

## Need for Government Intervention in Regulating Seed Sale Price and Trait Fee: A Case of *Bt* Cotton

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Seeds Bill 2004 is not yet enacted (into an Act), even ten years after its first introduction in the parliament. This study was aimed at finding the opinion of various stakeholders on three most contentious issues which have stalled the bill, *viz.*, regulation of sale price of seed, regulation of trait/royalty fee and granting state governments the powers to regulate seed prices. The study was conducted in Andhra Pradesh (AP) and Bihar states covering 240 farmers and 30 respondents each from researchers, Agriculture Department Officials (ADOs), Civil Society Organizations (CSOs), Private Seed Companies (PSCs) and seed dealers with a total sample size of 390. The farmers, CSOs, ADOs, researchers and seed dealers strongly demanded for regulation of retail price and trait/royalty fee over seeds by state governments, especially in case of hybrids and proprietary technologies such as *Bt* cotton. PSCs held a view that only market forces (demand and supply of seeds) and farmers' preferences should determine the sale price of seed. However, market forces did not operate in case of *Bt* cotton seed market because of monopoly market conditions. All the *Bt* cotton cultivars approved for commercial cultivation were hybrids developed by PSCs. Out of all the *Bt* cotton cultivars in market, 88% of them have been developed using two genes patented by Mahyco-Monsanto Biotech (MMB). PSCs charged royalty fee as high as 67 per cent of retail price of *Bt* cotton seeds until government intervention. The monopoly of MMB was attributed to economic and legal barriers for competitors and deliberate action of misinformation on legal patent rights. Farmers had no choice of non-*Bt* cotton hybrids or traditional varieties. Based on the study, it is suggested that regulation of retail price and trait/royalty fee of seed is scientific under monopoly market conditions for proprietary technologies involving royalty component.

**Keywords:** *Bt* cotton, monopoly, price regulation, royalty/trait fee, seeds bill, State Government

India possesses only 11 per cent of world's arable land but it has to feed about 18 per cent of the world population. Agriculture is still the livelihood option for more than 60% of Indian population. The agrarian situation in India is also unique with 85% of the operational land holdings being marginal (less than 1 ha) and small (1 to 2 ha) with the average size of these holdings being around 0.6 hectares. The semi-medium (2 to 4 ha) and medium (4 to 10 ha) holdings constitute 14% and the large holdings (more than 10 ha) make for the remaining 1%.<sup>1</sup> Hence, any agricultural policy should take into consideration the socio-economic and agro-ecological conditions under which these marginal and small farmers operate and the challenges they face. The legislations should aim

at providing access to various resources and services to farmers and equip them in achieving national agricultural development goals of food security, sustainable use and management of natural resources, environmental protection and adaptation to climate change. However, the national interests should not subdue the livelihood security and standard of living of farmers at the individual, family and community levels. For instance, India has achieved food security at the national level but more than 30% of its population is still below the poverty line. The malnourishment rate among children aged below 5 years is upto 45%.<sup>2</sup> This situation has raised serious concerns about the way the national agricultural development goals are achieved by jeopardizing the livelihood security of vulnerable sections like marginal and small farmers, women farmers and

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landless labourers. Hence, any agricultural legislation should have the dual aim of national interest and the interest of the primary stakeholders, i.e., farmers (especially, the marginal and small). It is more so in case of seed legislations since seed is central to agriculture and the national food security and sovereignty. Moreover, historically, the seed was primarily the common property of the farm women and men and they were actively involved in selecting, improving, saving, using, reusing, bartering and exchanging of seeds for centuries. Therefore, any seed legislation must aim to uphold farmers' rights over seed along with providing them access to resources and services that enhance the productivity of the seed and income of the farmers.

It is very pertinent to discuss here the history of Indian seed legislation in brief before understanding the new Seeds Bill 2004 and the contentious issues under study. Seed is the basic and most critical input for agriculture. The response of all other inputs depends on the quality of seeds to a large extent. It is estimated that the direct contribution of quality seed alone to the total production is about 15-20% depending upon the crop and it can be further raised up to 45% with efficient management of other inputs.<sup>3</sup> The quality of seed and plant material significantly affects productivity, which in turn affects the cost of production and competitiveness in the market.<sup>4</sup> India has enacted seed legislations from time to time to address the challenges of production and distribution of quality seed to farmers. The Seeds Act, 1966 provided for a formal system of seed quality control in India for the first time to regulate the quality of certified seed meant for sale by ensuring that the farmers get quality seeds for sowing and that the producers keep an eye on quality as well as marketability. The Act consists of three important bases on which the development of a reputable seed industry was attempted. They are a) seed certification, b) seed inspection, and c) seed testing. Each of these is important by itself and at the same time, they mutually reinforce each other. This act regulates only notified kinds and varieties of seeds. It became operational with the enactment of the Seeds Rules in 1968. Amendments to the Seeds Act and Rules were introduced in 1972, 1973, 1974 and 1981. Seeds were declared as an essential commodity under Essential Commodities Act, 1955 and the Seeds (Control) Order was issued in 1983. Owing to litigation, this order came into force only from July 1994. It has

provisions such as compulsory licensing of the seed dealers, price control, seed movement control and submission of the information about the procurement and sale of seed. New Policy on Seed Development (NPSD) 1988 liberalized Indian seed industry. Until the late 1980s, private firm participation in the seed industry in India was limited by two factors: economy-wide policies that restricted foreign investment and licensing, and seed-specific policies that limited the sector to 'small scale' participants and severely restricted imports of research or breeder seeds. With India's implementation of the Seed Policy of 1988, the 'small scale' limitation was removed, large domestic and foreign firms were permitted entry, and import restrictions were substantially lifted. Economy-wide liberalization occurred in India in 1991, including the abolition of the industrial licensing system and the easing of restrictions on foreign direct investment (FDI).<sup>5</sup> As a result of the reforms, new foreign and domestic firms entered the market, competition increased, and private sector R&D expenditures grew rapidly as domestic firms spent more on technology to compete with the entry of new research-intensive foreign firms. Another important motivation for firms' increased R&D expenditures has been the market's transition away from open-pollinated varieties (OPVs), which farmers can save and reuse in subsequent years, to hybrids, which cannot be reused without a significant reduction in yield and quality. Farmers' need to purchase seeds each year enable firms to recoup R&D investments.<sup>5</sup> NPSD 1988 is considered as one of the milestones in India's seed legislation that initiated the process of privatization of Indian seed industry. The value of Indian domestic seed industry increased from Rs. 600 crores in 1988 to Rs. 10,000 crores in 2011, which illustrates the tremendous growth of organized seed sector in India after implementing NPSD 1988. Share of value of proprietary hybrids in Indian seed market (in comparison with open pollinated varieties) has increased from 16.66% in 1988 to 28.26% in 1999 and to 60% in 2011. The fact that from 1984 to 1995, 50-60% of the seed requirement was met by the private sector and in 2010 it was estimated that 80% of turnover in seed business came from private companies establishes the dominance of private seed companies at present.<sup>6</sup> Signing of WTO in 1995 further paved the way for private research and development of varieties. The Protection of Plant Varieties and Farmers' Right Act (PPVFRA) 2001

was formulated for protection of plant varieties in India by integrating the rights of breeders, farmers and village communities. However, hybrids developed by private seed companies accounted for 90 per cent of new varieties which received PVP certificates (Certificates of Registration).<sup>7</sup>

