

Intellectual Property, Competition, and Regulatory Policies: A Case of Bt Cotton Seed Industry in India

Subash Surendran Padmaja*

Abstract: This paper explores the relationship between intellectual property rights, competition laws and regulatory policies in case of Bt cotton seed industry in India. Using timeline analysis, the paper tracks the events to understand the temporal scope and inter-temporal dependences of the events. This study illustrates that interaction of business model and regulatory policies resulted in anti-competitiveness in the industry. The study shows multiple regulatory enforcements due to the lack of clarity and foresight. Lack of clear legislative framework, specific criteria for assessment, transparency and public involvement in the regulatory decision-making process has led to these multiple enforcements.

Keywords: Bt cotton, competition, intellectual property rights, regulation, policies

1. Introduction

The relationship between intellectual property rights, competition laws and regulatory policies has received growing attention, particularly in the globalised economy (Correa, 2007). The interaction between these has resulted in a unique set of challenges for the policymakers, predominantly in developing countries. On the one hand, intellectual properties are supposed to provide an exclusive control to the owner, while competition laws aim to minimise the market entry barriers and benefit the consumers.

* Scientist, ICAR-National Institute of Agricultural Economic and Policy Research, New Delhi. The author may be contacted at: subashspar@gmail.com

Regulatory policies play a balancing act of ensuring both economic interest and welfare of the country as a whole. These contradicting objectives lead to conflicts and such conflicts are increasingly observed in developed countries (Raju, 2014). Though developing countries could use precedents from developed countries to absorb technologies for growth (Scherer and Watal, 2014), there are newer and emerging challenges unique to developing countries. UNCTAD (2016) has reviewed the interface between intellectual property rights and competition and suggested a balanced approach for innovation and competition in the market. There are provisions in the existing laws in India (Competition Act, 2002) to avoid conflicts; Section 3(5) (no interference of competition law on IPR policies), conditioned on interference if any violation such as abuse of dominant position (Section 4) (Chakraborty, 2015). On the other hand, conflicts between regulation and competition laws are observed in various sectors in India. Kathuria (2018) argued that when there is a conflict between a regulatory and competition agency, a third body could resolve the issue, where both agencies are bound to the decision. There are many reported cases where such conflicts are resolved through judiciary systems.

The study assesses Bt cotton¹ seed industry in India to illustrate the effect of interactions between intellectual property rights, competition laws and regulatory policies in the technology market and conflict resolutions through judiciary systems. Bt cotton is widely cultivated in India and it accounts for about 96 per cent of the total cotton area cultivated and produced in the country (ISAAA, 2017). Bt cotton industry has been mired with controversies. There was a strong opposition against the introduction of Bt cotton in India (Thomas and De Tavernier, 2017) even though the economic benefits of growing Bt cotton were well established (Subramanian and Qaim, 2010; Pray et al., 2011). Anti-GMO activism started immediately after the introduction of Bt cotton in India. The key arguments against Bt cotton were centred around the issues of increase in farmers' suicides, increased production cost, monopolisation of the seed market, patenting of seeds, and marketing strategy adopted by seed companies (business model). Cotton being a commercial crop grown by resource-poor farmers across dry-lands in India, it is alleged that Bt cotton is a key driver for increasing farmers' suicides (Thomas and De Tavernier, 2017). However, these allegations were questioned by Gruère and Sengupta (2011), who reported that there is no 'resurgence' of farmers' suicides due to the adoption of Bt

cotton. Other than the social and ethical controversies faced by Bt cotton, there was a series of litigations on regulatory procedures, monopolisation of the seed sector, litigation on intellectual property (Chawla, 2018) and the competition law (see CCI, 2015). Apart from these, the industry has also been under regulation through different government policies (Essential Commodities Act, Cotton Seeds Price Control Order) to protect farmers' interest. The implication of intellectual property, competition and regulatory policies on Bt cotton sector has been mentioned in few studies (Gupta and Chandak, 2005; Thomas and De Tavernier, 2017). Murugkar et al. (2007) in their study have discussed that government interventions by imposing a price ceiling (Cotton Price Control Order) had led to an anti-competitive effect in Bt cotton industry. Vithal (2018) attributed the lack of intellectual property law enforcement in India as the failure of Bt cotton (developed resistance against pink bollworm) varieties in India.

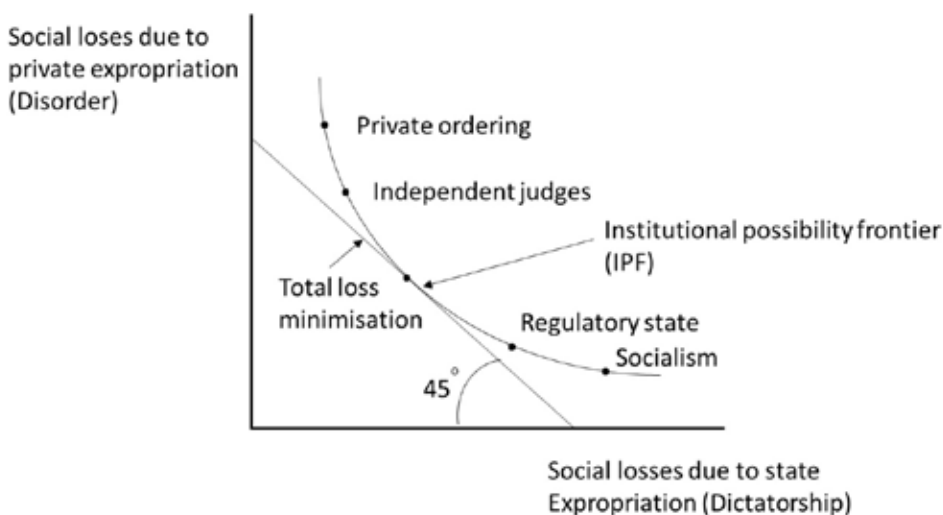
This study narrates the causes and consequences of various litigations on the intellectual property and competition and explores the effect of regulatory policies of the government on anti-competitiveness in the industry. The study is not to explore the jurisdictional overlaps between sectoral regulations, competition law, rather it explores the effectiveness of such multiple checks and balances on the Bt cotton sector in India.

