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Bio-Patents in High Yielding Varieties: A Boost for Indian Agriculture

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Abstract:

Biotechnology is replacing traditional agricultural practices. Investment in genetically modified (GM) crops helps farmers minimize their expenditure on pesticides and fertilizers. However, the government is laying its focus on industrial development over agricultural development, leading to food crisis. Thus India has to cultivate a domestic market conducive for foreign investment in this field. However due to corruption, conservativeness of the farmers, obsolete machinery, poor financial incentives and a weak system of intellectual property rights, foreign investors are unwilling to invest in India. The research article aims at providing recommendations that help inject an investment friendly environment in the country.

Keywords: Agriculture, Bio-patents, Foreign investment, Genetic modification, Plant breeders

1.0 Introduction:

Intellectual Property Rights (IPR) has been a field of law that has seen considerable development in recent years. Initially their rights were only seen as a means of protecting intellectual creativity. Today, these rights incentivize the society to explore new means of production, improvise or replace the existing technology and to trigger social, cultural, environmental and commercial development (Juma, 2009). Biotechnology has replaced traditional methods of agriculture, helping farmers increase their yield and profitability (Lesser, 2013): However, India being a signatory to the TRIPS (Trade Related Intellectual Property Rights) Agreement, should protect plant varieties through patents or sui generis protection. In the European context, although patents of plant varieties were introduced only in the late 1990's, there has been substantial investment by private companies. However, developing countries tend to resist investment in biotechnology due to the fear of dominance by United States and European life science companies in the seed industry (Schumpeterian, 1986): The essay attempts to resolve this conflict between developed and developing nations by recommending methods that generate mutual benefits.

Genetically modified crops (GM) have symbolized development in biotechnology since 1996. Initially, a success story in US, these crops gained importance all over the world. GM crops are obtained by inserting useful genes into plants, through a process called genetic engineering (Ahuja, 2009). These genes are then transported to various other countries by inserting them in local varieties of plants (Khader, 2007). These crops provide better yield, smaller growth period, better nutritional value and long lasting varieties of fruits and vegetables (Swann & Gill, 1993).

Plant breeders, biotechnology scientist and firms that deal in biotechnology inventions try to charge enough royalties from the use of their inventions and prevent people or firms from copying their invention. Therefore, they seek to protect their inventions using patents, plant breeder rights and trademarks (Sharma, 2009). Some countries also provide trade secret rights and monopoly rights to these individuals. Laws relating to biotechnology spread rapidly in developing countries in the late 1990's. This was accelerated by the World Trade Organization (WTO), which obligated member states to pass legislations to protect plant breeder's rights and patents for biotechnology inventions. (Phillips, 1966). Today, plant breeders have developed into massive private firms such as Monsato that govern the agricultural world. Therefore the essay ventures into measures that

need to be taken by the municipal government to ensure that agriculture in not defeated by evils of entrepreneurship and commercialization (Mansfield, 1962).

2.0 Materials and Methodology

This is a doctrinal research that attempts to analyze the current position of the Indian agricultural sector. By using secondary sources of research such as various articles, books, periodicals, internet sources and research papers, the paper provides an understanding of how the agricultural investment in the Indian subcontinent can be boosted. Further, the paper helps provide an international perspective on the matter, thereby providing suggestions to curb the existing lacunae in the system. Further, various graphs and data have been used from various internet sources and government portals to display how biotechnology has evolved and taken center stage as far as agricultural development is concerned.