Seed industry in India at present is regulated through Seeds Act 1966, Seeds (Control) Order 1983 and the NPSD 1988. However, far reaching changes have taken place in the national economy and agricultural scenario and in the international environment since the enactment of these legislations. Biotechnology sector came up with promises of extremely productive genetically modified (GM) crops. In 2002, Government of India approved *Bt* cotton for commercial cultivation in India. National Seeds Policy was thus formulated in the year 2002, to provide an appropriate climate for the seed industry to utilize available and prospective opportunities, safeguarding the interests of farmers and conservation of biodiversity. Liberalization has been targeted towards certain components of the policy retaining regulation to some components to safeguard national interests. China significantly limits the market access of foreign firms, while India has liberalized its seed sector and permits foreign and domestic firms to participate on equal terms. However, price restrictions implemented by Indian state governments severely limit the ability of all firms to charge market prices for biotech seeds.<sup>8</sup> Even with significant price controls, however, India's seed market is more liberalized than that of China. Despite the enactment of a seed law in 2000 creating a role for private firms, China continues to severely restrict FDI and the trading of certain types of seeds.<sup>9</sup>

The aims of National Seeds Policy such as development of infrastructure, ensuring supply of good quality seeds and facilitating the international seed trade are sought to be addressed through the proposed Seeds Bill 2004, which seeks to repeal and replace the existing Seeds Act 1966. The new Seeds Bill was introduced in the Parliament on 9 December, 2004 and serious objections were raised by various stakeholders against several provisions made in the bill and sought suitable amendments. These stakeholders include farmers; farmers' organizations; political parties and their farmers' wings; members of Parliament; researchers and academicians in National Agriculture Research System (NARS: mainly comprising ICAR and state agriculture universities);

state agriculture departments dealing with seed production, testing, certification and distribution; NGOs/civil society organizations; private seed companies and their associations; seed retailers and dealers. These stakeholders have different and contradictory views on several clauses in the Seeds Bill 2004 relating to important issues, such as: 1) Farmers' Rights, 2) Powers to state governments, 3) Regulation of retail price of seed, 4) Regulation of trait/royalty fee, 5) Compensation issues, 6) Punitive and accountability clauses, 7) Registration and parentage issues, 8) Certification of seed, 9) Import of seeds, etc. among others. Hence, the Bill was referred to Parliamentary Standing Committee on Agriculture (PSCA) to study and submit its report. The committee, before going into detailed examination of the Bill invited written memoranda from agricultural research institutions and universities, national and state level seeds corporations, private seed companies, scientists, experts, farmers' organisations, NGOs and other interested groups/individuals their views/suggestions/comments on the Bill. Seventy memoranda were received, based on which representatives from seven organizations were called in to give their expert comments on various clauses of the Bill.<sup>10</sup> Based on consultations and discussions with various stakeholders, the committee submitted its report on 20 November 2006 and recommended for major changes in the original Bill. Government of India accepted some of the amendments to the Seeds Bill 2004 and notified the Seeds Bill 2010 draft on 13 April 2010. Later, on 23 April 2010, the Ministry tried to place the revised and newly redrafted Seeds Bill 2010 in Rajya Sabha but could not do so because of protest by several MPs in the parliament to incorporate several clauses including those related to price and royalty fee regulation, among others, in the final draft. The extent of dissent among various stakeholders is evident from the fact that the Bill is not yet enacted (into an Act), even ten years after its first introduction in the parliament.

In this context, this research paper tried to address one of the most contentious and unsettled issues in the Seeds Bill 2004 *viz.*, regulation of sale price of seed. Two closely related issues such as regulation of trait/royalty fee over seed and granting powers to state governments to regulate seed prices were also studied. This research paper examines in detail the perception and opinion of various stakeholders of seed industry

regarding these three issues in the bill. The specific objectives of this research paper are:

- (a) To examine the opinion of various stakeholders about the contentious issues under study; and
- (b) To suggest suitable amendments to the bill based on the study.

### Materials and Methods

The exhaustive list of contentious issues with regard to Indian seed legislation was developed based on extensive review of literature and discussion with experts and stakeholders during a pilot study. A semi-structured interview schedule was developed and used to collect the opinion of various stakeholders in terms of their 'agreement or disagreement' on these contentious issues and the reasons for their opinion. An *ex-post facto* and survey research design was adopted. Several published secondary sources like reports of organizations, memoranda, letters, news stories and websites of various organizations were also used to supplement the primary data.

#### Locale of the Study

Two states, namely Andhra Pradesh (AP) and Bihar were selected purposively for the study based on the criteria of high and low Seed Replacement Rate (SRR) respectively for various crops. Two districts from each state namely, Warangal and Anantapur districts in AP and Samastipur and Vaishali districts in Bihar were selected purposively based on the criteria of maximum area under seed production and maximum number of stakeholders associated with seed industry.

#### Sample and Sampling Procedure

The sample consisted of six sets of stakeholders including 240 farmers; 30 respondents each belonging to state agricultural departments of Andhra Pradesh and Bihar; researchers from state agricultural universities and ICAR institutes; civil society organizations; private seed companies located in AP and Bihar and seed dealers/retailers from AP and Bihar. The farmers were selected using multi-stage stratified random sampling, whereas rest of the stakeholders were selected purposively based on their expertise and experience in either or combination of seed R&D, production, certification, testing, distribution, marketing and seed Intellectual Property Rights. Total sample size for the study was 390.

Respondents from state agriculture department included officers from Bihar Rajya Beej Nigam,

Bihar State Seed Certification Agency, AP State Seed Development Corporation, AP State Seed Certification Agency, Seed testing laboratory (quality control laboratories); Assistant Director of Agriculture, Agriculture officers and Assistant Agriculture Officers involved in distribution of seed through agriculture office at tehsil/mandal level.

