



The Impact of the World Trade Organization on the Indian Agriculture Economy, with special Reference to TRIPS

Anil Kumar¹, Poonam², Prof. Dara Singh³

¹Research Scholar, Department of Economics, Kurukshetra University, Kurukshetra Email id: anilkumar.kumar1795@gmail.com

²Research scholar, Department of Economics, Kurukshetra University, Kurukshetra. Email id: nimbriapoonam@gmail.com

³Professor, Department of Economics, Kurukshetra University, Kurukshetra Email id: dsingh@kuk.ac.in

ABSTRACT

As a consequence of increasing patent consciousness and shifting conditions brought about by the WTO, Indian patenting has quadrupled in the country. Intellectual property rights ownership is a critical aspect in determining the success of any technical breakthrough brought to market. It enables technical growth in order to sustain the country's industry. Agriculture's inventions include new plans, animal kinds, new treatment procedures, and novel crops that provide food. This paper examines developments in agricultural patents filed or owned by India. This also contains patents submitted by international businesses with operations in India. The nature of the innovative activity and the category of assignees were then used to assess these patents. Patenting efforts have been directed by foreign commercial firms.

Keywords: WTO, Intellectual Property-Rights (IPRs), Trade Related intellectual property rights (TRIPS), Patent Assignee, Convention on Biological Diversity.

JEL Classification: D23, F13, F15, F43, O34, O24, Q17

Introduction

Developing nations have a lot riding on ensuring that agriculture, their basis for life and progress, is given its appropriate position in international contexts dealing with global accords promising to increase their agricultural technology skills, cost of production, and access to markets. The WTO is accountable for founding a new global trading system that benefits all stakeholders. It is formed up of a variety of multilateral agreements, the majority of which have an impact on agriculture. There have been few efforts to bring these agreements together, analyze their respective contributions, and establish policies that would result in economic improvements for nations whose principal source of income is agricultural. While there are numerous measures in the multiplicity of international accords to ensure fairness when dealing with agricultural concerns, what is required is their right interpretation and successful execution. Because national laws continue to take precedence even after membership to international accords, member states must consider and enact equitable legislation within the context of their international duties and commitments. The deadlock in the finalization of the Doha Development Agenda (DDA) is partly due to the stubbornness of certain WTO members due to increased focus on protectionism, notably in agriculture, to favor domestic farmers at the expense of international communities. Early settlement of these difficulties is improbable as long as there is no attitude adjustment on these topics. The proposed strategy aims to make Indian agricultural sector not only more viable globally, but also more incremental domestically, by leveraging expertise as a crucial weapon to ensure that agriculture perpetuates the livelihood of millions of household dependents while also being environmentally sustainable. The essential point is that India as a country should not approach WTO problems as if it will always be an importer with no real intellectual property to offer the international market. Those who question the notion of intellectual property rights (IPRs) may not have been accustomed to Indian society's imaginative potential. Over the last ten years, the Honey Bee network has proved, via its data base of about 10000 records of inventions and excellent instances of conventional wisdom, ideas, and the practices, the enormous the impact that grassroots innovators can have to this notion. Add to this the potential of Indian scientists, and one can see why trade related intellectual property rights (TRIPs) beneath WTO may really make research and development in the official and unofficial sectors the center of our society's socioeconomic development. True, India must negotiate adjustments to TRIPs to accommodate our needs. However, because we are members of the WTO, we can advocate for these improvements.

Objective

The study's objectives are as follows:

- To examine the WTO's role in Indian agriculture and biodiversity.

- To examine the trend of patenting activities in several fields of agriculture in India from 2007 to 2018.
- Examine the upsurge in Indian agricultural patenting activities.

Review of literature

Khan (2001) The exposure that India received with the implementation of the Agriculture Agreement revealed that it has not forfeited on its responsibilities and undertakings under the Agreement, but instead has exceeded the Uruguay Round (UR) criteria. This was discovered as a result of India's participation in the implementation of the Agriculture Agreement. However, India has not been able to take advantage of the benefits promised in terms of development in exports and agriculture since developed countries have increased the amount of protection and subsidies they provide. It is prudent for India, as well as the Cairns Group, to support the liberalization of agricultural trade more quickly.