2. Theoretical Framework

The core focus of this study is the regulatory policies in the Bt cotton sector. Economic theories of regulation are classified into two broad categories – public interest theories and private interest theories (Den Hertog, 2010). Public interest theories argue that government intervention could increase social welfare by avoiding market failures (Shleifer, 2005). These theories assume that the regulators have sufficient information and enforcement power to promote public interest effectively. These theories also assume that regulators are 'pro-public'. This has been criticised by followers of 'Chicago School of Law and Economics', who argue that the private ordering (Ellickson, 1991), and private litigation (Coase, 1960) can take care of market failures and there is no need of interfering through policies and regulations. They also argue that the government regulators are incompetent, corrupt and captured, as pointed out in Stigler's capture theory (Stigler, 1971). The fundamental assumption of these theories is that

the regulators do not necessarily have sufficient information about the firm with respect to cost, demand, quality and other behavioural dimensions. The theory establishes that the state regulatory agencies could imperfectly enforce public interest and are benevolent to their own interest even at the cost of public interest. As against the argument in public interest theories that the government intervention could increase the social welfare by avoiding market failures, the private interest theory maintains that regulations are the manifestation of interest group behaviour which results in the transfer of wealth to effective interest group engendering net social welfare loss. In this context, it is assumed that the competition would thereby replace regulation in the sector.

Figure 1: Regulation Strategies and Trade-offs



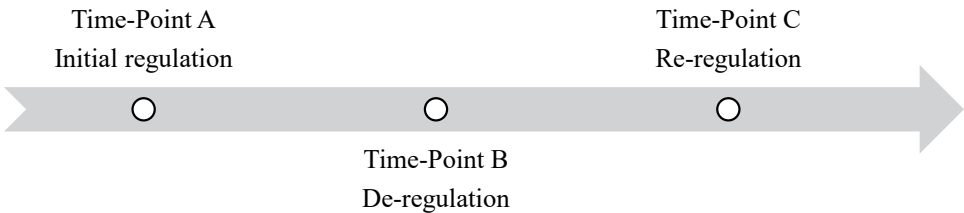
Source: Shleifer (2005).

Shleifer (2005) proposed enforcement theory of regulations, where he argues that the strategies (government regulation, private ordering and private litigation) are imperfect and optimal institutional design depends on the choice among these imperfect alternatives. The theory recognises trade-off, measured using institutional possibility frontier, between social cost in private and state expropriations (Figure 1). These theories are used as a base to explore our research question.

3. Methodology

This study uses timeline analysis, a qualitative analytical approach, to assess the interplay between different dimensions. A timeline of events² with respect to Bt cotton industry in India is build based on the review of newspaper articles, blogs and other published literature. Timeline analysis is used to understand the events in detail and concise the counterfactuals and consequences of the events. Molk and Rowell (2016) illustrated the use of timeline approach for analysing regulatory decision-making. Timeline approach could be a complementary alternative to the commonly used binary approach of the regulation (on or off; regulation or deregulation) (see Figure 2). Timelines could help in understanding the ‘temporal scope’ and ‘inter-temporal dependences’. Temporal dimension deals with the time period to be considered for the decision. While inter-temporal dependences deal with the dependence of multiple regulatory decisions at different time points.

Figure 2: A Simple Regulatory Timeline



Source: Illustration based on Molk and Rowell (2016).

Similar approaches have been used in other studies. Holgersson et al. (2018) studied the evolution of intellectual property strategy in mobile telecommunication system using longitudinal cases. In this study, a timeline of Bt cotton seed industry for the period 1986-2019 is constructed. The timeline is created using an extensive review of the literature (specifically Gupta and Chandak, 2005; Thomas and De Tavernier, 2017) for the period before 2006, and grey literature (newspaper articles, blogs) for the recent period. There were discrepancies on the sequence of events across the literature and such discrepancies are explicitly noted and others were solved by triangulating the events from multiple studies. Drawing on the timeline of events, this study explores the inter-temporal dependencies

of events to contextualise and understand the decision-making and its consequences over the period.