Researchers included scientists from ICAR institutions (IARI, New Delhi and Regional Station, Pusa, Samastipur; National Bureau of Plant Genetic Resources, New Delhi; National Institute of Agricultural Economics and Policy Research, New Delhi; Indian Institute of Maize Research, New Delhi; Central Research Institute for Dryland Agriculture, Hyderabad; National Academy of Agricultural Research Management, Hyderabad; Indian Institute of Rice Research, Hyderabad; Indian Institute of Millets Research, Hyderabad; Indian Institute of Oilseeds Research, Hyderabad), SAUs (Division of Seed Science and Technology, Seed Research and Technology Centre, ANGRAU, Hyderabad; Seeds farm, Rajendra Agricultural University, Samastipur, Bihar) and National Seeds Corporation, New Delhi. Majority of the researchers interviewed were seed technologists/breeders involved in seed research, production and distribution of breeder, foundation and certified seeds of varieties/hybrids developed by their institutes/organizations. Some researchers were experts in issues such as IPR issues in seed and farmers' rights. Researchers were interviewed in Hyderabad, Pusa, Samastipur and Delhi.

Civil society organizations involved in the study included NGOs and farmers' organizations which were involved in policy advocacy related to seed legislation. These organizations were actively involved in discussions and debates on Seeds Bill. These organizations met Union Agriculture Minister, Prime Minister and several MPs and submitted memoranda for bringing several amendments and inclusion of several clauses in the final draft of the bill. These organizations also participated in several meetings and public discussions organized by Parliamentary Standing Committee on Agriculture constituted to look into contentious issues in Seeds Bill and to suggest suitable amendments. Representatives of CSOs were interviewed in Hyderabad, Patna and Delhi. Representatives of PSCs were interviewed in Hyderabad, Patna, Samastipur and Delhi.

Seed dealers contacted for the study also sold other agriculture inputs such as pesticides, fertilizers

and bio-fertilizers. Dealers were interviewed in Samastipur, Vaishali (Hajipur city), Warangal and Anantapur.

Farmers were selected randomly. One tehsil/mandal in each district was selected randomly in each of the four districts. In each tehsil/mandal, two villages were selected randomly. Thirty farmers were selected randomly and interviewed in each village thus making a total sample size of 240 farmers. The list of districts, blocks/mandals and villages from where farmers were interviewed is provided in Table 1.

**Data Collection Tools**

Primary data was collected using personal interview and focussed group discussion methods in the year 2012 (from February to August). Though paper deals with price regulation of seeds in general, a detailed case study of *Bt* cotton (only crop where pricing is in practice at present) was undertaken. Both quantitative and qualitative data were collected.

**Results and Discussion**

Amendments were made to the Seeds Bill 2004 based on the recommendations of Parliamentary Standing Committee on Agriculture (PSCA). For instance, most of the recommendations of PSCA

related to upholding farmers’ rights have been accepted by the government and amendments have been incorporated in the recent draft Seeds Bill 2010. Certain recommendations pertaining to making the punitive and accountability clauses more stringent have also been accepted. However, Seeds Bill could not be enacted as of now on account of not reaching consensus on certain important issues. The three most contentious issues on which there is no consensus among various stakeholders are regulation of sale price (retail price) of seed, regulation of trait/royalty fee and granting powers to state governments to regulate seed industry in their respective states including regulation of sale price and trait fees on seeds. Whether seed sale prices be regulated? Is blanket seed price regulation in all crops under all the circumstances required? Under what circumstances price regulation is necessary? These are some of the questions which require scientific attention.

The results of the study are discussed separately for each contentious issue in the following sections:

**Regulation of Sale Price of Seed**

The Parliamentary Standing Committee on Agriculture (PSCA) has recommended for the introduction of price regulatory mechanism in the Bill to ensure that the farmers should not be charged with arbitrary prices by the seed producers and sellers. The bill is completely silent on seed pricing as of now. PSCA has recommended for regulation of prices through a statutory body or a Committee for the fixation of price of seed by incorporating appropriate provisions in Clauses 5, 11, 15, 22 and 25 of the Bill.

The opinion of various stakeholders on the regulation of retail price of seed is presented in Table 2. All the farmers, Agriculture Department Officials (ADOs), Civil Society Organizations (CSOs), and majority of researchers unanimously

Table 1—List of villages selected for interviewing farmers

State	Districts	Blocks (Tehsil/mandal)	Villages
Andhra Pradesh	Anantapur	Vidapanakallu	Vidapanakallu, Gadekallu
	Warangal	Raghunathapally	Satyanarayanapuram, Cherla Thanda
Bihar	Samastipur	Pusa	Madhapur Chapra, Mahammada
	Vaishali	Hazipur	Dharampur, Bindupur

Note: Warangal district is presently part of newly carved out Telangana state. Hyderabad, earlier the capital of AP is presently the capital of Telangana state.

Table 2—Agreement of stakeholders on regulation of retail price of seed

Regulation of retail price of seed		Agreement of stakeholders											
		Farmers		CSOs		ADOs		Researchers		Dealers		PSCs	
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Need for regulation	Agree	240	100	30	100	30	100	24	80	25	83	0	0
	Disagree	0	0	0	0	0	0	6	20	5	17	30	100
Mechanism of regulation	Within Seeds Bill	240	100	30	100	30	100	18	60	0	0	0	0
	Outside Seeds Bill	0	0	0	0	0	0	6	20	25	83	0	0

Note: CSOs – Civil Society Organizations; ADOs – Agriculture Department Officials; PSCs – Private Seed Companies; Dealers include seed dealers and retailers.

argued that price regulation was necessary since private seed companies (PSCs) are charging exorbitantly high prices on seeds, especially on hybrids and proprietary technologies such as *Bt* cotton. They argued that price regulation mechanism should be included in the Bill itself in the form of a statutory body or a committee for the fixation of price of seed.

There has been a fierce attack on the government both in the parliament and outside on amending the Seeds Bill to incorporate clauses on price regulation. Many of the recommendations of the Parliamentary Standing Committee on Agriculture, which gave its report in 2006, have been incorporated in 2010 version of the Seeds Bill, but price regulation stubbornly stays out of its ambit. The agriculture ministry's stance is clear. "A free and competitive market environment will spur the growth of the seeds industry. Therefore, price is better left to market forces rather than to artificial controls".<sup>11</sup>

On the other hand, all the PSCs argued that government (either central or state) should not interfere in fixing the price of seeds. They strongly believed that only market forces such as demand and supply and farmers' preference should decide the price of seeds. They also expressed that price regulation would curtail the competition among seed producing agencies to develop new innovations and it would harm farmers in the long run by limiting their access to quality seed. Price regulation would disincentivize them in investing in seed R&D and business. They defended the high price of seeds in case of proprietary technologies on the ground that lot of money was invested in R&D to develop those innovations and that lot of money needs to be further invested in developing new innovations.