Swaminathan (2002) "Why Indian Farmers Need WTO" was used to discuss the Indian agriculture situation. The current agricultural problem in India is one of surplus output rather than a lack of productivity. We have a food grain mountain of more than 60 million tonnes, as well as a sugar mountain. The transition from scarcity to abundance should have resulted in India becoming a major agricultural exporter. Instead, Indian farmers are enraged and depressed. Exports have been curtailed since global agriculture prices have been decreasing over the past two decades. It demonstrates that the price of rice fell from \$571/tonne to \$179/tonne between 1980 and 2001, while the price of wheat fell from \$219/tonne to \$131/tonne. Cotton, sugar, coffee, soyabean, maize, tea, rubber, cattle, coconut oil, and palm oil are all experiencing the similar step downturn. This occurred because every government in the world has heavily subsidized agriculture for so long that surpluses have accumulated everywhere. People spend a lesser proportion of their money on food as their income grows. Meanwhile, the global spread of new technologies has transformed agriculture output. The result has been an increase in surpluses. Some nations have expanded into non-traditional crops, resulting in further surpluses. However, enormous subsidies in Europe, the United States, and Japan continue to be the root source of oversupply.

Rajendran (2013) has discovered that India's commerce volume is gradually expanding. At the moment, we can assess the impact of rising Indian international commerce on three critical and interconnected areas: environment, food security, and the water. The study of the influence of international commerce on these places is urgently needed for the mentioned reasons: Food security is jeopardized by sluggish food production, declining the food production area, slowing down the yield of food crops, general slowing in agricultural growth, and a rise in absolute population and food grains demand. In recent years, water availability per capita has decreased drastically, and major water disputes have occurred among industries that are water-using.

Mousavi et. al. (2013) used time series data from 1980 to 2010 to study the causal links between agricultural production export quantity and the real exchange rate in India. All of the macroeconomic series utilized in this analysis are nonstationary, order one level integrated, but not co-integrated. Co-integration analysis was used to investigate the long-run links between currency rates and agricultural exports. A Granger-causality study was performed to see whether one indicator had any potential predictive power for the other. The results reveal that there is no substantial association between agricultural production export quantity and the real exchange rate. Similarly as we talk in the other words, neither variable causes the other in any direction. The findings also show that the parameters are not co-integrated, indicating that agricultural exports and Indian exchange rates have no long-run relationship.

Singh, K. K. (2016) Since agricultural biotechnology IP protection is evolving, regulatory ambiguity remains. However, more instances are raising the same problem, so we can test the legal framework and see how well it reflects reality. How intellectual property and agricultural regulations effect biotechnology is still unclear. Competing regulatory systems entangle seed price fixing, genetic traits, licencing mechanisms, and commercial agreements. Some laws are in peril because their intended purpose and application are being compromised, something legislators never intended. This lack of clarity may deter Indian entrepreneurs from using their IP and being inventive. Farmers and breeders' dedication to seed production makes agricultural biotechnology unique, but it requires efficient intellectual property protection like other technological domains to introduce new varieties, improve innovation quality, and protect investments. India's agricultural biotechnology innovation framework lacks market- and science-based strategies. Nation IP policy has yet to be tested in practice.

Venkateswaran et. Al. (2022) The purpose of using the Garret ranking method was to identify the factors that impact the decision of scientific institutes and organizations to seek patent protection for their ideas. When it comes to protecting their ideas from imitators, scientific organizations and institutes put the importance of being oblivious or irrelevant to their job minimize. Factor study revealed that scientific institutions and organizations face many challenges while trying to patent their ideas. These include legal and economic concerns, restrictions based on resources and processes, monetary considerations, and issues based on uncertainty. The measures that the proper authorities should do to encourage scientific institutes and organizations to patent their inventions have been brought to light by these factors.

