec, who are relentless in their desire to gain control and monopolize rural communities. These attempts are both explicit, as visible in the case of Basmati rice and implicit, as visible in the case of Bt cotton. Common themes emerge from both of the above case studies, which effectively characterize the harsh consequences incurred by rural Indian communities.

Thematically, the agricultural cycle of production is being destroyed. For farmers, it is no longer a right but a privilege to have the ability to grow a seed, harvest the crop, and sell the yield in a cyclical process. In the case of Basmati, there is a third party royalty fee to be

paid in order to even access the ability to grow the seed. Historical knowledge, family recipes and cultivation skills were no match for the legal apparatus working in favour of RiceTec. Thousands of years of culture has been threatened within a few years, and so easily, with minimal recourse. In the case of Bt cotton, the freedom to grow a seed with bare hands was capped due to scientific genetic patents.

The right to produce has been manipulated by agro-business conglomerates leaving farmers with a limited capacity to autonomously control the agricultural production cycle. IPR structures have fuelled the increase in economic growth and investment levels within India. Conglomerates are spending some \$7 billion a year on research and development[125]. By 2004, Monsanto alone had applied for a total of over 70 patents in India [126]. Such high levels of investment make it clear that there is no real solution or conclusion in sight.

Until governing officials both domestically and internationally take a step back to realize the disastrous effects IPR law has had on rural communities, change will be hard coming. Amidst great industrial development potential, rural India is the loser. These losses threaten sovereignty, income, biodiversity, culture, community and the very identity of the average Indian[127].

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Appendix

Farmer suicides and Bt cotton area in Andhra Pradesh, 1997-2006

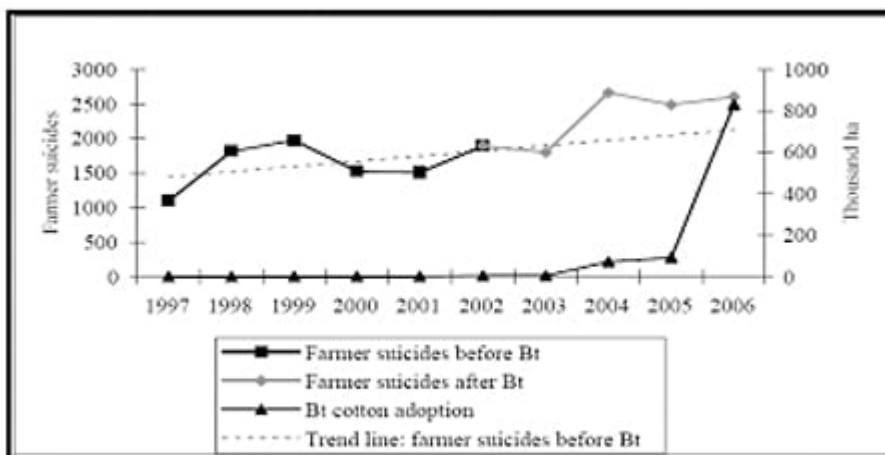


Figure 1.0 Gruère, Guillaume P. et al., (2008), "Bt Cotton and Farmer Suicides in India, Reviewing the Evidence", International Food Policy Research Institute. <<http://www.ifpri.org/pubs/dp/ifpridp00808.pdf>> pg 34.

Table: Selected Crop Related Patent Applications Filed by Monsanto in India, January 1995-December 2003 (Abstract from Online Search on TIFAC Database on Patent Applications in India at www.tifac.org.in)

Title	Year of Application
Method for reducing pest damage to corn by treating transgenic corn seeds with pesticide	2003
Method for reducing pest damage to corn by treating transgenic corn seeds with Thiamethoxam	2003
Seed Treatment with combinations of insecticides	2003
Seed Treatment with combinations of Pyrethrins Pyrethroids Clothianidin	2003
Seed Treatment with combinations of Pyrethrins Pyrethroids and Thiamethoxam	2003
Nucleic acid molecules and other molecules associated with soybean cyst nematode resistance	2002
Method of enhancing biological effectiveness of plant treatment compositions	2001
Compositions promoting chemical substances in plants	2001
Corn event PV ZMGT32NK603 and composition and methods for detection thereof	2001
Transforming plants to express Bacillus Thuringiensis Delta Endotoxins	2001
Expression of Fructose 1.6 Bisphosphate aldolase in transgenic plants	1998
Fungicides for the control of take-all disease of plants	1995

Figure 1.1 The following is a simplified list of Monsanto's Patent Applications

Seeds of Destruction

The Hidden Agenda of Genetic Manipulation

by F. William Engdahl

Global Research, 2007 ISBN 978-0-937147-2-2

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This skillfully researched book focuses on how a small socio-political American elite seeks to establish control over the very basis of human survival: the provision of our daily bread. *"Control the food and you control the people."*

This is no ordinary book about the perils of GMO. Engdahl takes the reader inside the corridors of power, into the backrooms of the science labs, behind closed doors in the corporate boardrooms.

The author cogently reveals a diabolical World of profit-driven political intrigue, government corruption and coercion, where genetic manipulation and the patenting of life forms are used to gain worldwide control over food production. If the book often reads as a crime story, that should come as no surprise. For that is what it is.

Engdahl's carefully argued critique goes far beyond the familiar controversies surrounding

the practice of genetic modification as a scientific technique. The book is an eye-opener, a must-read for all those committed to the causes of social justice and World peace.

What is so frightening about Engdahl's vision of the world is that it is so real. Although our civilization has been built on humanistic ideals, in this new age of "free markets", everything- science, commerce, agriculture and even seeds- have become weapons in the hands of a few global corporation barons and their political fellow travelers. To achieve world domination, they no longer rely on bayonet-wielding soldiers. All they need is to control food production. (Dr. Arpad Pusztai, biochemist, formerly of the Rowett Research Institute, Scotland)

If you want to learn about the socio-political agenda -why biotech corporations insist on spreading GMO seeds around the World- you should read this carefully researched book. You will learn how these corporations want to achieve control over all mankind, and why we must resist... (Marijan Jost, Professor of Genetics, Krizevci, Croatia)

The book reads like a murder mystery of an incredible dimension, in which four giant Anglo-American agribusiness conglomerates have no hesitation to use GMO to gain control over our very means of subsistence... (Anton Moser, Professor of Biotechnology, Graz, Austria).

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