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Review Article

Intellectual Property Rights and the welfare effects on Agriculture Research: A Review

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Abstract

The profound changes that have affected agriculture in modern times are perhaps best illustrated by the evolution of production techniques due to mechanization, new chemical inputs such as herbicides, pesticides and fertilizers, genetic selection of crops and animals, new crop varieties, and countless other technical and organizational improvements. These innovations have allowed a generalized increase in physical output while, at the same time, agriculture has suffered a massive exodus of labour forces towards the non-farm sectors. Indeed, a stylized fact of developed countries' post-war growth is that productivity in agriculture has grown faster than in other sectors. This remarkable record naturally begs the question of what is at its root, and a view that commands considerable consensus is that agricultural productivity growth is due to (past) investments in scientific research and development (R&D). It is argued that the conventional assumption of competitive pricing cannot hold when new technologies are produced by private firms because such innovations are typically protected by intellectual property rights (such as patents) that confer (limited) monopoly rights to discoverers. The review summarized the intricate relationship between IPR and research and development and tools for effective IPR management and policy considerations. Overall, the IPR in agri-food sector literature offers diverse, sometimes conflicting views with limited empirical research. As a result, further comprehensive empirical investigations are required to understand the subject and better inform policymakers.

Keywords: *Intellectual property rights, agricultural sector, agricultural industry, agricultural research and biodiversity conservation.*

Introduction

Intellectual property (IP) refers to the creations of the human mind like inventions, literary and artistic works, and symbols, names, images and designs used in commerce. Intellectual property is divided into two categories: Industrial property, which includes inventions (patents), trademarks, industrial designs, and geographic indications of source; and Copyright, which includes literary and artistic works such as novels, poems and plays, films, musical works, artistic works such

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as drawings, paintings, photographs and sculptures, and architectural designs. Rights related to copyright include those of performing artists in their performances, producers of phonograms in their recordings, and those of broadcasters in their radio and television programs. Intellectual property rights protect the interests of creators by giving them property rights over their creations. The Advent of WTO The recognition of agriculture as a rule-bound enterprise of investment and profit making became obvious with its inclusion in the intergovernmental negotiations for the General Agreement on Tariffs and Trade (GATT) for the first time in the Uruguay Round (1986-1994). This round led to the establishment of the World Trade Organization (WTO) in January 1995. Now, the WTO has at least half a dozen intergovernmental agreements that directly affect agriculture. These are, Agreements on Agriculture (AoA), Applications of Sanitary and Phytosanitary Measures (SPS), Technical Barriers to Trade (TBT), Anti-Dumping, Subsidies and Countervailing Measures, Safeguards, and Trade Related Aspects of Intellectual Property Rights (TRIPs). An understanding of the implications and the application of these agreements, particularly the TRIPs, has become more important than ever before at every stage of planning, research, upscaling and commercialisation of agricultural technologies.

Fig 1: Symbols of Intellectual Property Right

The TRIPs Agreement is covered in an elaborate document—comprising 73 articles in 7 parts, namely, (i) General provisions and basic principles, (ii) Standards concerning availability, scope, and use of IPRs (iii) Enforcement of IPRs, (iv) Acquisition and maintenance of IPRs and related inter partes procedures, (v) Dispute prevention and settlement, (vi) Transitional arrangements, and (vii) Institutional arrangements. There are seven forms of intellectual property rights recognised in the TRIPs Agreement. These include, Copyright and related rights, Trademarks, Geographical Indications, Industrial Designs, Patents, Layout-Designs (topographies) of integrated circuits, and protection of undisclosed information. This agreement also covers provisions related to control of anti-competitive practices in contractual licences, although, it does not directly relate to IPR. In days to come, when application of various forms of IPR in different areas of agriculture is put to practice, we may face serious problems unless timely remedial measures are taken, awareness is brought out and also due emphasis is given on IPR literacy, higher education and capacity building in the country. Following establishment of the international institutional mechanisms, such as, the Convention on Biological Diversity (CBD) and the WTO, and further,

signing of International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), the growing importance and the global scope of IPR in agriculture are well realised and recognised.