Shendekar et. (2023) A complex ecosystem with global consequences on innovation, sustainable development, and food security has been found in agricultural IPR research. This research covers all intellectual property rights issues, from biopiracy to patents and plant variety protection. IPRs may foster new agricultural technologies, but farmers' and indigenous peoples' rights are hurdles.

Sekhar et al. (2024) Intellectual property rights (IPRs) empower farmers and support rural development. Intellectual property rights allow farmers to control and benefit from their discoveries, traditional knowledge, and genetic resources. This tendency toward R&D expenditure improves agricultural practices, yields, and living circumstances. In addition, IPRs may assist rural communities generate money and avoid poverty. IPRs enhance local economies, innovation, and entrepreneurship in agriculture.

Indian Agriculture

Agriculture is at the heart of the Indian economy. In terms of agricultural production, India ranks second in the world. More over half of the population is employed in the rural economy. Agriculture contributed approximately 17.3 percent of GVA (Gross Value Added) in 2016-17. Almost 3/4 of all landholdings are less than 2 hectares in size, making them scattered and small. Resources for irrigated agriculture are limited; just 35% of all agricultural land is irrigated. Development costs are less developed. As a result, crop output is poor, Rice production is around one-third that of the United States. These small landholder farmers with low income require government assistance due to insufficient irrigation infrastructure and comparably less developed production inputs (electricity, fertilizer, seeds). Historically, Indian agricultural policy has tried to maintain food costs low for end consumers while incentivizing production through domestic support and subsidies. India's agriculture strategy has been a success. India transitioned from a food deficit to a food surplus despite an expanding population (from 1950 to 2012, India's population rose nearly fourfold, but food production increased fivefold, making India the world's sixth largest net exporter). India's population is growing at a pace of 1.5% per year and is currently 1.3 billion strong. According to the 2015 GHI Report, India is one of the leading countries in terms of severe hunger. The Indian government signed the National Food Security Act (NFSA) in 2013 to guarantee that government subsidized cereals are available to two-thirds of the population. Every month, the Public Distribution System will deliver five kilos of food each individual at a significantly subsidized rate. Meeting this aim and providing food availability for the Indian people is a big undertaking and a responsibility of the Indian government. It is imperative to provide domestic aid to Indian farmers given the status of Indian agriculture today. Poor nations have always advocated for a "food subsidy box" exempting domestic aid from Permissible Subsidy computations. Unfortunately, the World Trade Organization has concluded that such a box cannot be established. It is concerned that if the green box is manipulated with, the further actions stated in the box would be regarded useless and difficult to accomplish. Furthermore, inventories obtained for food security may wind up on the global market, affecting international commerce.

WTO Agreement's Effect on Indian Agriculture

Farming is the ancient culture in all of human history. Agriculture has been practiced in India for over ten thousand years. The World Trade Organization (WTO) is the forerunner of the 1947 General Agreement on Tariffs and Trade (GATT). GATT hosted eight rounds in all. The WTO Agreement on Agriculture, often known as the "International Treaty," was one of the key agreements reached at the Uruguay Round, in which 123 nations took part. The goals of WTO laws are to promote free and liberal commerce. However, this principle was often misapplied. Exporting nations began dumping their products in importing countries, posing a severe danger to emerging countries' economies, particularly India's agriculture. The Indian economy has changed dramatically since the establishment of the WTO. The WTO Agriculture Agreement has had a significant influence on Indian agriculture, which India has felt multiple times. The Competitive Agricultural Markets (CAM) hypothesis was incorrect. Agricultural exports were dominated by the few huge corporations and trading representatives. Cheap imports have repeatedly struck Indian markets, sending shockwaves through agricultural producers. Because of the lack of openness during discussions, the latter consequences of WTO rules were authoritarian. Other factors contribute to India's low productivity. Except for the rice industry, India is a minor player in the worldwide market. The WTO Agriculture Agreement has both positive and bad implications for Indian agriculture. Because agriculture employs over half of the Indian population, overall export - import of agricultural goods is directly or indirectly influenced by WTO rules. As a result, WTO standards play a crucial role in strengthening the socioeconomic conditions of rural Indians. Indeed, WTO laws have an impact on the Indian economy, either directly or indirectly.

Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)

Trade-related intellectual property rights (TRIPS) are another key accord under the WTO framework. The owners of the patented items have the sole right to utilize it under this agreement. Over the last two decades, international laws aimed at preserving intellectual property rights (IPRs) have undergone significant modifications. Patent, copyright, trademark, and other types of intellectual property rights (IPRs) protection rules have become a typical element of global trade agreements. When it comes to intellectual property rights (IPRs), the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) is the international agreement that has you covered. Some ways in which the impact of TRIPS on the regulation of IPRs might be seen are illustrated below. A minimum of 20 years of patent protection across all technological disciplines is mandated by TRIPS for all member countries. The result is a rise in the number of patent applications and approvals around the world as creative types look for ways to safeguard their work and gain an edge in the global marketplace. Trademarks: Under TRIPS, all signatory nations must establish lawful means to register and enforce trademarks. As a result, there has been a global rise in the number of trademark registrations, as businesses recognise the need of safeguarding their names and images. Protection of original works after the creator's death is mandated by the TRIPS agreement's copyright clause. Because of this, there have been more copyright conflicts and legal proceedings taken to safeguard creative works like books, songs, and movies. Geographical indications are marks used to identify items that originate from a specific geographic region and have unique features or characteristics, and TRIPS requires member countries to protect these indications. The pharmaceutical patents: TRIPS has been a controversial issue in the area of pharmaceutical patents, as it has been accused of restricting access to affordable medicines in developing countries. This has led to an increase in the recognition and protection of traditional products and cultural heritage, such as Champagne and Roquefort cheese. Members of the agreement are obligated to offer at least 20 years of patent protection for newly developed pharmaceuticals. This has increased the cost of proprietary medications and made it difficult to obtain low-cost generic alternatives. Significant changes have been made to the way intellectual property is governed as a result of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). While it has laid the groundwork for safeguarding the interests of creators and innovators, it has also been criticized for its potential to limit poor people's access to life-saving medications and other necessities. Trade Related Intellectual Property Rights (TRIPS) has been the

subject of ongoing debate among policymakers and stakeholders in the international trade community. Most notably, Throughout the multinational trade discussions known as the Uruguay Round (1986-1994), members of what is now the World Trade Organization (WTO) agreed to the Protocol on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which defines basic protection criteria that the majority of the world's economies must adhere towards. Further global Several bilateral and regional trade treaties, as well as a number of intergovernmental agreements negotiated under the auspices of the global Intellectual Property Organization, have set IPR standards (Carsten and. Maskus, 2005).

Biodiversity, Climate Change and Agriculture: Interface between TRIPS and CBD

The Convention on Biological Diversity (CBD) and the Agreements on Trade-Related Aspects of Intellectual Property Rights (TRIPS) are incompatible. Most analysts believe that there is no contradiction between the two accords, and that CBD has complimented TRIPS by including safeguards to preserve a member country's sovereign rights and assets, even if they are of naturally derived. However, there has been a delay in ensuring that the essential precepts represented in this Agreement are followed. One of the primary objectives of CBD was to secure the preservation of biodiversity in order to preserve the environment, on which human and animal existence depends. For illustration, in 2002 in Hague, WTO members have agreed on a goal date of 2010 for significantly decreasing global biodiversity loss. In actuality, it is estimated that approximately 13 million of hectares of the forest ecosystems are lost each year due to forest degradation, with climate change posing further concerns. The link between biodiversity and climate change has been estimated (although informally) to suggest that for every 1° rise in global mean surface temperature, 10% of species examined thus far face an increasing danger of extinction. As a result, climate change has a significant impact on agriculture and food supply. When you consider that nearly 75% of food crop kinds that were available and cultivated by man have perished in the previous 100 years, and that 90% of human food demands are fulfilled by a mere 30 crops, the severity of the situation becomes clear. The same may be said for cattle. 21percent of total of the 7000 cattle breeds are threatened, as are marine bio-resources. Such widespread depletion of biological resources is unavoidably going to have a significant influence on agriculture and food security in the future decades and millennia. It remains to be seen how far biodiversity conservation legislation can go in preventing big disasters.