The strongest argument made by the supporters of price regulation mechanism is very low share of seed

producing farmer in retail price of seeds, especially in case of hybrids and *Bt* cotton. The procurement price and market price of maize hybrid seeds by different companies in study area in Bihar is given in Table 3.

It is very clear from the table that price of seed in the market was much higher than the total cost to company. Seed producing farmers' share in the retail price of maize seed ranged from 5 to 12.5%. Another study in case of *Bt* cotton seeds sold in Andhra Pradesh also indicated that the share of seed producing farmer in the retail price of seed was below 30 per cent in general and it was less than 10 per cent in case of seeds marketed by Mahyco-Monsanto Biotech (MMB).<sup>12</sup> The reason behind such exorbitant high prices of seed is the higher share of royalty/trait fee (discussed in detail in the next section).

The critical analysis also revealed that market forces did not operate in case of *Bt* cotton seed market because of monopoly market conditions. The number of commercially approved biotech events and the varieties and hybrids developed using these events are given in Table 4.

Biotech event refers to a specific set of genes that have been placed in specific plant background material, for instance, *CryIAC* gene used in breeding *Bt* cotton. The new events and the varieties and hybrids containing these events have to be registered and require approval from Genetic Engineering Appraisal Committee (GEAC) that works under the Ministry of Environment and Forests (MoE&F), Government of India. It is to be observed that out of 1128 cultivars approved for commercial cultivation, only one is variety (BN *Bt*) and rest 1127 cultivars were hybrids. Further, this only variety was developed by public sector research institutes whereas rest of the hybrids was developed by private sector companies. This illustrates that technological barrier to realization

Table 3—Cost of production, procurement and marketing prices of maize seeds in 2010-11 and 2011-12 in Bihar

Seed supplying company	Cost of production to farmer (Rs/Kg)	Procurement price to farmer (Rs/Kg)	Other costs to company (Rs/Kg)	Total cost to company (Rs/Kg)	Market price of seed (Rs/Kg)	Farmer's share in market price (%)	Dealer's share in market price (%)
Bayer	10	15	35	50	120	12.5	20
Monsanto	10	15	35	50	120-300	12.5-5	20
Pravardhan	10	15	35	50	120-220	12.5-6.8	20

Note: Average cost of production was arrived at by discussion with farmers; Average procurement price was arrived at based on discussion with farmers, dealers and private seed companies; Cost to company was worked based on discussion with private seed company representatives and agriculture department officials of Bihar; Market price of seed was collected from dealers; Farmers' share in market price is worked out as percent of procurement price to market price; Information on dealers' share was collected directly from dealers. The dealers' share for a particular crop seed/produce is generally fixed before the season by the proprietor of the product; Other costs include costs related to transportation, processing, storage, packaging and marketing costs.

Table 4—Commercially approved biotech events, their proprietors and number of varieties/hybrids developed using these events as on May 2012

Name of the event and gene	Year of approval	Proprietor and proprietor type	Number of hybrids/ varieties	% Share of hybrids/ varieties
<i>Mon531 (Cry1Ac)</i>	2002	Mahyco (Private)	233	20.65
<i>Mon15985 (Cry1Ac + Cry2Ab)</i>	2006	Mahyco (Private)	762	67.55
Event 1 ( <i>Cry1Ac</i> )	2006	J. K. Agri Genetics Ltd. (Private)	40	3.54
GFM event ( <i>Cry1Ab + Cry1Ac</i> )	2006	Nath Seeds (Private)	90	7.97
<i>BNLA 106 (Cry1Ac)</i>	2008	CICR & UASD (Public)	1	0.08
Event 9124 ( <i>Cry1Ac</i> )	2009	Metahelix Life Sciences (Private)	2	0.17
Total			1128	100

Source: Compiled by the researchers from annual reports of the Ministry of Environment and Forests for the years 2002-03 to 2012-13;<sup>13-23</sup> Annual report of Ministry of Agriculture;<sup>24</sup> Website of Genetic Engineering Appraisal Committee and Indian Biosafety Rules and Regulations.<sup>25</sup>

Note: Number of hybrids/ varieties refers to number of varieties and hybrids developed using the event and gene and approved by GEAC for commercial cultivation; CICR— Central Institute for Cotton Research, located at Nagpur in Maharashtra; UASD—University of Agricultural Sciences, Dharwad located in Karnataka.

of farmers' rights is more profound in India than the legal barrier as in case of developed countries. Farmers' rights have no meaning in case of hybrids since technical barriers limit farmers from saving and reusing these seeds. This is a threat against farmers' rights in the context wherein Indian seed sector is getting privatized and PSCs are interested in developing and marketing hybrids.

Analysis of market structure of *Bt* Cotton cultivars revealed that a total of 995 hybrids out of 1128 hybrids approved by GEAC for commercial cultivation in India were developed using 2 genes patented by MMB, which accounted for more than 88% of all the *Bt* cotton hybrids in the market. Although competing technology is on offer from JK Seeds and Nath Seeds, Monsanto holds 90 per cent of the market.<sup>26</sup> It is to be noted that private seed companies have developed only hybrids, contributing for 100 per cent share of *Bt* cotton cultivars in the market. It makes business sense for PSCs since farmers need to purchase new seeds every season/year in case of hybrids. The BN *Bt* seeds, the only public sector *Bt* cotton variety seeds, were also withdrawn from ICAR in 2009 from the market after the first season owing to poor performance on farmers' field and genetic contamination.<sup>27</sup> Since this BN *Bt* variety was also withdrawn, the *Bt* cotton seed market is completely dominated by hybrids developed by PSCs. Agriculture department officials, researchers and CSOs maintained that complete absence of substitute products (*Bt* cotton hybrids/varieties) from public sector institutes led PSCs to set exploitative and monopolistic prices. Farmers expressed that non-*Bt* cotton hybrids and traditional varieties were

non-existent in the market further leading PSCs to gain absolute control over market. Had there been enough *Bt* cotton varieties by public sector in the market, farmers would have had choice and prevented from exploitation by PSCs.

It is very clear that monopoly existed in case of *Bt* cotton seed market where MMB dominated the market share. It sells its hybrids directly or through some other PSCs which have entered into licensing and sublicensing agreements with it to use the genes in their hybrids.