Fig 2: Signs of Intellectual Property Rights

The IPR, after long debate, is recognised as an asset and means of rewarding and harvesting the fruit of agricultural research and development. Recognition of intellectual property rights provides an effective means of protecting and rewarding innovators. This acts as a catalyst in technological and economic development. The essence of regulation of IPR by law is to balance private and public interests. At the same time, equitable benefit sharing is, although, agreed upon under the CBD, is yet to be realised in effective terms. Global and National Scope of IPR Broadly, protection of all forms of IPR may be relevant in agriculture but its application has to be limited to the relevant domestic Acts in vogue. Hybrids in plants and animals may be protected de facto by not disclosing the parents, whereas protection for plant varieties may be availed by a sui generis system. The provision for Plant Variety Protection (PVP) made under the TRIPs Article 27.3(b), allows countries to provide such protection either through patent, or an effective sui generis PVP system or any combination of the two. Patents, in India, are so far available to new processes but not to all products per se. In agriculture, patents may be obtained for processes related to agrochemicals, growth promoters and regulators, vaccines, drugs, hides and wool, dairy technology, food technology, fuel and biogas production, bioreactors, standardisation of various laboratory protocols, environment management, etc. Copyrights and related rights, on the other hand, may be registered for databases, bioinformatics, genes and gene sequences, amino acid sequences, antibodies, etc. Application of industrial designs and the topographies of integrated circuits would be relevant, particularly in agricultural engineering. Nevertheless, in the days to come, IPR is likely to dominate the agricultural scenario irrespective of whether the technology in question is conventional or modern—biotechnology or information technology. Countries are required to enact/amend their domestic laws in accordance with the TRIPs Agreement and the between-country disputes have to be resolved at the WTO platform, according to its dispute settlement procedures. In this context, it is important to have in place well enacted laws corresponding to the different forms of IPR that not only keep in view the basic needs of the country but are also capable of tackling complexities, which might arise at the international level. In India, the Patents Act, 1970, constituted the basic Principal Act on the subject. This Act hardly included innovations in agriculture under the patentable subject matter. In particular, it excluded methods of agriculture and horticulture as well as all innovations in the areas of treatment and protection of plants and animals from pestilence or those aimed at increasing their productivity and value of their pro-

duce. This broad exclusion had historical impact and implications in respect of IPR protection in agriculture in the country. India is bound by all the provisions of TRIPs Agreement, which oblige the country to enact/amend relevant domestic laws. Further, with such shifts in legal provisions and also national policies, increased private participation in agricultural R&D and far more publicprivate relationships, including both competition and cooperation in relevant areas, are imminent. Several legislative and institutional adjustments are being made in the country to gear up and face the challenges of globalisation. These include enactment of new legislations on Protection of Plant Varieties and Farmers' Rights Act, 2001 and Geographical Indications of Goods (Registration and Protection) Act, 1999, and amendment of Patents Act, 1970 in 1999 and 2002. The Biological Diversity Bill, 2000 is in the process of enactment and revision of the Seeds Act, 1966, is also receiving attention. The need to provide for protection in the areas specific to farm animal sector is also being realised. Effective implementation of IPR related legislations in place and those in the offing is expected to have significant impact on the course of agricultural R&D in the country. Therefore, it is considered important to identify and develop various national policy options for addressing the emerging areas of IPR in agriculture, including the access to various protected technologies to the Indian farmers, entrepreneurs and users. It is high time that a critical analysis of the system is undertaken for its strengths, weaknesses, opportunities and threats (SWOT), to convert threats into opportunities and mitigate weaknesses through timely action.