Conventional Biological Diversity and India:

The United Nations Convention to Combat Desertification (UNCBD) was one of two historic binding agreements reached at the Earth Summit in 1992. As for the other, it was the United Nations Framework Convention on Climate Change.

At the Earth Summit in Rio de Janeiro, Brazil, on June 5, 1992, countries negotiated and signed the Convention on Biological Diversity (CBD). On December 29, 1993, the convention officially entered into effect. On February 18, 1994, India formally joined the treaty as a signatory. There are now 196 signatory states to this convention.

The convention's overarching goals include the protection of species and ecosystems, the promotion of sustainable use of resources, and the "fair and equitable sharing of benefits" resulting from the use of traditional knowledge and materials. In this case, the UN Environment Programme is responsible (UNEP).

According to the CBD, manufacturers from both developing and developed nations may use manufacturing standards tied to eco-labels as a means to expand their access to green consumer markets. The CBD's Article 11 mandates the creation and implementation of incentives for conservation and sustainable usage, and the Parties are starting to work together to meet this stipulation.

India stands out as a mega biodiversity nation. Despite covering just 2.4% of the Earth's surface, it is home to 7-8% of all known species. The agricultural variety of India is well-known; the country is home to countless kinds of plants, animals, fish, and microorganisms. Approximately 46,000 plant species and 81,000 animal species have been recorded in India, according to the country's respective botanical and zoological surveys. India has an abundance of biological resources and a wide range of ecosystems, making it one of the world's most ecologically diverse nations.

From October 1-19, 2012, Hyderabad, India played home to the eleventh meeting of the Conference of the Parties (COP 11) to the Convention on Biological Diversity (CBD) and the sixth Meeting of the Parties to the Cartagena Protocol on Biosafety (COP/MOP 6). On September 11, 2003, India joined the Cartagena Protocol on Biosafety as a Party after signing the document. In addition, in December of 2014, India accepted the Cartagena Protocol on Biosafety's Nagoya-Kuala Lumpur Liability Redress Supplementary Protocol.

India's Biodiversity Regulations and Policies: The Constitution of India (Article 48A2 and Article 51(A)(g)3) enshrines a commitment to environmental protection that is grounded on indigenous knowledge systems and practices. The Indian Forest Act (1927), the Wildlife (Protection) Act (1972), the Forest Conservation Act (1980), the Environment Protection Act (1986), the Biological Diversity Act (2002), the National Forest Policy (1988), and the National Wildlife Action Plan (1999) are all important pieces of legislation that protect and promote biodiversity (2002-2016). In 2003, the government established the National Biodiversity Authority (NBA), a statutory body; in 2006, it enacted the National Environmental Policy; in 2008, it released the National Biodiversity Action Plan (NBAP); and it released the National Action Plan for Climate Change, an additional point to the NBAP (2008)

Some values are identified and actions are made in order to build national action plans for conventional biological diversity and to maintain biological variety.

Proclaiming the inviolable worth of natural variety, admitting that protecting biodiversity is a top priority for many people, Responsible for ensuring the State's biodiversity is preserved and that it is used in a responsible manner, Recognizing the State's right to protect its biological resources under its

Sovereignty, applying a policy of extreme care to the protection of species diversity, The importance of women and local communities is emphasized. The loss of biodiversity in the area may be slowed by helping poor nations get access to technology and by finding ways to provide fresh, extra funding.

Biological Diversity Act, 2002 (BDA) Equitable benefit sharing from the use of biological resources is established by the National Biodiversity Authority (NBA). An applicant must pay a fee for the commercial use of a genetic resource, with 95% of that going to the local and indigenous population. Those who work to preserve biological resources and such who generate and disseminate information about those uses are referred to as "Benefit Claimers" under BDA. The advantages could be monetary or abstract.