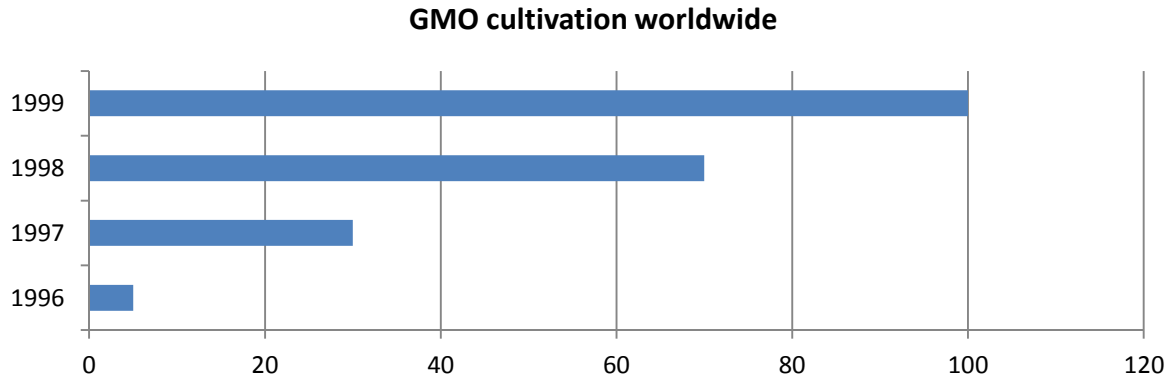

Figure 1: Growth of GMO cultivation per Million Hectare (U.S. Dept of Agriculture)

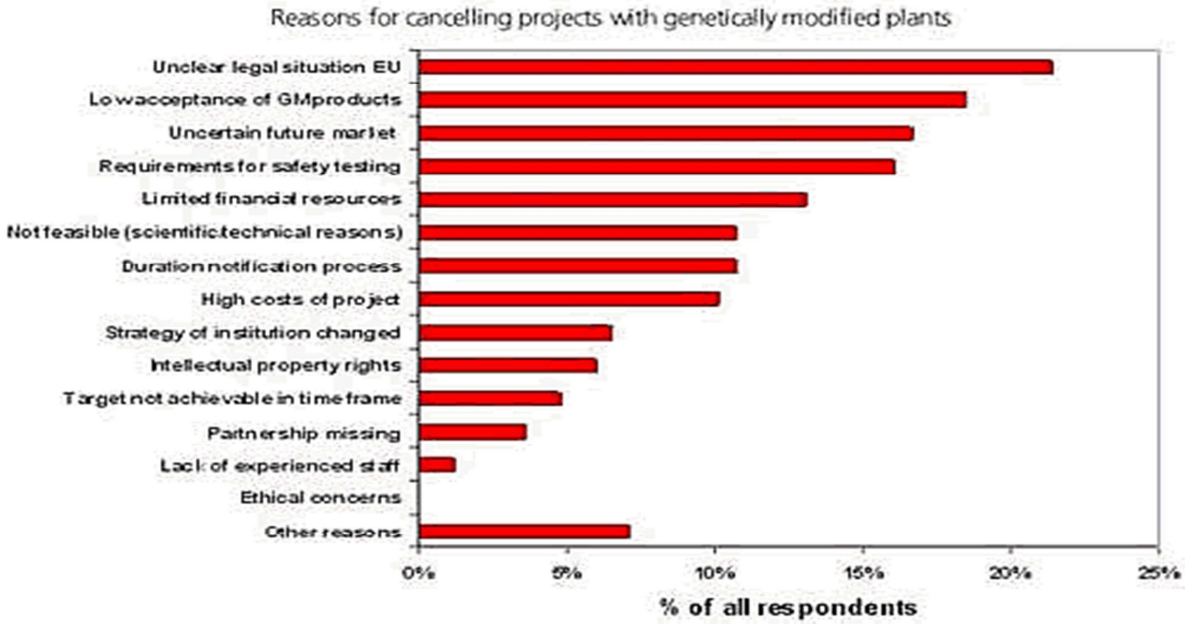

Figure 2: Reasons for cancelling GMO projects with foreign investors (Apis-UK, 2005)