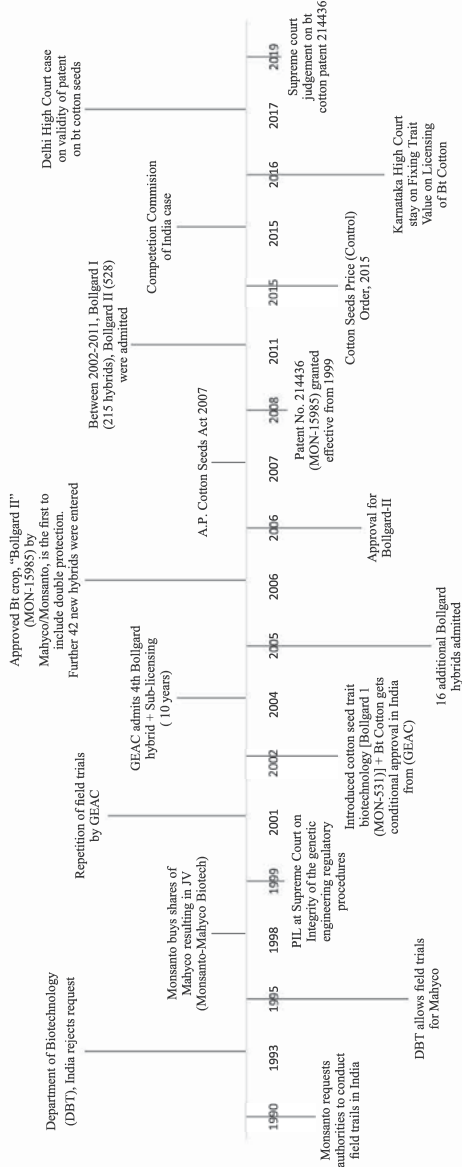
4. Results and Discussion

The timeline of events in Bt cotton industry in India is shown in Figure 3. The timeline is divided into three phases – phase 1 (1990-2002), phase 2 (2002-07), and phase 3 (2008-2019). Phase 1 is the initial regulation phase, where the regulatory authorities assessed the technology. In phase 2, the technology got widely adopted in the country with lesser regulatory interventions, and in phase 3, there was a series of litigations and emergence of strong re-regulations. There are quite a good number of literature writings on the earlier phase of Bt cotton development (Phase I) (see Cohen and Paarlberg, 2004; Gupta and Chandak, 2005; Thomas and De Tavernier, 2017). However, there is a dearth of literature discussing second and third phases.

In 1990, Monsanto Holdings Private Ltd. (MHPL) (henceforth Monsanto) requests the authority (Department of Biotechnology – DBT) in India to conduct field trials. There was a parallel negotiation with the Government of India for a technology transfer agreement. The request was rejected by DBT in 1993, citing exorbitant trait fees and issues with development of hybrids by crossing the exotic Bt varieties with indigenous varieties (Gupta and Chandak, 2005). On the other hand, DBT preferred incorporation of the Bt gene directly into indigenous variety.

In 1995, DBT allowed Maharashtra Hybrid Seeds Company Ltd. (henceforth Mahyco) to conduct field trials and approved import of 100 grams of cotton seeds containing Cry1Ac gene.³ Later in 1996, the Central Government also approved the import of Bt cotton variety (US Cocker 312). It's unclear whether Monsanto started negotiating with Mahyco before or after DBT allowed Mahyco to conduct trials. Monsanto initially acquired 26 per cent of the stake in Mahyco and started participating in the trials conducted by Mahyco. During the period 1996-1998, field trials were carried out in nine states (Andhra Pradesh, Karnataka, Tamil Nadu, Haryana, Maharashtra, Madhya Pradesh, Rajasthan, Punjab, and Gujarat). Though Gupta and Chandak (2005) reported that these field trials were carried out with permission, Thomas and De Tavernier (2017) stated that the field trials started before securing permission from DBT. In 1998, Monsanto and

Figure 3: Timeline of Events in Bt Cotton Industry in India



Source: Compiled by author.

Mahyco started a 50:50 joint venture (JV), named Mahyco-Monsanto Biotech Pvt. Ltd. (MMBL). Thomas and De Tavernier (2017) argued that Mahyco enjoyed preferential treatment from the regulatory authorities. He pointed out that the Mahyco's Director, who is also a World Food Prize recipient, had a good rapport with the Government and regulatory authorities (Scoones, 2003; Newell, 2007).

In 1999, Vandana Shiva and other activists and associations challenged the integrity of the genetic engineering regulatory procedures through a Public Interest Litigation in Supreme Court. The court ordered a temporary ban on the field trials until the Genetic Engineering Approval Committee (GEAC) guarantees the safety of the humans and the environment. In 2001, the GEAC refused to accept the observation of DBT and asked to repeat the trials. The GEAC trials were monitored by the Indian Council of Agricultural Research (Cohen and Paarlberg, 2004). At the same time, DBT amended the law empowering Review Committee on Genetic Manipulation (RGCM) and granted multi-location small trials to MMBL (Damodaran, 2005). This decision contradicts the Swaminathan Task Force report which suggested an independent regulatory set-up (Damodaran, 2005). Meanwhile, in 2001, MMBL discovered Navbharat Seeds Pvt. Ltd., selling Bt cotton seeds (Navbharat 151) in Gujarat. Subsequently, a case was registered with Gujarat High Court against Navbharat for violating the Environmental Protection Act/rules (Gupta and Chandak, 2005). Though Thomas and De Tavernier (2017) pointed out that 'GEAC banned the Navbharat 151 when it was discovered that the seed variety contained the illegally incorporated gene of Monsanto', it is to be noted that the incorporation of the Bt gene was not illegal as the event MON 531 was not patented. But growing them without GEAC was illegal which comes under the purview of Environmental Protection Act/rules. GEAC ordered Gujarat Biotechnology Coordination Committee to burn illegal plantation and also tried to procure back the illegal seeds, but the order was late and the seeds were sold out in the market before the intervention.

As said above, phase 1 was the initial period of regulation. Scoones (2003) had quoted Indian officials of the Department of Biotechnology admitting the lack of knowledge with respect to the technology. The lack of interaction with the critics of science policy also creates a sense of distrust in the regulatory process. They have also shared their skepticism in their ability to

enact the regulations. Though Herring (2014) points out that India follows a 'precautionary approach' in the case of genetically modified (GM) crops, it was not so before the introduction of GM crops. Government of India has issued bio-safety guidelines earlier in 1989. These guidelines were drafted before the GM crops came to India, so, explicitly it didn't embrace a 'precautionary principle' (Cohen and Paarelbergs 2004). There are three major inferences from the period I: (i) lack of clarity on the policy led to delay and distrust on the regulatory process, (ii) private litigation took care of the market and regulatory failures (Case of Navbharat seeds), and (iii) regulations also shaped the industry (Monsanto's JV with Mahyco). The initial regulatory challenges pushed Monsanto to enter into a partnership with an India entity (Mahyco). It's to be noted that India had just opened its economy during the same phase.