Noted agriculture scientist, Dr. M. S. Swaminathan too, has been demanding for price regulation in the Bill. "I have said there should be price regulation where appropriate, not everywhere. The government should have the authority to use price controls in certain situations, but not to usurp the role of the market".<sup>11</sup> The scientist, who is referred to as the Father of India's Green Revolution, worries that lack of price control could have disastrous consequences for the Indian farmer in accessing new technology. "High seed prices and trait fees," he warned, "will come in the way of social inclusion on technology access—and social inclusion is fundamental to growth of the sector".<sup>11</sup>

Several NGO activists have also argued that 'free choice' is a myth in the real world. The GM technology proponents' argument, that the choice of using the technology or its products should be left with farmers, is strongly refuted by some, the argument being that use of the technology by powerful multinational corporations will eventually result in producer-farmer losing their freedom to save the seed and consumers losing their freedom to

choose the food. There is skepticism about the ability of farmers to freely choose, especially when available information may not be complete in all respects.<sup>28</sup> The researcher observed red gram being grown as refugia crop around the *Bt* cotton crop during his recent visit to cotton growing farmers in Kurnool district of Andhra Pradesh in October 2015. The farmers shared that at present even PSCs do not have non-*Bt* cotton seeds to supply for planting refugia crop. This situation highlights that question of farmers' preference is a myth in the absence of choice.

Very recently, it has been reported that MMB did not have patent on *MON-531* or *CryIAC* gene in India. In 2002, Monsanto released Bollgard I version of *Bt* cotton seeds. These seeds contained *MON-531* or *CryIAC* gene. The *MON-531* or *CryIAC* gene in the US had expired in 2012. However, it did not have any patent in India but collected royalties. The misinformation that Monsanto held patent for the gene in India prevented public sector agriculture research institutions to use this gene in developing *Bt* cotton varieties and their approval for commercial cultivation by GEAC. In 2006, Monsanto launched the Bollgard II variety, which has a patent in India.<sup>29</sup>

#### Regulation of Royalty Fee

In case of proprietary technologies, when new traits are included in the seeds, the PSCs charge extra fees on account of royalty fee they claim over patented trait(s). The regulation and extent of royalty fee has become a bone of contention within and between the government and the PSCs (mainly MNCs and large domestic companies) who sell such seeds. There is demand from several stakeholders for incorporating a suitable provision in Clauses 5, 11, 15, 22 and 25 of the Bill for defining the procedure to fix royalty over proprietary technologies. This is an important clause that is missing in the Seeds Bill.

The perception of various stakeholders on the regulation of trait/royalty fee is outlined in Table 5.

Majority of the PSCs (53%) argued that there is no need to regulate trait fee. MMB contends that its license agreement with seed companies is a private one and that the government has no role in regulating the royalty. MMB is bolstering its argument with a new weapon - a patent that it holds in India for its *Bt* technology.<sup>30</sup> A more serious argument made by the Association of Biotechnology Led Enterprises (ABLE), which groups the six major agri-biotech MNCs and five Indian companies, is that price controls will kill research into new seed technology. But for such companies the real issue is the trait fees which bring vast profits and for which tough battles have been fought.<sup>26</sup>

However, it was interesting to note that remaining PSCs (47%) advocated in favor of trait fee regulation since proprietary technologies have benefitted only MNCs and large scale domestic companies. The small scale seed companies have to pay a large sum to get licensing and sub-licensing rights to acquire these patented technologies, even for few years, for use in development of new hybrids. There was a license agreement between Indian companies and MMB according to which Indian companies had to pay an upfront 5 million rupees and an amount annually fixed by MMB for using the patented gene developed by it in development of *Bt* cotton seeds. Indian companies were also asked to pay Rs. 1200/- on every seed packet (of 450gm each) initially.<sup>31</sup> Hence, small scale and newly established seed companies argued that trait fee regulation would benefit them to emerge and compete with MNCs and large scale Indian companies. However, all those PSCs who argued in favor of trait fee regulation suggested that such mechanism should be outside the framework of the bill and that the extent of royalty charged be negotiable between the technology developers and the

Table 5—Agreement of stakeholders on trait/royalty fee regulation

Trait/Royalty fee regulation		Agreement of stakeholders											
		Farmers		CSOs		ADOs		Researchers		Dealers		PSCs	
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Need	Agree	240	100	30	100	30	100	30	100	25	83	14	47
	Disagree	0	0	0	0	0	0	0	0	5	13	16	53
Mechanism of regulation	Within Seeds Bill	240	100	30	100	30	100	6	20	25	83	0	0
	Outside Seeds Bill	0	0	0	0	0	0	24	80	0	0	14	47

Note: CSOs— Civil society organizations; ADOs— Agriculture department officials; PSCs— Private seed companies; Dealers include seed dealers and retailers.

central government. They further added that extent of trait fee charged should take into consideration the factors such as monetary value of investment incurred in R&D and risks involved therein, marketing and promotion costs, sufficient revenue margins for the proprietors, incentive to invest further in R&D and market conditions (size of the market for the product, potential growth and competition in the market) for the product/service. The PSCs in favour of regulation of trait fee want the regulation outside the Seeds Bill because they fear that once price regulation becomes part of Seeds Act (once it is enacted), the case of price regulation would become stronger and it is very difficult to bring amendments thereafter. They perceive that if provision of price regulation is included in the seed rules/guidelines, it is more amenable for revision. They also fear that price regulation (as of now, practiced only in case of *Bt* cotton seeds) would be extended to other crops ultimately leading to reduction in their profit margins. PSCs perceive price regulation as antagonistic to their interests of further liberalization of Indian seed sector with least regulation in import, export and trade of seed and seed germplasm.

All the researchers, ADOs, CSOs and farmers strongly advocated in favor of regulation of royalty fee since private companies are charging exorbitantly higher prices especially for *Bt* cotton seeds on account of higher share of royalty fee. All the researchers, ADOs, NGO personnel and farmers also felt that the bill should include a clause to regulate royalty fee. Majority (80%) of the researchers expressed that trait

fee regulation mechanism should be outside the framework of the bill and argued that central government should be the authority to regulate trait fee since seed companies have a pan-Indian business operations and it would be highly inappropriate from administrative standpoint for different states to fix different trait fee. The retail price of *Bt* cotton seeds supplied by MMB in Andhra Pradesh and the share of royalty is given in Table 6.