3.0 Results and Discussion

Figure 1 clearly indicates the growing trend of GMO crops in the world. Growth has escalated by nearly twenty times in the past four years. India is globally known as an agrarian economy. This means that majority of its GDP arises from sale and export of agricultural produce. Growth in High Yielding Variety (HYV) technology has helped result in greater efficiency and profitability. This means that if Indian farmers need a secure livelihood, the Indian markets and the government have to be open to foreign investments and trade. Private firms are likely to invest in the development and supply of GM crops only when there is a reasonable profitability in their investment (Figure 2). Such profitability will be ensured by stronger IPR laws, as it helps to secure the interest of investors in the market (Phillips, 1966). By secure and strong laws, not only will the patentee get exclusive economic rights over the distribution of his invention, but it will also incentivize his investment in such a market (Figure 2). Secure IPR's will allow these private firms to appropriate some of their economic benefits that are generated from the use of their property rights towards the benefit of the local farmers. However, irrespective of how strong these IPR's are, private firms will not invest in biotechnology if the potential market lacks the required technological advancement to support their inventions (Nouges, 1990). Therefore the problems arising out of IPR in biotechnology are twofold:

1. *National Insecurity of Transition Economies*: Transition or developing economies refrain from making laws protecting advancement in biotechnology because they do not want private firms from western countries to hamper their country's local agricultural units, by monopolizing and distributing seeds and hybrid variety crops. This mentality exists as developing nations try to achieve self-sustainability over development (Mueller, 1969). These countries look to preserve their local agricultural sectors and their industrial units.

2. *Benefitting the Benefitted:* The private companies from technologically advanced countries will only be motivated to invest in biotechnology if they see a reasonable opportunity for maximizing profits gained from their invention (Mansfeld, 1983). Therefore these companies target only developed or technologically advanced countries as only these countries will be able to economically benefit the private firms and also to preserve their invention (Moore, 1998). However, this 'profit motive' that drives the private investors can be detrimental to the interest of the farmers. Due to lack of a 'social motive', the technological advancements in biotechnology will circulate only among developed nations. Subsequently, the countries that need these technologies the most are neglected. Hence expansive patent protection can be detrimental in the spread to such technology to all corners of the world, leading to failure in providing for social welfare. Developing countries need investment from foreign private firms, in order to boost their process of development.

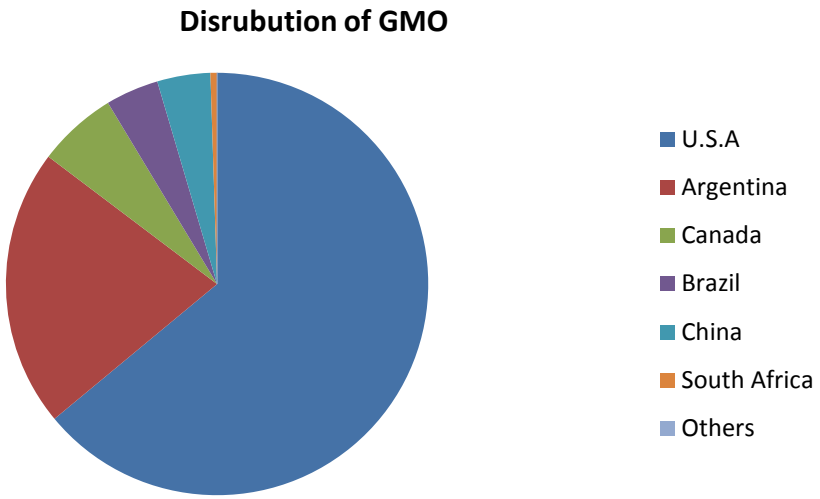

Figure 3: Comparative Analysis on Agricultural Development

3.1. Investment in biotechnology: an international perspective

There has been experimental evidence in various countries that demonstrate the benefits of private investment in developing countries. Monsanto is one such private firm that has taken active initiative in spreading the benefits of biotechnology in developing economies, thereby helping these nations develop agriculturally. Early introduction of the GM crops by Monsanto with collaborating companies were made in countries having strong IPR's in relation to other countries.