2. Origin of Intellectual Property (IP)

The Intellectual Property (IP) is a term referred to work or inventions that are a result of some individual's original creativity. It basically, means the legal rights arising out of an intellectual activity in any field like literary, industrial and artistic or industrial etc.

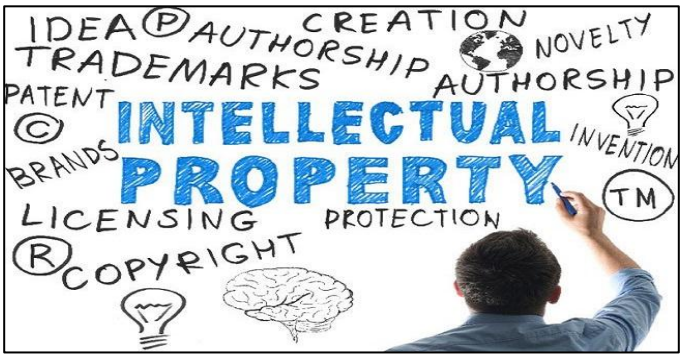


Fig 3: Intellectual Property Rights Signs

It includes the results that are the creations of one's creative mind. Prior to the General Agreement on Tariffs and Trade (GATT), the Intellectual Property and its related rights were not a subject, to any international trade negotiations. There's a long history of the Intellectual Property, which is way complex but, also fascinating. It is traced all the way to 500 BCE, when Sybaris, a Greek State made it possible for the citizens of their state, to obtain a patent for one year, for "any new refinement in luxury". Since, then we can conclude that Patent, Copyright and Trademark laws have become more complicated over the centuries but, the intent remains the same.

The laws and legislation procedures relating to the IPR have their roots in Europe. The trend of Patents started in the 14th Century, they were technologically less advanced than England. However, the first ever known Copyrights appeared to be in Italy where, Venice was considered the cradle of Intellectual Property systems. While, the Patents are about 150

years old concept, as first introduction was based on, the British Patent System. To foster creativity and to ensure the possibility for the inventor to make benefits of their creativity.

3. Introduction to IPR

The Intellectual Property Rights (IPR) are the legal rights that are conferred as an exclusive right, to the creator or the inventor in order to, protect his invention or creation for a period of time. Originally, only patent, copyrights and trademarks of industrial design were protected under the IPR but, now it has a much wider meaning. IPR enhances technological advancement as it's a mechanism of handling piracy, unauthorized use and infringement.

It gives protection to the trade secrets and undisclosed information which are important factors in the industries and the R & D institutions. The Drugs and Pharmaceuticals are the match that requires having a strong IP system as inventing new drugs comes with all associated risks at the developmental stage. Here, competition is driven by the scientific knowledge concepts rather than manufacturing know-how.

The Intellectual Property Rights are the non-fundamental Human Rights which, are open to state interference to fulfil the obligations of the Human Rights. The evolution of the IPR consists of all statutorily recognised rights. The globalization of the Intellectual Property Rights has triggered the debate on the evaluation of the relationship between them and the Human Rights.

According to the IPR, the traditional knowledge is considered to be a huge part of the public regime/domain since, they don't meet the criteria for the protection and security or the private ownership. The holders or owners/creators of the IPR have the ensured monopoly, on the usage of their item, property or research, for a specified particular amount of time.

The Intellectual property rights are important to promote and stimulate research and development. This is to ensure the rights of the individuals and organisations, the protection of their innovative ideas and research and so, they can reap the benefits of their hard work as it is extremely important, for the growth and development of humanity by, efforts of individuals.

The IP empowers enterprises, individuals or other institutes, to exclude others from having the right or using their name without the permission, with their creations/innovations. Thus, it gives the investors, a reasonable reason to return their investment, in the field of research and development. It encourages the disclosure, publication and distribution of the innovative creators, to open their discovery or creation to the public rather, then keeping it as a secret.