In 2002, GEAC conditionally approved the release of four Monsanto hybrids for commercialisation for a period of three years in South India (Qaim et al., 2006). It declined commercialisation in North India due to apprehension over the susceptibility of the seeds to leaf curl. MMBL launched its Bt cotton hybrid (Bollgard I, MECH 12, MECH 162, MECH 184) varieties. Though this was hailed as a regulatory breakthrough, there were apprehensions regarding the speed of adoption of GM crops due to the political nature of the bio-safety approval process (Cohen and Paarlberg, 2004). Later in 2004, GEAC approved four more hybrids and furthermore 16 hybrids using event MON 531 and MON 15985. Mahyco developed a second event by sourcing MON 15985 (Bollgard II) from Monsanto. There were two patents of Bollgard II – (1) Patent No. 214436 (Methods for transforming plants to express *Bacillus thuringiensis* delta endotoxins) and (2) Patent No. 232681 which provide IPR protection to Bt II technology. The patent 214436 was granted in 2008 effective from 1999. Similarly, other firms/organisations also developed events for the cotton crop. The events were approved by GEAC and various companies have released their hybrids (Table 1).

Though more than 10 events are patented, only five events of cotton are approved by GEAC – MON 531 (Maharashtra Hybrid Seeds Company), GFM Cry 1A Event (Nath Seeds), JK Event 1 (J.K. Agri Genetics Pvt. Ltd.), MON 15985 (Maharashtra Hybrid Seeds Company), and Event MLS 9124 (Metahelix Life Sciences Pvt. Ltd.) (GEAC, 2019). In the period 2002-2011, approximately 215 Bollgard I hybrids and 528 Bollgard II hybrids were

Table 1: Bt Cotton Events in India

S. No.	Event	Developer	Year of approval
1	MON 531*	Mahyco/Monsanto	2002
2	MON 15985	Mahyco/Monsanto	2006
3	Event-I	JK Agri Genetics Ltd.	2006
4	GFM Event	Nath Seeds	2006
5	Cry1Ac Event	CICR (ICAR) & UAS Dharward	2008
6	Event MLS 9124	Metahelix Life Sciences Pvt. Ltd.	2009
7	EVENT-10	JK Agri Genetics Ltd.	2013
8	CRY1F EVENT 281 24 236	Dow AgroSciences LLC	2014
9	Event 3006 210 23	Dow AgroSciences LLC	2014
10	Event PDAB4468.19.10.3	Dow AgroSciences LLC	2015
11	Cotton Transgenic Event MON 88701	Monsanto Technology LLC	2015
12	Elite Event EE-GH7	Bayer Crop Science NV/LP	2019

Note: *Mon 531 was not patented in India.

Source: Compiled by author based on inPASS database of Office of the Controller General of Patents, Design and Trade Marks, Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Government of India.

released. In Phase II, during the short interval of five years, the technology slowly got assimilated in the Indian market. This is a case of private ordering where the market (firms) is self-regulating. This mechanism worked well within the industry, the agreement between domestic seed companies and MMBL was complementary, domestic companies needed the technology and Monsanto needed domestic firms to scale their technology. Irrespective of multiple organisations having the patent of the technology, MMBL captured the major share of the market through its unique business model. As discussed before, the initial regulations shaped this business model in India.

MMBL licensed the Bollgard I and Bollgard II technologies to approximately 50 Indian seed companies. These seed companies in turn introduced the

Bollgard technology into their own germplasm and manufactured over 300 different Bt cotton hybrid seed varieties eventually. As a result, MMBL established itself as the sole supplier of GM cotton seeds in India (more than 90 per cent of the cultivated cotton employ Monsanto's technology). There was no patent over the Bt I technology. The companies signed a bilateral agreement by introducing a new category called "Technology Trait", for which they charged a "Trait Fee". The companies paid a lump sum amount of Rs. 50 lakh (negotiated individually) as trait fee initially. The royalty fee was charged on each packet of the cotton seeds sold by the company. During the period 2002-2005, the companies were charging Rs. 1600 for 450 gm of seeds, of which Rs. 1250 was charged as trait value on each packet (Table 2). This higher price led to a series of litigations and the emergence of regulatory reforms.

Table 2: Trait Value and Bt Cotton Seeds Price

(Value in Indian Rupees)

Year	Trait value (Rs./packet)		Seeds packet price (450 gms)	
	BG I	BG II	BG I	BG II
2002-05	1250		1700-1800	
2006			750 [@] / 900 ^{@@}	
2007 ^s	148.15		750	
2008-10*	50	90	650	750
2011-15**	50	90	830	930
2016-17 [#]	0	49	635	800
2018-19 [#]	0	20	635	730

Notes: BG I - Bollgard I, BG II - Bollgard II. [@] Government of Andhra Pradesh, vide its order dated 29th May 2006 fixed the Maximum Sale Price (MSP) of Bt cotton seeds. ^{@@}MRPTC interim order on Bt cotton seeds. ^sMMBL entered into a 'Settlement and Release of Claims Agreement' and consequent 'Supplementary and Amendment Agreement' with the Indian seed companies. *Price fixed by the State Government of Andhra Pradesh and Maharashtra, Gujarat fixed the same price but did not mention the trait value. **Price fixed by the Government of Telangana. [#]Price fixed by the Government of India under Cotton Seeds Price Control Order, 2015.

Source: CCI (2015), additional data compiled by author.