It is very clear that MMB enjoyed royalty share as high as 67 per cent of retail price for few years in the beginning since 2002 when *Bt* cotton was approved for commercial cultivation in India. However, AP government, based on the representations made by farmers' groups and CSOs filed a case with Monopolistic and Restrictive Trade Practices (MRTP) Commission and fixed the price of *Bt* cotton seeds in 2006 at Rs. 750/- and Rs. 925/- respectively for *Bt* I and *Bt* II seeds for a packet of 450 grams. AP government in 2008 further reduced the prices to Rs. 650/- and 750/- respectively for *Bt* I and *Bt* II seeds. State government of Andhra Pradesh was the first to implement price restrictions. Its 2006 directive capped prices for biotech cotton seeds at less than one-half the prevailing market price. Today, price caps have spread to important cotton-growing states throughout the country including Maharashtra, Gujarat, Tamil Nadu, Karnataka, Madhya Pradesh, and West Bengal.<sup>32</sup>

Following Andhra Pradesh's success in getting prices slashed, several other governments followed suit, using the Essential Commodities Act to fix rates

Table 6—Market price and share of royalty on *Bt* cotton seeds supplied by Mahyco-Monsanto Biotech in Andhra Pradesh

Year	Type of seed	Market price of seed for 450 gm packet (Rs.)	Share of royalty (Rs.)	% share of royalty in market price of seed	Andhra Pradesh Government's intervention
2002	<i>Bt</i> I	1800	1200	66.66	Nil
2004	<i>Bt</i> I	1850	1250	67.56	Nil
2006	<i>Bt</i> I	750	250	33.23	MRP of seed was fixed
	<i>Bt</i> II	925	400	43.24	
2008	<i>Bt</i> I	650	150	23.07	MRP of seeds further reduced
	<i>Bt</i> II	750	225	30.00	
2012	<i>Bt</i> I	830	200	24.09	MRP of seeds increased
	<i>Bt</i> II	930	250	26.88	
2013	<i>Bt</i> I	830	200	24.09	MRP of seeds remains same
	<i>Bt</i> II	930	250	26.88	

Source: Information on share of royalty for the years 2002, 2004, 2006 and 2008 were compiled from sources.<sup>31</sup> Share of royalty pertaining to the years 2012 and 2013 was arrived at by the researcher based on the discussions with Agriculture Department Officials of Andhra Pradesh.

Note: In 2010, the National Seed Association of India (NSAI: Association of Private Seed Companies) demanded that they should be allowed to increase the seed costs of *Bt* cotton by Rs. 200/packet. MRP was increased in 2012 considering the demand of NSAI.

at a much lower rate. Gujarat, Madhya Pradesh, Karnataka and Maharashtra did manage to bring down the price of Bollgard seeds but were challenged by MMB. It managed to win against Madhya Pradesh because the government had failed to enact a law that would have enabled it to fix prices.<sup>33</sup>

The intervention of government to fix *Bt* cotton seed prices has also led to reshaping of the marketing strategies between technology provider (MMB) and the PSCs which were part of licensing and sub-licensing agreement with MMB. It is reported that National Seed Association of India (NSAI: Association of private seed companies in India) is seeking refund of money worth Rs. 13000 million paid to MMB over and above the government stipulated trait value and wanted the MMB to refund the same with interest. MMB has also moved the Court against eight companies that reportedly refused to pay dues of Rs. 4000 million towards the trait value.<sup>34</sup>

#### **Powers to State governments**

Another closely related issue is the demand for granting state governments the enough powers to regulate seed industry in their respective states including the powers to regulate retail price and trait fee of seeds. Although, some minor changes with respect to the role of state governments in registration of seed developers, producers, seed processing plants, and supervising their operations, etc., were accepted in the proposed amendments to Seeds Bill, many crucial issues such as price regulations, regulation of trait/royalty fee, regulating erring companies, and compensation mechanisms in case of crop failures, etc. were not agreed upon.

The demand for granting powers to state governments gain more importance in the context wherein the state governments are being sued in legal courts by MNCs for taking decisions in the best interests of the farming community and the national sovereignty. Many instances wherein state governments have failed to regulate the erring companies because of absence of appropriate and strong provisions in the seed legislations and consequent absence of powers to state governments have been reported. In a letter to the Honorable Prime Minister, Government of India, representatives of farmer wings of different political parties, independent farmer organizations and NGOs working with farmers in Andhra Pradesh have quoted four

cases citing the helplessness of government of AP in regulating private seed companies in the state.<sup>35</sup> Here only three cases related to the regulation of sale price and trait fee are quoted.

- 1) In 2006, after Monopolistic and Restrictive Trade Practices (MRTP) Commission's ruling to reduce the *Bt* cotton seed price, AP government reduced the cotton seed prices to Rs. 650 and Rs. 750 for Bollgard I and II respectively. Challenging this, MMB moved to Delhi High Court on this issue. The case is still pending in the Court.
- 2) In 2007, when Agriculture officers in Warangal district (in AP) found that Mahyco *Bt* hybrids were being sold in Warangal market, they raided and seized the shop. Mahyco challenged that cotton seed was removed from Essential Commodities Act (ECA) 1955, hence Seed Control Order which draws powers from ECA does not apply to cotton. At this juncture, AP Government made a new act to regulate transgenic cotton seed in the state. However, all these Acts, including Seed Control Order 1983, will be repealed once the Seeds Bill 2004 is passed, there by taking away the rights of the farmers and also the powers of the state government. (In 2005, there was large scale *Bt* cotton crop failure in Warangal District because of spurious seeds supplied by Mahyco. The state government asked Mahyco to pay compensation to farmers. This company refused to pay and moved to AP high court on paying compensation saying state government is harassing them. AP High Court orders were also in favour of Mahyco because Seeds Bill 1966 does not give those powers to state or central government. Till date the company has not paid compensation. After this incident in 2005, Government of AP did not give permission to Mahyco for sale of *Bt* cotton seeds. Agriculture officers raided shops selling Mahyco *Bt* hybrids because Mahyco was not given permission by Government of AP for marketing of their *Bt* cotton seeds in 2007).
- 3) In 2010, Monsanto filed case in AP High Court requesting to stop state government from reducing the royalty arguing that it does not have any power to do so. The case is still pending in the Court.

As the state governments would be implementing the Seeds Bill (after enactment), they are demanding

for powers to regulate the private seed companies. The opinion of various stakeholders on granting powers to state governments to regulate seed industry in their respective states is presented in Table 7. All the farmers, ADOs and CSOs unanimously approved that state governments should be given authority to regulate retail price and trait fee of seeds, since agriculture is a state subject under Constitution of India and farmers have better service access to state department of agriculture rather than the central government. Majority of researchers agreed in favor of granting powers to state governments in regulating sale price of seed but they added that regulation of trait fee should be done by central government as it is an issue of national interest.

However, PSCs were against the interference of government (both central and state governments) in regulation of sale price and trait fee of seed.

Even several members of parliament, irrespective of their political affiliations, fiercely argued for price regulation and granting powers to state governments since agriculture is a state subject. “The MPs were clear that the Bill should protect the interests of farmers and not of multi-national companies and big business houses. They demanded a price regulatory mechanism so that seeds were available to farmers at affordable prices and not left to “market forces.” The AP delegation gave the example of *Bt* cotton seeds that were introduced in the country at high prices and were lowered on orders of the state High Court”.<sup>36</sup> Several farmers’ organizations and NGOs expressed that the bill will further incentivize the transition of Indian seed industry towards privatization and increased seed prices.<sup>11</sup>

It is clear that in the existing legal framework, state governments have no powers and they are finding it difficult to regulate the seed industry in their

respective states. Even in Seeds Bill 2004 and its subsequent amendments, powers to state governments are inadequate. Hence, State governments should be given powers to regulate seed prices and royalties in the best interest of agriculture and farming community. Since there are demands for including agriculture in the concurrent list under constitution of India, it might be appropriate to involve both the center and the states in regulation of private seed companies including powers to regulate sale price and trait fee over seeds.