3.1. Types of Intellectual Property

1. **Patents –** A Patent is a document issued by the government office, on application request, normally to protect the rights of the new inventions, ideas or scientific processes. The Patent holders are required to pay, periodic renewal fees to the government. Therefore, the approved Patent is for a limited period of time only.
2. **Copyright –** It covers all the literary and artistic works including novels, plays and poems, films, music, architectural designs or photographs etc. It deals with the rights of the intellectual

creators and also, include the rights of the creator/inventor and those of performers, producers and the broadcasters as well.

3. **Trademarks –** They specifically protect the colours, sounds, designs, phrases or symbols of individual's creative creation. It indicates trade origin and the source of the trademark owner. It gives the licensor, the ability to control the permission, marketing, financial arrangements and the quality of his products. They may be granted separately from the Patent and know-how licenses.
4. **Trade Secrets –** The systems, processes, formulas, strategies or any other form of confidential information of any organisation is covered under this. This is majorly to provide these organisations, with competitive advantage in the market as they are vital in the growth of the company.
5. **Statutory Provisions and Legislations.**

The Rights to Intellectual property is inserted in the United Nations Declaration for the Right of Indigenous People (UNDRIP). Particularly, the Article 27 of the UNDHR states that everyone has the right to protect the material and moral interests that are the results of any scientific, artistic or literary production of an author. The Convention Establishing the World Intellectual Property Organization (WIPO Convention) (1967), concluded in Stockholm provides, under its Article 2 (viii) that the IP shall include rights relating to fields like scientific discoveries, industrial designs, literary and artistic works etc.

There are a few international platforms and forums that work for protection and promotion of the Intellectual Property Rights, such as the World Trade Organisation and World Intellectual Property Organisation (WIPO). Furthermore, they do make new laws on IPR and analyse the ways of how these laws can guarantee the protection within the ambit of Human Rights. The Article 2 of WIPO states that IP should include the rights related to the commercial names, literary and artistic works, trademarks and designs against the unfair competition. The importance of the Intellectual Property was first recognised by the Paris Convention for the Protection of Intellectual property (1883) and the Berne Convention for the Protection of Literary and Artistic Works (1886). Both these treaties were originally administered by WIPO. In India, other laws protecting and promoting Intellectual Property Rights are recognised under the legislative statute, such as: –

3.2. The Geographical Indications of Goods (Registration & Protection) Act, 1999

- ***The Patents Act (1970)***
- ***The Trade and Merchandise Marks Act, 1958.***
- ***The Designs Act, 2000***
- ***The Copyright Act, 1957***

4. World Intellectual Property Organisation (WIPO)

The World Intellectual Property Organisation or WIPO is a specialized agency of the United Nations (UN) that was created in 1967 and is headquartered in Geneva, Switzerland. It was created to encourage the intellectual property (IP) protection and to promote the creative activities, all over the world. In simple basis, it is a global organization body that provides global forum for IP services, policies, cooperation and information. There is a strength of 192 members and the motto of the organisation is to promote creative activities and protect intellectual property, all across the world. As far as our country

is concerned, India is a signatory member of the WIPO organisation.

WIPO is a self-sufficient and self-funded agency of the United Nations (UN). The organisations dedicated in working out the balance and developing the accessibility of the IP system then, also reward for creativity and innovation. Hence, safeguarding the economic development while protecting the public interests. The signature feature of the organisation is that it implements administrative functions as discussed in the Berne and Paris Unions. It assists the development of the campaigns, to improve IP protection in the world. Further, it also conducts research and publishes the results of the IP development in the various countries.

The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), 1995 is an international agreement, among the member countries of the World Trade Organisation (WTO). It is related to the aspects of Intellectual Property Rights and sought to standardise the rules and regulations and laws related to the Intellectual property laws. It provides a uniform degree of preservation and protection of the Intellectual property of the citizens of all the member countries and the general public. It mandates that there must not be any discrimination between the intellectual properties created by any citizen of the member countries, to the TRIP's. this provides a minimum standard of protection for the IP hence, the domestic laws of a country can provide a higher degree of protection, on their own.