In 2006, the Andhra Pradesh Government intervened to file a case against Bt cotton seeds pricing to the Monopolies and Restrictive Trade Practices Commission (MRTPC) (CCI, 2015). Andhra Pradesh Government negotiated with the private companies to bring down the seed prices to Rs. 750 and fixed the trait value to Rs. 150. Concomitantly, various states such as Gujarat and Maharashtra enacted state legislations to control the cotton price. MRPTC in its order dated 11th May 2006 stated:

“There is a basic difference between royalty and trait value ...and are not synonymous... In any case, the lump sum payment of Rs. 50 lakhs may be considered as royalty for the same, but the future payments on sale cannot be termed as royalty” and held that “... by temporary injunction, the MMBL is directed during the pendency of this case not to charge trait value of Rs. 900/- for a packet of 450 gm of Bt cotton seeds and to fix a reasonable trait value that is being charged by the parent company in the neighbouring countries like China.”

Later, Andhra Pradesh government fixed price of Bt cotton seeds under the A.P. Cotton Seeds Act, 2007. Subsequently, there were several price interventions by state governments and subsequent litigations against them (see Table 3 cases 1-4). As a result of these interventions, in 2009, Nuziveedu Seeds Ltd. (NSL) (a sub-licensed company) refused to pay trait fee. MMBL then terminated the License of NSL and later reinstated it when NSL agreed to pay the dues. Subsequently, in 2015, MMBL terminated the agreements with seven seed firms (including NSL) after the firms stopped paying the fee. In October 2015, they sued NSL, Prabhati Agri Biotech Ltd. and Pravardhan Seeds Pvt. Ltd. for selling Bt cotton seeds, citing the non-payment of Rs. 165 crores accounting to the sub-licensing agreement. In 2015, the Department of Agriculture, Government of India issued the Cotton Seeds Price (Control) Order, 2015, under Section 3 of the Essential Commodities Act (1955) to regulate Bt cotton seed prices. The order came into effect from March 2016 and fixed the prices at Rs. 635 and Rs. 800 for BG-I and BG-II, slashing the royalty fee to an extent of 74 per cent.

Table 3: Key Litigations with Respect to Bt Cotton Seeds

Cases	Year	Parties	Court	Issue	Reference
1	2009	All India Crop Biotech Association of India v. State of Gujarat	The High Court of Gujarat	Validity of the provisions of the Gujarat Cotton Seeds Act, 2008	https://indiankanoon.org/doc/105919585/
2	2011	National Seeds Association of India v. State of Gujarat	The High Court of Gujarat	Cotton as an essential commodity	https://indiankanoon.org/doc/1991507/
3	2013	NSAI v. State of Maharashtra & Ors	The High Court of Bombay (Nagpur Bench)	Price control of cotton seeds	https://indiankanoon.org/doc/49622381/
4	2015	Seed Industries Association of Maharashtra v. State of Maharashtra	The High Court of Bombay (Nagpur Bench)	Maximum sale price of Bt cotton seeds	https://indiankanoon.org/doc/12222660/
5	2016	Association of Biotechnology Led Enterprises, Ors. v. Union of India and Ors.	The High Court of Karnataka	Price ceiling on Bt cotton seeds	https://indiankanoon.org/doc/181513040/
6	2017	Monsanto Technology LLC and Ors. v. Nuziveedu Seeds Limited & Ors.	The High Court of Delhi	Sub-license agreements, trademark sub-license agreements, intellectual property rights	https://indiankanoon.org/doc/143517948/

Cases	Year	Parties	Court	Issue	Reference
7	2018	Nuziveedu Seeds Ltd. and Ors. v. Monsanto Technology Llc and Ors.	The High Court of Delhi	Sub-license agreements, trademark, trait fee and intellectual property rights	https://indiankanoon.org/doc/27725858/
8	2019	Monsanto Technology LLC and Ors. v. Nuziveedu Seeds Limited and Ors.	The Supreme Court of India	Sub-license agreements, trademark sub-license agreements, intellectual property rights	https://indiankanoon.org/doc/116548206/
9	2020	Monsanto Holdings Pvt. Ltd. v. Competition Commission of India	The High Court of Delhi	Challenging CCI's order to investigate MMBL	https://indiankanoon.org/doc/158839264/

Note: References last accessed on 30-05-2020.

In 2015, the Ministry of Agriculture (Case No. 2 of 2015), Nuziveedu Seeds Limited (NSL), Prabhat Agri Biotech Limited (PABL), Pravardhan Seeds Private Limited (PSPL) (Case No. 107 of 2015) filed a complaint with the CCI against MMBL and Monsanto Group alleging abuse of their dominant position in the Bt cotton technology market (CCI, 2015). In 2016, the Ministry of Agriculture and Farmers' Welfare (MoA) came up with "Licensing and Formats for GM Technology Agreements Guidelines, 2016" and was open for comments for 90 days. The draft came up with new policies such as: once the genetically modified traits are transferred to plant, the transgenic variety per se cannot be patented and would be only protected under Protection of Plant Varieties and Farmers' Rights Act, 2001 (PPV&FR Act). The draft also stipulated that the licensor cannot refuse licensing of the technology, and should grant license within 30 days. It also recommended a parallel adjudicatory authority (Controller of Seeds). The draft also fixed a cap on royalties (Rs. 25 lakh upfront fee) and from the sixth year the trait value would be depreciated by 10 per cent each year.

In 2017, MMBL filed a case in Delhi High Court (Table 3, case 6), but the court refused to put a stay on it. So the prices were kept the same as the previous year. MMBL alleged that NSL with other companies is continuing to 'Market and Sell' Bt cotton seeds after the termination of sub-license agreement including trademark sub-license agreement (on Bollgard I and Bollgard II) and patent (No. 214436). They accused them of three issues – breach of trust, non-payment of dues and attempted misappropriation of intellectual property rights (IPRs). Monsanto also approached Karnataka High Court through Association of the Biotech Led Enterprises (ABLE-AG)⁴ (Table 3, case 5). Karnataka High Court in its interim order, stated that the centre cannot fix the trait fee as it is an agreement between companies but it can fix Maximum Sale Price (MSP) on cotton seeds. In November 2016, High Court gave a restraining order on selling Bt cotton seeds using MMBL trade-marks. NSL moved to court against this order. NSL claimed that the power to fix royalty or 'trait value' lies with the Protection of Plant Varieties and Farmers' Rights (PPV&FR) Authority (Damodharan, 2016).