Indian Agriculture and TRIPS

The TRIPs agreement would necessitate considerable changes to our country's patent framework. The TRIPs agreement attempts to deliver a basic level of intellectual property protection. A number of prerequisites must be met for the TRIPs agreement to be implemented successfully. Legal, administrative, and institutional changes are critical, as are adequate research funding and first-rate scientific and technological capacity. TRIPs can support innovation, technology transfer, foreign direct investment, genetic resource exploitation, and environmental protection if IPR protection is appropriate and effective (globally). The economic advantage of a protective system far outweighs its expenses. While constitutional measures are required for venture formation and information exchange, it is far from sufficient, given the importance of a plethora of other factors impacting research investment, transfer of technology and dispersion in DCs, and the capacity to absorb gains from new rules of the system. A country's capacity to convert from a technology importation to a technology generator will be a key predictor of its position in the global hierarchy. Large investments in research and technology are required for foresight, with an emphasis on excellence and cutting-edge sectors.

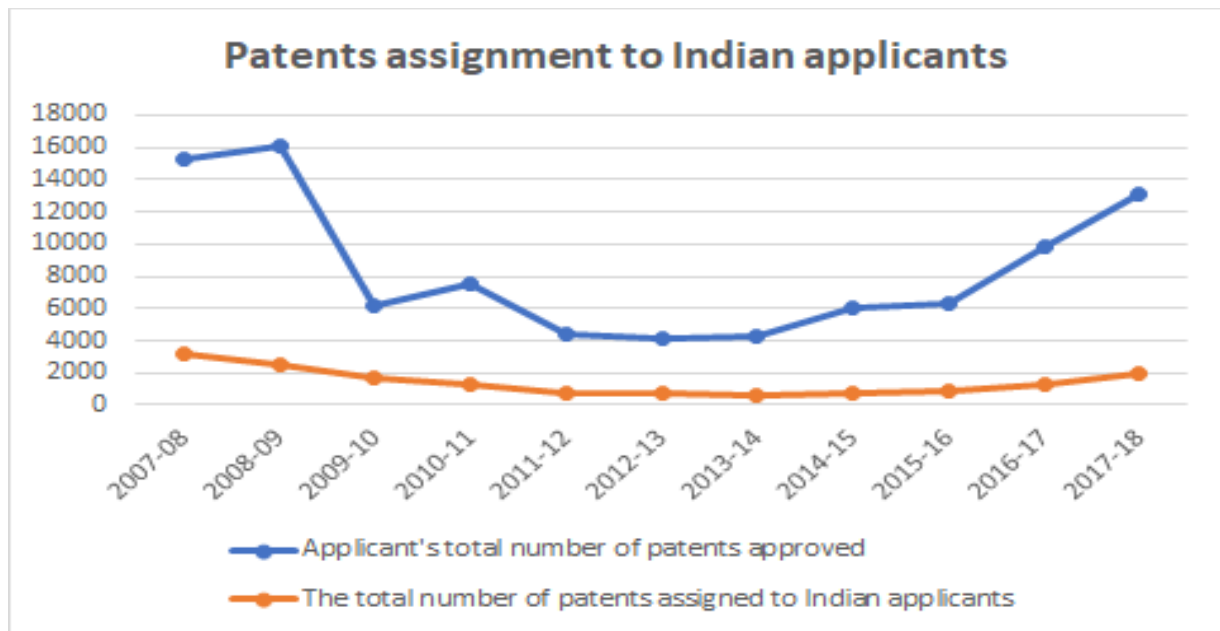


Fig 1 Sources: Compiled from CGPDTM Annual Reports, 2007-2018, <http://www.ipindia.nic.in> (<http://www.ipindia.nic.in/>)