5. Why promote and protect Intellectual Property?

There are several reasons for promoting and protecting the intellectual property and its related rights.

1. Progress of humanity and the moral good benefit of them, remains in the ability to create and invent new works in the field of technology and culture.
2. It encourages distribution, publication, and disclosure of the creation to the public for their benefit, rather than keeping it a secret and a personal establishment.
3. The promotion and protection of intellectual Property can promote economic development and it may also, generate new jobs and industries. It could improve the quality of life, with the latest new innovations, inventions and creativity.
4. They increase the market value of the creators or innovator's business. It generates huge incomes through the licensing, selling or the commercializing of their products. So, improving the stock market and increasing the profits.
5. The creative and intellectual ideas are converted into profitable assets. The products/services can be commercially successful and may benefit a lot of individuals in the societies, across the globe as it increases the export opportunities for the business.

6. Evolution and Scope of the IPR

The WIPO Programme in the year 1998-99 budget, were initiated to address the growing concerns related to the Intellectual Property Rights, of the indigenous knowledge holders. The Intellectual Property gave rise to duties, specifically for the owner of the IP that are certain functions to be performed by them, in relation to their work or products. The various laws that come under the ambit of Intellectual property umbrella did not emerge or evolve together and they are as a fact, quite dissimilar in many aspects. Thus, the international treaties and agreements

promote the intellectual workers and labours and bring together all the related laws of IP together.

The Intellectual Property Rights are distinguished from other rights because of the nature of intangibility. It ensures the Right to Sue or take any legal action against the person, who gains unauthorised access to his creation or innovation against the property. The scope of the Intellectual Property Rights is a broad one. They help in balancing the nature of innovator's interest and the benefit of the public by, providing them an environment where, innovation, invention and creativity can flourish to the highest and can benefit all. The Intellectual Property systems have a common form of internal appeal procedure against the violators of IPR.

Apart, from the initiatives of Government for training judicial officers in matters such as IPR matters, the laws are also, updated and amended to provide the efficient speedy trials to the citizens. Like in India, The Cell for IPR Promotion and Management (CIPAM), which is a government body works with WIPO and the National Judicial Academy (NJA), India, for organising training sessions and sensitisation programmes on IPR's for the High Court and District Court judges. Thus, ensuring that the law system has a greater understanding on matters like IPR and its assertion in the society. The National Intellectual Property Rights (IPR) Policy, 2016 was a vision project of Indian government, to guide the future developments of the Intellectual Property and its Rights in the country. It seemed to place an institutional mechanism for implementation and monitoring of developments in global as well as national IPR's

7. History and Evolution of Intellectual Property

Intellectual Property may sound like a modern-world invention, but it has actually been around since the development of civilization. Many sources pin the origins of Intellectual Property rights to the year 1421 when the world's first modern patent was awarded to an Italian inventor. However, according to Former Lord Justice of Appeal Robin Jacob, the history of Intellectual Property law can be traced back to as early as 600 BCE. This article explores the documented string of events that eventually led to our modern understanding of Intellectual Property laws, and elevates the conversation to answer a more pertinent question: *So what?*

Expert Insight: Many people shy away from studying history in general, believing that it is just tedious memorization of events based on evidence. While partly true that historians are essentially walking historical records, a significant portion of the practice involves many social applications, sociological methods, and anthropological theories.

7.1. Recognition, But Not Quite Possession: 600 BCE

The earliest records relating to Intellectual Property date back to the 6th century BCE, from Sybaris in Ancient Greece. It supposedly granted a yearlong exclusivity for bakers to make their culinary invention. In a manner of speaking, the rise of Intellectual Property originated from the rising of bread.

Granting exclusive rights is a culture our modern society was born into. However, knowing that it has existed for millennia tells us of our valuation of individual talents. Although the ancient Greeks still considered their inventions as gifts from

the gods, recognizing the human part of the innovation process proves that we are very similar to our distant ancestors.