The argument was that according to Section 3 of the Indian Patents Act, 1970 any "method of agriculture or horticulture" and "plants and animals in whole or any part thereof other than micro-organisms but including seeds, varieties and species and essentially biological processes for production or propagation of plants and animals" are not patentable. Under Section 2 (a) of PPV&FR Act, 2001 plant variety includes "transgenic variety" (Damodharan, 2016).

The single bench of Delhi High Court (Table 3, case 6) issued an interim order and held termination of the sub-license to be invalid and also asked to fix the trait value based on the Central Government Recommendation (Cotton Seeds Price Control Order, 2015).

The court also observed that "the use of the suit patent, or trademarks of the plaintiffs by the defendants becomes unauthorised so as to give rise to a valid cause of action for infringement only if it can be held that the sub-license agreements have been legally terminated by the plaintiffs, such termination naturally rendering continued use of the sublicensed technology or trademarks without consent or permission of rightful owner." Chawla (2018) quoted the case as a situation of "dilemma between utilitarianism and capitalism".

This was followed by an appeal on the interim injunction, which was taken up under a Division Bench in the Delhi High Court. In 2018, the Delhi High Court Division Bench held in favour of NSL (Table 3, case 7). The court ruled that the patent (No. 214436) would fall under the exclusion criteria under Section 3(j) of the Patents Act (non-patentability of a living organism). But the court held that Monsanto can apply for registration under the PPV&FR Act and claim a benefit-share under the provisions of the Act.

MMBL challenged the Division Bench of Delhi High Court ruling in Supreme Court (Table 3, case 8). In 2019, Supreme Court reversed the order of the Division Bench on the grounds that Division Bench was supposed to consider the question on the grant of the injunction given by the single bench and not to decide on the patentability (Kuruganti, 2019). They remanded the issue back to the single judge at Delhi High Court. Meanwhile in 2018, enacting the Cotton Seeds Price (Control) Order 2015, the central government further reduced the prices of BG II (Rs. 740) but kept the same for BG I.

Period III points out a couple of interesting observations: (i) emergence of re-regulation is rooted in the several events from the previous period (Phase I and II), (ii) failure of private litigation as a regulatory mechanism, and (iii) conflict in the existing business model as a result of the regulatory process. As pointed out before, Murugkar et al. (2007) argued that government interventions through imposing price ceiling (Cotton Seeds Price Control Order) had led to an anti-competitive effect in Bt cotton industry. But the study shows that events in the previous period (intertemporal dependence) might have favoured anti-competitiveness and MMBL rather gained monopoly through its business model.

In the period I, first Bt cotton technology – BG I, was not protected under patent. The technology was transferred to domestic seed industry under the sub-licensing agreement. This created an ideal business process and the domestic companies opted for the model. It created a locked-in effect (domestic companies are already using the technology with lower fixed cost), and it worked in favour of them when the regulatory intervention (price cap) came to effect (companies were asked to pay the fees based on the licensing agreement). This created conflicts and resultant litigations between the two groups of companies. A group of domestic companies,

which was sub-licensing the technology, challenged the technology-providers with respect to the validity of the patent over the technology and anti-competitive measures taken by the technology provider. The conflict between patent law and competition law came up in the recent case *Monsanto Holdings Pvt. Ltd. v. Competition Commission of India* (Table 3, case 8). Honourable Justice Vibhu Bakhru quoting the earlier ruling on *Telefonaktiebolaget L.M. Ericsson v. CCI and ors.* (Table 3, case 8) argued that the CCI can examine alleged anti-competitiveness, and there is no repugnancy between the Patents Act and the Competition Act. He further clarified that the *CCI v. Bharti Airtel Ltd.*⁵ case where the Supreme Court rejected CCI's jurisdiction was due to the existence of a regulatory statutory body (TRAI). As of now the jurisdiction of the CCI is resolved, there could be follow up appeals in this regard.

5. Effect on the Cotton Seed Industry

These series of events have brought structural changes in the cotton seed industry. The share of Bt cotton seeds in the total cotton cultivated area increased from 45 per cent in 2002 to 96 per cent in 2017 (ISAAA, 2017). This shows that there is a faster spread of Bt cotton technology. Though in the short run, studies (Qaim et al., 2006; Subramanian and Qaim 2010) showed the benefit of adoption of Bt cotton by farmers (consumer), a recent study (Kranthi and Stone, 2020) has shown that in the long run with the increasing emergence of pests with Bt resistance, farmers are spending more on pesticides. Srivastava and Kolday (2016) have raised concerns over the long term growth in productivity at macro-level. Ramasundaram et al. (2011) in their article noted that Bt cotton in India is mostly hybrid⁶, which is shaped by the private sectors to ensure yearly income through seed sales to farmers. Hybrids are encouraged by the business model, which involves licensing and generation of income exploiting the technology. One of the key success highlighted is that the prices of Bt cotton seeds have decreased as a result of regulations. This has brought relief for the farmers, on the other, this also gave way to anti-competitiveness (Murugkar et al., 2007). Monsanto in their Annual Report 2019, stated aggressive regulator intervention as an institution risk they face with respect to their agricultural portfolio in India (p. 109). Through price regulations, governments are trying to control the price and, on the other, they are trying to make the industry competitive. These two strategies conflict as for increasing competition the prices

should be higher which contradicts the price regulations. Simultaneous use of both competition laws and regulations has adversely affected the Bt cotton seed industry.