3.1.1 Argentina

In Argentina, plant breeder's rights are considered to be the best in developing countries. The seed industry started an institution called ARPOV in 1991 modeled after European plant royalty bureaus (Harabi, 1995). This body was able to take action against plant breeders' law violators and therefore helped to substantially reduce black market seeds. Monsanto, a foreign private firm in combinations with a local firm, Nidera, introduced round-ready soyabeans, Bt cotton and Bt corn into commercial markets of Argentina. However, heavily on black market seeds. Hence the private companies reduced their price to induce more demand. Thus, it proves that ultimately, the beneficiaries of IPR's are the local farmers and the public; not so much the MNC's (Kilman, 1998).

3.3.2 South Africa

In South Africa, there exists strong IPR's. Thus the private companies, like Montaso exert a massive influence on the farmers. Montaso and other firms, increase their profitability as the farmers are forced to buy new seeds from the companies. There farmers are not allowed to replant the seeds (Blair, 1972). However, the profits are still not substantial as only a small portion of land is actually covered with GM crops. However, due to India's large landmass this is not going to take place.

3.3.3 Republic of China

In China, the IPR's are not as strong as South Africa's. Here Montaso, Delta & Puniland (DPL) and the Singapore Economic Development Board entered into a joint venture with Hebei Provincial Seed Company (HBSC) to produce and market Bt. Cotton. The Chinese Academy of Agricultural Sciences (CAAS) approved of this GM crop. But this Bt gene was not protected by patent. However, their varieties were protected through their joint venture with HBSC. In subsequent years Montaso and DPL faced multiple problems in various districts. In some districts, they had to compete with the government's Bt Varieties and were not given monopoly power from the state. These companies had to incur the cost of production, distribution, marketing and research of the local farmers. Because of the inability of the farmers to save, their seeds were also limited. All these problems arise because the breeder's protection law was yet not passed in China. Hence there is a need for introducing breeders' rights in India. It is clear through Figure 3 that India has to desperately revamp its traditional forms of agricultural practices and open itself to the benefits of biotechnology. Thus, due to limited size of revenue that is gained by these countries, there is no incentive on the part of the MNC's to invest in these countries. Thus if developing countries need better investment, they need to develop and strengthen their IPRs. Strong IPRs also benefit small farmers. For example, in South Africa and certain districts in China, the MNCs provide 75%-80% of the benefits from research to farmers (Padmanabhan, 2012). However, the question to be asked is whether the benefits received from the use of GM crops outweigh the costs incurred by the farmers.

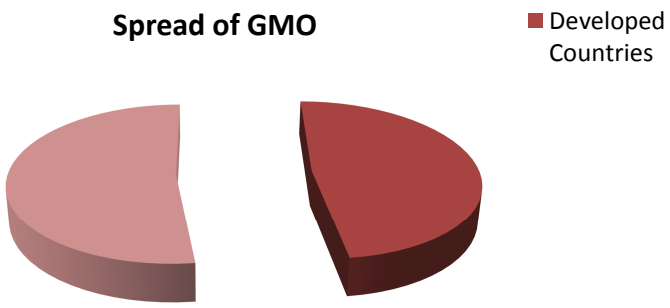

Fig 4: Distribution on Genetically Modified Organisms in the World (ISAAA)

Figure 4 indicates that out of the 28 countries that cultivate GMOs, a larger proportion on them come from developing nations. This is owing to the dependence of these countries on agriculture. What we must aim for is a greater percentage on investment in developing countries.

4.0 Suggestions

This dilemma can be addressed by means of the following suggestions that the researcher would like to propose.

4.1 Spreading Awareness

In most developing nations today, small farmers resort to traditional methods of production. On the contrary, developed nations use high end technology in agriculture, hence resulting in higher productivity. This leaves the developing nations lagging behind, and unable to match up to the international market. To address this issue, the concerned government has to demonstrate to the farmers, the benefits of GM crops over normal crops (Barton, 1998). Farmers learn from 'action' over 'words'. By merely making the farmers aware of the benefits of the GM crops, will not suffice. Farmers tend to trust a particular technology only when they see results, before their own eyes. By conducting demonstrations at a village level, participation from the farmers will increase. Trained government personnel should grow such crops in village fairs, awareness camps, etc. Agriculture should be introduced as a subject in government schools, wherein the various new technologies regarding agriculture should be made known to the students (Gort and Klepper, 1982). These students are the future agriculturalists of the country. Therefore effort should be made at the preliminary level itself, in order to make the agricultural market, more investment friendly. The idea will also reduce the problem of urbanization, as many villagers will be able to secure their lives in their own village, rather than looking for opportunities in the cities (Butler and Marion, 1985).