There is a general agreement between various stakeholders (except PSCs) for regulation of sale price and royalty fee over seeds. Even members of parliament, irrespective of political affiliations, demand for price and royalty fee regulation. Even the claim of PSCs that market forces should rule seems unscientific since there is a clear case of monopoly in case of *Bt* cotton seed market and the royalty fees were as high as 67% of the retail price of seeds until government intervened to regulate the price. The source of monopoly by MMB in case of *Bt* cotton seed market could be attributed to (a) real and perceived technological superiority of *Bt* cotton seeds, (b) economies of scale and cost advantages owing to large market for cotton seeds, (c) high capital requirements, (d) lack of substitute goods especially by public sector, (e) control of technology in terms of ownership and access to gene, (f) patent over gene, and (g) deliberate action in terms of misinformation over absence of patent on *MON-531* or *CryIAC* in India, which prevented public sector research bodies to use this gene for developing *Bt* cotton varieties.

Hence, it is scientific and justified to regulate seed price and trait fees in case of seeds involving royalty component under monopoly market conditions. Abusing of monopoly is against the provisions of

Table 7—Agreement of stakeholders on granting powers to state governments

Issues related to granting powers to state governments		Agreement of stakeholders											
		Farmers		CSOs		ADOs		Researchers		Dealers		PSCs	
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Regulation of retail price of seed	State	240	100	30	100	30	100	18	60	25	83	0	100
	Centre	0	0	0	0	0	0	5	17	0	0	0	0
	Both	0	0	0	0	0	0	2	7	0	0	0	0
Regulation of trait/ royalty fee	State	240	100	30	100	30	100	11	37	25	83	0	100
	Centre	0	0	0	0	0	0	17	57	0	0	0	0
	Both	0	0	0	0	0	0	2	6	0	0	0	0

Note: CSOs— Civil society organizations; ADOs— Agriculture department officials; PSCs— Private seed companies; Dealers include seed dealers and retailers.

Competition Act 2002 (earlier Monopolistic and Restrictive Trade Practices Act 1969). The Seeds Bill should incorporate appropriate clauses to grant state governments the power to regulate seed prices and royalty fees before it is finally enacted in the parliament.

### Conclusion

The Seeds Bill is not yet enacted (into an Act) even ten years after its first introduction in the parliament in 2004. The government has accepted and incorporated some of the recommendations made by the Parliamentary Standing Committee on Agriculture (PSCA). This paper addressed one of the most contentious yet unresolved issue *viz.*, regulation of sale price of seed. The study found that farmers, Civil Society Organizations (CSOs), Agriculture Department Officials (ADOs), researchers and seed dealers strongly demanded for regulation of sale price and trait/royalty fee over seeds especially in case of proprietary technologies like *Bt* cotton. The farmers, CSOs, ADOs, and seed dealers were in agreement that state governments be given powers to regulate sale price and trait fee over seeds. However, researchers stated that powers to regulate seed industry including powers to regulate trait fee should be with central government since issues of seed and seed policy are of national interest.

Private Seed Companies (PSCs) strongly argued that government (both centre and states) should not interfere in fixing sale price of seed. They added that only market forces such as demand and supply and farmers' preference should decide the price of seeds. However, it was found that market forces did not operate in case of *Bt* cotton seed market because of monopoly market conditions. All the *Bt* cotton cultivars approved for commercial cultivation were hybrids developed by PSCs. Out of all the *Bt* cotton cultivars in market, 88% of them have been developed using two biotech events (*CryIAc* and *CryIAc + Cry2Ab*) developed by one multinational company *viz.*, Mahyco-Monsanto Biotech (MMB). The market of *Bt* cotton seed was a clear case of monopoly even though there are few other players in the market. Farmers had no choice of non-*Bt* cotton hybrids or traditional varieties in the market. Source of monopoly for MMB could be attributed to complex of economic and legal barriers for other competitors and deliberate act of misinformation on legal patent rights.

With respect to trait fee regulation, majority (53%) of the PSCs demanded that government should have no say, while remaining 43% were in agreement with it. Small scale and upcoming seed companies expressed the view that patented genes used for development of *Bt* cotton hybrids have only helped multinational and large Indian seed companies. It is reported that the Indian seed companies who went into license agreement with MMB had to pay an upfront 5 million rupees and an amount annually fixed by MMB for using the patented gene developed by it. Indian companies were also asked to pay Rs. 1200/- on every seed packet (of 450gm each) initially. Hence, small scale and newly established seed companies argued that trait fee regulation would benefit them to emerge and compete with MNCs and large scale Indian companies. However, all those PSCs who argued in favor of trait fee regulation believed that such mechanism should be outside the framework of the Bill and that the extent of royalty charged be negotiable between the technology developers and the central government. The data revealed that PSCs charged royalty fee as high as 67 per cent of the retail price of the seeds until Andhra Pradesh government intervened and fixed the prices.

The opinion of various stakeholders (farmers, CSOs, researchers, ADOs, seed dealers) was in favor of regulating sale price and trait fee of seeds. The PSCA and even several members of the parliament (MPs), irrespective of their political affiliations, have raised the strong voice for the same. Even the claim of PSCs that market forces should rule seems unscientific since there is a clear case of monopoly in case of *Bt* cotton seed market. Based on the study, it is suggested that clauses related to regulation of sale price and trait fee in case of proprietary technologies be included in the Seeds Bill before it is enacted. The Bill should also provide the central government and state governments the powers to regulate the seed companies in the larger interest of agriculture and farming community.