6. Summary and Conclusion

Based on the timeline analysis, the study shows that the new business model (sub-licensing) resulted in barriers to entry for a non-patented product. Later, when the newer versions of the product emerged with patent, the business model discouraged other firms to pursue developing new varieties based on their patents. Government intervention through enforcing price cap also discouraged the firms from investing in R&D based on new patents. This study shows that interaction of business model and regulatory policies resulted in anti-competitiveness in the industry. On the other hand, the study concludes findings similar to Kathuria (2018), which argue that the simultaneous application of competition laws and regulations is over-enforcement, which is bad for the market, consumer and economy in the long run. The multiple enforcements observed in the sector is due to the lack of clarity and foresight. FAO and International Service for National Agricultural Research (ISNAR) list four elements for developing the regulatory framework for biotechnology: (i) legislative framework, (ii) criteria for the assessment of a product, (iii) transparency and public involvement; and (iv) approaches to risk assessment and risk management. As the study narrates, lack of clarity over jurisdictions, lack of specific criteria for assessment and lack of transparency and less involvement of the public in the regulatory decision-making process in the past had long term effects on the Bt cotton seed industry.

Acknowledgement: The study is funded under the project 'Technology Foresight in Agriculture'. The paper is based on a case study 'Nuziveedu vs Monsanto' prepared by the author for teaching postgraduate students of Management in Agriculture course at ICAR-National Academy of Agricultural Research Management (ICAR-NAARM), Hyderabad. The author would like to acknowledge Dr. R. Kalpana Sastry, Dr. K. Srinivas and Ms. Praveena Veluganti for the support in developing the case and also acknowledges the support of Mr. Ayush, Mr. Neelesh, Mr. Prataap and Ms. Sheesham Rana (PGDMA students). The author would like to thank Dr. Arul George Scaria and Dr. Vikas Kathuria for the guidance. The author would also like to thank Mr. K.S. Aditya and Mr. Philip Kuriachen for proofreading the draft.

Endnotes

- ¹ *Bacillus thuringiensis* (Bt.) cotton is a transgenic technology developed in cotton crop to combat insects. It is created by genetically altering the cotton genome by introducing microbial protein in bacterium called *Bacillus thuringiensis* (Transgenic). This process allows plants to create the toxic which when consumed by insects would dissolve the lining of the gut leading to death of the organism.
- ² Once the gene is transferred into the cotton plant, it is called an event. These events undergo rigorous testing under the Genetic Engineering Approval Committee (GEAC) for approval. Once the events are approved, hybrids and varieties of the cotton plant are developed using these events by crossing.
- ³ Cry1Ac is a gene from soil bacteria [*Bacillus thuringiensis* (Bt)] used to develop Bollgard I.
- ⁴ In 2007, four seed associations, namely Association of Seed Industries (led by Mahyco), All India Crop Biotech Association (led by other MNCs), Indian Seed Industry Association and Seed Association of India (led by Mandhari) merged to become National Seed Association of India (NSAI). There was a split in the seed associations in India as a result of this conflict. To name a few are ABLE-AG, NSAI and Federation of Seed Industry of India. Association of the Biotech Led Enterprises (ABLE-AG) is an association of 11 leading biotechnology companies in India.
- ⁵ <https://indiankanoon.org/doc/130504148/>
- ⁶ Hybrids seeds require replacement each year. The seeds from the next generation of hybrid seeds cannot be replanted (a certain percentage would lose their desired traits). So, farmers need to buy hybrid seeds each year, this is not the case with varieties, where the seeds can be replanted to 3-4 generations.

Reference

- CCI. (2015). Case No. 02/ 2015, Case No. 107/ 2015, Case No. 03/ 2016, Case No. 01/ 2016, Case No. 10/ 2016. Competition Commission of India (CCI), <https://www.cci.gov.in/sites/default/files/Ref%20Case%2022015%20%26%20others.pdf>
- Chakraborty, S. (2015, November 15). Interplay between competition law and IPR in its regulation of market. *Academike*. Retrieved from <https://www.lawctopus.com/academike/interplay-competition-law-ipr-regulation-market/>

- Chawla, V. (2018). Monsanto's Loss of Patent Over Bt Cotton is a Victory for Farmers and Indian Seed Companies. *Economic and Political Weekly*, 53(25), (Online). <https://www.epw.in/engage/article/monsantos-loss-patent-bt-cotton-victory-farmers-indian-seed-companies?>
- Coase, R. (1960). The problem of social cost. *Journal of Law and Economics*, 3, 1-44.
- Cohen, J.I. and Paarlberg, R. (2004). Unlocking crop biotechnology in developing countries - A report from field. *World Development*, 32(9), 1563-1577.
- Correa, C. (2007). Intellectual Property and Competition Law: Exploration of Some Issues of Relevance to Developing Countries. *ICTSD IPRs and Sustainable Development Programme Issue Paper No. 21*. International Centre for Trade and Sustainable Development (ICTSD), Geneva, Switzerland.
- Damodaran, A. (2005). Re-Engineering Biosafety Regulations In India: Towards a Critique of Policy, Law and Prescriptions. *Law Environment and Development Journal*, 1, 1-20. <http://www.lead-journal.org/content/05001.pdf>
- Damodharan, H. (2016, December 22). GM technology: Trait fee war between Monsanto and Indian seed firms intensifies. *The Indian Express*. <https://indianexpress.com/article/india/gm-technology-trait-fee-war-between-monsanto-and-indian-seed-firms-intensifies-4439264/>
- Den Hertog, J. (2010). Review of economic theories of regulation. *Discussion Paper Series*: 10-18. Tjalling C. Koopmans Research Institute, Utrecht School of Economics, Utrecht University.
- Ellickson, R. (1991). *Order without Law*. Cambridge: Harvard University Press.
- GEAC (2019). Biosafety Data of Approved GM crops. Genetic Engineering Appraisal Committee (GEAC), Ministry of Environment, Forest and Climate Change, Government of India. <http://www.geacindia.gov.in/biosafety-data-approved-GM-crops.aspx>. Last assessed on 25-11-2019.