4.2 Separate Conflict Resolution Mechanisms

A stronger system of enforceability of IPRs will attract more investment in this regard (ISAAA, 2013). Once the private companies, feel that their invention will be secured efficiently by effective laws, investment will automatically increase. In order to harvest such technology, the concerned government has to create a secure environment for these investors (Leibenleft, 1981). This can be done by creating a separate quasi judicial system, to deal exclusively with disputed dealing with IPR's. IPR disputes require immense amount of knowledge of both national and international laws. Therefore, the arbitrators that would be appointed in these quasi judicial bodies should be extremely knowledgeable in this field. By implementing this idea, the investors will be ensured of the fact that their concerns will be dealt with quickly, efficiently and in the eyes of knowledgeable personnel (Comanor, 1964). This will help create a better environment for the private companies to invest. Furthermore it will reduce the burden of the judiciary. The world has been a witness to many developmental activities in the past decade. With more development, it is expectable that the number of companies applying for patents will increase. Therefore, by establishing a separate court system, the concerned state is getting ready to face the challenges of the future generations. A corresponding administrative body should also be appointed running parallel to the court system. The powers and functions of this body should be related to keeping a check on the implementation of IPR's, assisting the quasi-judicial body, monitoring the establishments of the private companies, making suggestions to the government to import required technology, etc.

4.3 Governmental Aid

The Indian Council of Agriculture Research (ICAR) promotes PPPs (Public-Private-Partnerships) with the biotechnology industry. It does this with the active backing of the Ministry of Science and Technology. The MoA has handed Monsanto and the industry access to our agri-research public institutions placing them in a position to seriously influence agri-policy in India (Todhunter, 2013). Most developing nations still look at agriculture as a major contributor to the National Income. Hence, a little expenditure by the government in this regard, will only produce better returns. Developing nations must allocate a larger portion of their Union Budget in employing the latest agricultural technology. Investment in technology must be given more importance by all developing nations in order to match up to the international market (Mansfield, 1984). GM crops will not only increase the per capita income of the farmers but will also increase agricultural output. The problem of wastage of grains and vegetables will reduce, as GM crops have longer durability. This will ultimately lead to better local investment in agriculture, which many developing nations lack. Problems of price rise can also be addressed. Most products use agricultural output, in their production process. By addressing the agricultural market ultimately, it creates an impact on all other markets. Therefore, all these factors will

ultimately benefit the nation in the long run. However, the immediate question that arises, is the availability of these funds.

Various international funding organizations, will be more than happy to fund countries that are willing to channelize these funds in the right manner. Investment in agriculture, more often than not leads to profitability, if not in the short run, in the long run. Thus these countries will be able to repay these loans. For such a situation to occur, international funding organizations should provide long term loans at a low rate of interest (Lesser & Masson, 1983). In case of extremely poor countries that suffer from food shortage, interest free loans should be given. This will incentivize all developing nations to borrow money from these organizations (Arrow, 1962). To ensure that these funds are utilized only for productive purposes, an administrative agency, consisting of delegations from all funded countries, must be set up to discuss their problems and developments. Setting up such a body, will not only help in checking the appropriation of funds but will also help to create an environment of healthy competition between the developing nations. This will hasten the process of development and will ultimately result in a world devoid of any threat from food shortage.