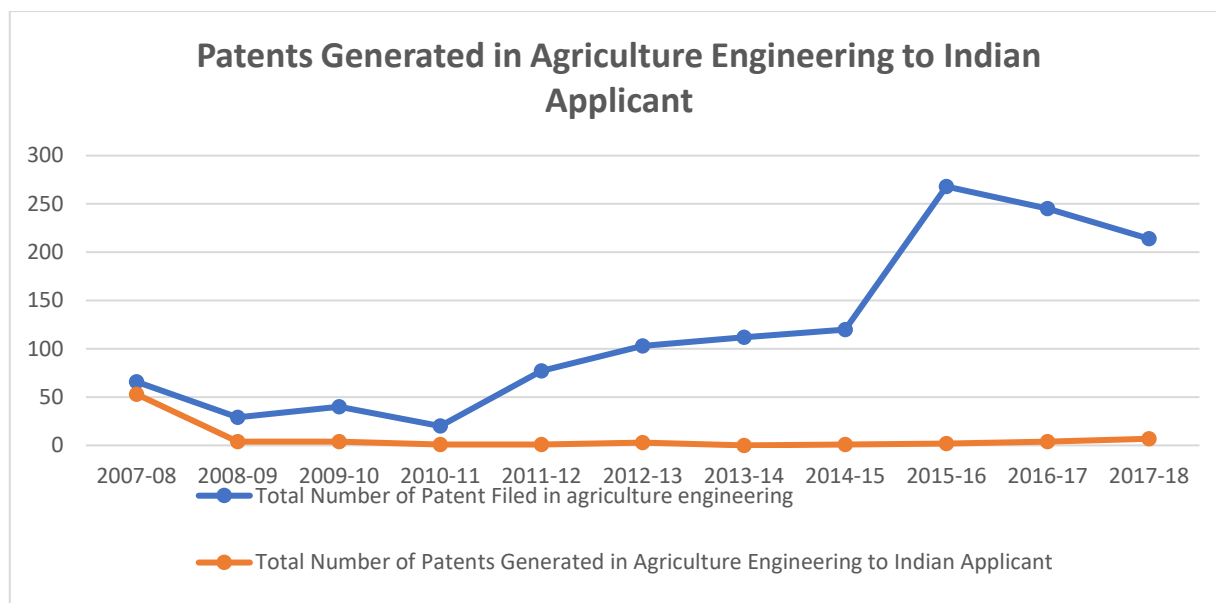


Fig 2 Source: Compiled from CGPDTM Annual Reports, 2007-2018, <http://www.ipindia.nic.in> (<http://www.ipindia.nic.in/>)

These statistics reveal patterns in the overall number of patents granted to Indian applicants, the overall number of patents submitted for the field of agricultural engineering, and the overall number of patents produced for Indian applicants within the field of agriculture engineering. A look at the patterns of patent assignments to Indian applicants may be seen in Figure 1. From 2007–08 to 2017–18, these tendencies are shown. At first, the overall number of approvals for applicants goes up, but later on, it goes down. An rise in 2016–17 is accompanied by a decrease in the overall number of patents granted to applicants from India. Fig. 2 shows how the overall number of patents in agricultural engineering for Indian applicants has been trending over the last several years. In the first several years of patenting agricultural engineering, Indian applicants saw a precipitous drop. Subsequently, the quantity of the same increased during the period of 2017-18.

Conclusion

In order to remain in this competitive period, India's agriculture sector is facing significant problems. Unfortunately, India is currently unprepared to confront WTO challenges. The farming community in India is not completely aware of the global advances. Farmers' illiteracy is a key barrier to the availability of knowledge regarding WTO laws and regulations. However, it is essential that individuals understand how to compete in the globe under the WTO rules. Given the dearth of modern technology, infrastructure, and pre-requisites, the global landscape has created a competitive and attractive environment for India's agriculture industry, which must be addressed with greatest seriousness. The chances of India gaining a portion of South Asian rice markets are slim since the sticky rice type favored there is not grown in India. Furthermore, quality concerns may hinder India from acquiring market dominance in this region. Most developing nations, including India, are suffering from a severe lack of technical competence and infrastructure necessary to meet WTO standards and expectations. The industrialized countries will not accept any agricultural goods that do not meet WTO nutritional standards. To meet these requirements, the government need highly qualified workforce in all sectors of the economy. As a result, we will be unable to function successfully in the WTO environment unless we make significant investments in training our human resources and developing a network of ISO accredited laboratories. It is imperative that such a network be established without further delay. This necessitates structural adjustments at the institutional level.

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