- Gruère, G., and Sengupta, D. (2011). Bt Cotton and Farmer Suicides in India: An Evidence-based Assessment. *The Journal of Development Studies*, 47(2), 316-337, doi: 10.1080/00220388.2010.492863
- Gupta, A.K., and Chandak, V. (2005). Agricultural biotechnology in India: ethics, business and politics. *International Journal of Biotechnology*, 7(12/3), 212-227.
- Herring, R. J. (2014). On risk and regulation: Bt crops in India. *GM Crops and Food*, 5(3), 204-209, doi: 10.4161/21645698.2014.950543
- Holgersson, M., Granstrand, O., and Bogers, M. (2018). The evolution of intellectual property strategy in innovation ecosystems: Uncovering complementary and substitute appropriability regimes. *Long Range Planning*, 51(2), 303-319.
- ISAAA. (2017). Biotech countries facts and trends: India. International Service for the Acquisition of Agri-biotech Applications (ISAAA) SEAsiaCenter, Philippines. http://www.isaaa.org/resources/publications/biotech_country_facts_and_trends/download/Facts%20and%20Trends%20-%20India-2017.pdf
- Kathuria, V. (2018). Conflict between Regulation and Competition Law in the Indian Telecom Sector. *Economic and Political Weekly*, 53(38), 38-43.
- Kranthi, K. R., and Stone, G. D. (2020). Long-term impacts of Bt cotton in India. *Nature plants*, 6(3), 188-196. <https://doi.org/10.1038/s41477-020-0615-5>.
- Kuruganti, K. (2019). Was there a victory for Monsanto in India's Supreme Court on a patent matter? *Down to Earth*. <https://www.downtoearth.org.in/blog/agriculture/was-there-a-victory-for-monsanto-in-india-s-supreme-court-on-a-patent-matter--62800>
- Molk, P., and Rowell, A. (2016). Reregulation and the Regulatory Timeline. *Iowa Law Review*, 101(4), 1497. <https://ilr.law.uiowa.edu/print/volume-101-issue-6/reregulation-and-the-regulatory-timeline/>
- Monsanto (2019). *Annual Report 2019*. <http://www.monsantoglobal.com/global/in/Documents/Monsanto%20India%20Limited%20AR%202019.pdf>.

- Murugkar, M., Ramaswami, B. and Shelar, M. (2007, September 15). Competition and Monopoly in Indian Cotton Seed Market. *Economic and Political Weekly*, 3781-3789.
- Newell, P. (2007). Biotech firms, biotech politics negotiating GMOs in India. *Journal of Environmental Development*, 16(2), 183-206.
- Pray, C.E., L. Nagarajan, J. Huang, R. Hu, and B. Ramaswami. (2011). The Impact of Bt Cotton and the Potential Impacts of Biotechnology on Other Crops in China and India. In C. A. Carter, G. Moschini, and I. Sheldon (eds) *Genetically Modified Food and Global Welfare* (Frontiers of Economics and Globalization), vol. 10, 83-114. Bingley, UK: Emerald.
- Qaim, M., Naik, G., Subramanian, A., and Zilberman, D. (2006). Adoption of Bt. Cotton and impact variability: insights from India. *Review of Agricultural Economics*, 28(1), 48-58.
- Raju, K.D. (2014). Interface between Competition law and Intellectual Property Rights: A Comparative Study of the US, EU and India. *Intellectual Property Rights* 2, 115. doi:10.4172/2375-4516.1000115
- Ramasundaram, P., Suresh, A., and Chand, R. (2011). Manipulating technology for surplus extraction: The case of Bt cotton in India. *Economic and Political Weekly*, 46(43), 23-26.
- Scherer, F.M. and Watal, J. (2014). Competition Policy and Intellectual Property: Insights from Developed Country Experience. *Regulatory Policy Program Working Paper RPP-2014-10*. Cambridge, MA: Mossavar Rahmani Center for Business and Government, Harvard Kennedy School, Harvard University.
- Scoones, I. (2003). Regulatory maneuvers: The Bt cotton controversy in India. *Working paper* 197. Institute of Development Studies.
- Shleifer, A (2005). Understanding regulation. *European Financial Management*, 11(4), 439-451.
- Srivastava, S.K. and Kolday, D. (2016). Agricultural biotechnology and crop productivity: macro-level evidences on contribution of Bt cotton in India. *Current Science*, 110(3): 311-319.

- Stigler, G. J. (1971). The theory of economic regulation. *Bell Journal of Economics*, 2, 3–21.
- Subramanian, A., and Qaim, M. (2010). The impact of Bt cotton on poor households in rural India. *Journal of Development Studies*, 46 (2), 295–311.
- Thomas, G., and De Tavernier, J. (2017). Farmer-suicide in India: debating the role of biotechnology. *Life Sciences, Society and Policy*, 13, 8. doi: 10.1186/s40504-017-0052-z
- UNCTAD (2016). *Examining the interface between the objectives of competition policy and intellectual property*. Intergovernmental Group of Experts on Competition Law and Policy. Fifteenth Session, Geneva, 19–21 October 2016, Trade and Development Board, United Nations Conference on Trade and Development (UNCTAD).
- Vithal, B.M. (2018, July 17). Bt Cotton in India - Current Scenario. *Cotton Statistics and News*, 16.