4.4 Amendments to Legislation

There is a roaring debate as to whether IPR's in biotechnology should exist or not. There is a huge concern because, by providing IPR's, the government is monopolizing the development in that field. However, IPR's serve as an important tool in bringing forth these inventors to invest in their findings, which will ultimately benefit the world at large. Furthermore IPRs also help to preserve the interest of the inventor by preventing other firms from copying the invention (Ahuja, 2009). However, according to the current laws in place a very obvious fallacy exists. This fallacy is with respect to the time period of these rights. One has to understand that twenty years of monopolizing an invention is not really a good idea. In a fast developing world like today's, monopolizing development in a particular field, is not really the right way ahead. Protecting the interest of the investor is one thing and putting a full stop to development is another. The law should be such, that it strikes a balance between the two. This can be done, by making a few amendments with respect to the current regulations regarding IPR's. Twenty years of protection is quite unreasonable in today's times, as a large part of society is in need of such technology. Furthermore, according to sociological jurisprudence, when a conflict between individual interest and societal interest exists, then the law should be framed in a manner that protects the society over the individual. Thus the government has to keep the societal development at a higher pedestal compared to individual interests (Merges & Nelson, 1990). To resolve this issue, the government can reduce the term of protecting patented rights, from 20 years to 10 years or less. By doing this, the government can protect both societal and individual rights. A period of ten years, will serve as enough time for the private firms to collaborate with the domestic agricultural agencies, and experiment the practicality of their investment in the respective markets (Ahuja, 2009). This time period will also help the private companies to ensure that their prospective markets possess the required technology to sustain their invention. On the lapse of this time period, depending on their success, technology, markets of investment and methods of production, other companies can also invest in the same technology. This will ensure that the benefits from their invention are spread far and wide. Nevertheless, in ordered to protect the inventor company, a small portion of the profits earned by other firms should be appropriated to the founder company, for the remaining ten years. This will make the current system more harmonious.

4.5 Checking Corruption

Corruption is yet another issue that needs attention. In the years 2003-04 the average monthly farm income in India was Rs 2115 per family, which may have risen in 2011 to Rs 2400 per month. A major portion of this money is pocketed by middlemen and the distributors (Sharma, 2011). Black market seeds continue to be a huge problem on many countries. These seeds lack performance and are sold, tax free. Moreover, these seeds deter the profits of the investors, hence staining the investment friendly environment of the markets. Another problem is with respect to the funds that the government has allocated towards agriculture (Seltz, 1998) There is always a probability that some of these funds could be misappropriated for unlawful purposes. To tackle his issue, the banking system needs to be strengthened. Having a national rural bank with local branches will substantially reduce the number of middlemen in these funding agencies. The idea is to minimize the influence of the administrative wing of the government in funding agricultural development. Every decision or project, laid down by the finance ministry or the agricultural board, should be made known to the

public (Ravindran, 2007). The consent of the public must be taken before taking any step in this direction. Creating a system that recognizes the right to information is key, as it helps make the government more accountable. Loans provided for productive purposes, should be done at a low rate of interest. To ensure the productivity, the bank can issue cheques instead of hard money. These cheques should be open and must be printed exclusively for the rural agriculturalists. The cheque should be filled in only to a limited fixed amount of money. The cheque should be encashed by the drawer only on providing a proof (bill, receipt, etc) that the cheque has been used for productive purposes only. Productive purposes may include expenditure on seeds, fertilizers, tools, raw materials, machinery, etc. Awareness programs should be conducted to keep the farmers informed about the banking system and the recent developments in technology.

5.0 Conclusion

A few centuries back, India was known worldwide as a brilliant agricultural economy. Even post-independence, India was heavily dependent on agriculture as a source of income. However, the Green Revolution in 1984 helped revamp Indian agriculture in the past few decades. However with the introduction of biotechnology in the market, India is again lagging behind.

What was once a revolution in 1984 has now become obsolete. Thus Indian agriculturalists along with the government have to focus on improving the scenario in India and open themselves up to private players in the global market. Bt. Cotton and Bt. Brinjal have been success stories in the past. This clearly goes to prove the benefits of such government-private partnerships. It is time for India to widen its horizons and secure tomorrow's farmers.

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