### References

- 1 Ministry of Agriculture, *Agriculture Census 2010-11 (Phase I): All India Report on Number and Area of Operational Holdings* (Agriculture Census Division, Department of Agriculture and Cooperation), 2012, 1-83.
- 2 Ministry of Statistics and Programme Implementation, *Children in India 2012*, Report of Ministry of Statistics and Programme Implementation; [mospi.nic.in/mospi\\_new/upload/](http://mospi.nic.in/mospi_new/upload/)

- Children\_in\_India\_2012.pdf* (accessed on 15 December 2013).
- 3 SeedNet India portal, <http://seednet.gov.in/material/IndianSeedSector.htm>(accessed on 30 October 2012).
  - 4 Chand R, *Trade Liberalization, WTO and Indian Agriculture* (A Mittal Publications, New Delhi), 2002.
  - 5 Pray C E, Ramaswami B & Kelley T, The impact of economic reforms on R&D by the Indian seed industry, *Food Policy*, 26 (2001) 587-98.
  - 6 Manjunatha B L, Rao D U M & Dastagiri M B, Trends in seed production, growth drivers and present market status of Indian seed industry: An analytical study, *Indian Journal of Agricultural Sciences*, 83 (3) (2013) 315-320.
  - 7 Manjunatha B L, Rao D U M, Dastagiri M B, Sharma J P & Burman R R, The legal protection of public and private plant varieties in India: A comparative study, *Journal of Bioremediation and Biodegradation*, 4 (7) (2013) 1-5.
  - 8 Linton K & Torsekar M, Innovation in Biotechnology Seeds: Public and private initiatives in India and China, *Journal of International Commerce and Economics*, United States International Trade Commission, 3 (1) (2011) 189-222.
  - 9 United States Council for International Business, *Written submission to the United States Trade Representative in connection with public hearing concerning China's compliance with its WTO commitments*, 22 September 2009.
  - 10 PSCA, *Twenty Second Report of Standing Committee on Agriculture (2006-07) on the Seeds Bill*, 2004: Fourteenth Lok Sabha, Ministry of Agriculture, Department of Agriculture and Cooperation, Lok Sabha Secretariat, New Delhi, 2006, 5.
  - 11 Jishnu L, Seeds of strife, *Down to Earth*, 31 August 2010. <http://www.downtoearth.org.in/node/1737> (accessed on 30 November 2013).
  - 12 Venkateswarlu D, *Child Labour and Trans-National Seed Companies in Hybrid Cottonseed Production in Andhra Pradesh*, Study commissioned by India Committee of the Netherlands, 2003.
  - 13 MoE&F, *The Genetic Engineering Approval Committee (Biosafety Regulatory Framework in India)*, In *Conservation of Natural Resources including Forestry and Wildlife*, Ministry of Environment and Forests, New Delhi, Annual Report 2002-03, p.15.
  - 14 MoE&F, *The Genetic Engineering Approval Committee (Biosafety Regulatory Framework in India)* In *Conservation of Natural Resources including Forestry and Wildlife*, Ministry of Environment and Forests, New Delhi, *Annual Report 2003-04*, p. 59.
  - 15 MoE&F, *The Genetic Engineering Approval Committee (Biosafety Regulatory Framework in India)* In *Conservation*, Ministry of Environment and Forests, New Delhi, *Annual Report 2004-05*, p. 23.
  - 16 MoE&F, *The Genetic Engineering Approval Committee (Biosafety Regulatory Framework in India)* In *Conservation*, Ministry of Environment and Forests, New Delhi, *Annual Report 2005-06*, 43-44.
  - 17 MoE&F, *The Genetic Engineering Approval Committee (GEAC)* In *Conservation*, Ministry of Environment and Forests, New Delhi, *Annual Report 2006-07*, 52-53.
  - 18 MoE&F, *The Genetic Engineering Approval Committee (GEAC)* In *Conservation*, Ministry of Environment and Forests, New Delhi, *Annual Report 2007-08*, 55-56.
  - 19 MoE&F, *Biodiversity Scheme/Genetic Engineering Approval Committee (GEAC)*. In *Conservation*, Ministry of Environment and Forests, New Delhi, *Annual Report 2008-09*, 48-49.
  - 20 MoE&F, *Biodiversity Scheme/Genetic Engineering Approval Committee (GEAC)* In *Conservation*, Ministry of Environment and Forests, New Delhi, *Annual Report 2009-10*, 41-43.
  - 21 MoE&F, *Biodiversity Scheme/Genetic Engineering Approval Committee (GEAC)* In *Conservation*, Ministry of Environment and Forests, New Delhi, *Annual Report 2010-11*, 45-46.
  - 22 MoE&F, *Biodiversity Scheme/Genetic Engineering Approval Committee (GEAC)* In *Conservation*, Ministry of Environment and Forests, New Delhi, *Annual Report 2011-12*, 52-54.
  - 23 MoE&F, *Biodiversity Scheme/Genetic Engineering Approval Committee (GEAC)* In *Conservation*, Ministry of Environment and Forests, New Delhi, *Annual Report 2012-13*, 53-58.
  - 24 MoA, *Bt. Cotton Seeds*, Department of Agriculture and Cooperation, Ministry of Agriculture, New Delhi, *Annual Report 2011-12*, p. 43.
  - 25 DBT biosafety, (2012), [http://www.dbtbiosafety.nic.in/Standing\\_Committee/YearWise\\_List2002\\_May2012.pdf](http://www.dbtbiosafety.nic.in/Standing_Committee/YearWise_List2002_May2012.pdf) (accessed on 10 January 2014).
  - 26 Business Standard, Battle royal over *Bt* cotton royalty, News Report by *Business Standard*, 28 May 2010.
  - 27 Jishnu L, Untangling India's *Bt* cotton fraud, *Down to Earth*, 15 February 2012.
  - 28 Sahai S, *Bt* cotton: Confusion prevails, *Economic and Political Weekly*, 25 May 2002.
  - 29 Arya S, *Bt* cotton: Govt admits Monsanto never had patent in India, News Report by *Times of India*, 26 April 2015. <http://timesofindia.indiatimes.com/city/nagpur/Bt-cotton-Govt-admits-Monsanto-never-had-patent-in-India/articleshow/48674689.cms> (accessed on 10 September 2015).
  - 30 Business Standard, *Bt* cotton: Monsanto is back in courts over royalty, News Report by *Business Standard*, 1 April 2010.
  - 31 Anilkumar Y V, *Seed Bill 2010: An Analytical View*, Internship Report, A P University of Law, Visakhapatnam, 2010.
  - 32 Mishra S, Monsanto at the receiving end of *Bt* cotton pricing policy, *Down to Earth*, July 1-15 (2006).
  - 33 Jishnu L, Not a nice trait to have, News Report by *Business Standard*, 1 April 2010.
  - 34 Kurmanath K V, States' orders supersede bilateral pacts: Cottonseed firms, News Report by *The Hindu Business Line*, 28 October 2015, <http://www.thehindubusinessline.com/economy/agri-business/states-orders-supersede-bilateral-pacts-cottonseed-firms/article7780981.ece?ref=relatedNews> (accessed on 02 November 2015).
  - 35 AP Farmers Unions and NGOs Coordination Committee, *Seeking amendments to Seed Bill, 2010, given the experience with the regulation in the last six years*, Memorandum to Prime Minister, 30 April 2010.
  - 36 The Hindu, No agreement on price regulation and penalty clause in the Seeds Bill, News Report, *The Hindu*, 29 July 2010, New Delhi.