Expert Insight: In the absence of written texts from prehistory, we can learn social values through artefact's. For instance, remains of animals bearing early forms of branding indicate that early humans attributed produce quality with the method of growing. This idea of adding a separate value on the maker – and, in extension, on how they care for their animals – starkly emulate the modern trademark and patent virtues.

Therefore, identifying the defining moments in the history of Patents, Copyrights, Trademarks, and other protective rights is akin to holding a mirror in front of our society - we are shown a version of ourselves, and along follows the possibility of discovering something previously unbeknownst to us.

7.2. Back step into the Dark Ages

However, the resemblance of our values to ancient views would pause for a long time with the rise of the Roman Empire. Religion came to the fore, and so the individualistic view on creatorship took a back step and remained there since. At around 480 CE, Emperor Zeno overthrew the whole concept of sole proprietorship on artistic and agricultural produce. The Church gained absolute control over the entire Empire.

Nevertheless, through the centuries, religious influence over society waned as humanism remerged through ancient texts. This movement, which in many ways is traceable to Aristotelian and Platonic worldviews paved the way for the Enlightenment. During this period of human appreciation, the first genuinely recognizable iteration of Intellectual Property appeared.

7.3. Let There Be Light

As we collectively emerged from traditionalism during the Renaissance, our appreciation of scientific and technological developments overtook the prevailing dogma. With the influx of revolutionary models of thinking came radical advancements in the field of engineering.

Expert Insight: There was a more significant premium placed on innovations with industrial applications. This is evidenced by the first patent with legal protection granted in 1421 to an Italian inventor. The 1421 license also closely resembles our current patent protections.

However, equal recognition towards works of art would receive legal protection much later during the European Reformation. While publishing guilds were already present before the Reformation, licensing of the written word was an often lopsided agreement.

During 1623, the Statute of Monopolies emboldened select groups of individuals to control their industry. Thus, publishers owned most of the rights associated with authored works. And with the author assuming the losing position, amendments were placed to arrive at the modern version of written word license: the copyright. It was the year 1710 when the Statute of Anne empowered writers with renewable 14-year protection for their original works.

7.4. The New UPC Agreement, the Regulation and Standardization

Now European Patent with unitary effect finally got the final blessing, it is time look into some of the details of the EU Regulation "*Implementing Enhanced Cooperation in the area of the Creation of Unitary Patent Pro-*

tection" 1257/2012 (Unitary Patent Regulation – UPR). We do not mean the unfortunate referral to national law within Art. 5 of the UPR that has previously been called Epic Fail in this blog. Even more interesting is – in particular with respect to a subject we covered many times – "Standardization" – the coming role of the EPO. UPR art. 9 (1) let's assigns a new task to the EPO, receiving and registering licensing commitments undertaken by the proprietor of the European patent with unitary effect in international standardisation bodies. What is it all about?

Standardization is both a blessing and a curse. A blessing, because standardization fosters the worldwide dissemination of unitized technology and thus creates a basis for an extremely vital and successful competition process. A curse, because the frequently unavoidable inclusion of technology protected by IPRs in a standard causes a very unclear liability risk for any implementer of the standard. One refers to an essential IPR if it is not possible on technical (but not commercial) grounds, taking into account normal technical practice and the state of the art generally available at the time of standardization, to implement the standard without infringing that IPR. The proprietor of this essential IPR is therefore able to enjoin any implementer from the use of the standard, even if its patent only reads on a tiny fraction of that standard. That is one of the reasons for the vast number of current IPR disputes in the mobile telecommunications sector.

The Standard Setting Organizations (SSOs) have early introduced the so-called FRAND licensing commitment to overcome this issue. With making this commitment the proprietor of an essential IPR commits oneself to any interested party to license its IPR on fair reasonable and non-discriminatory terms. However, the desired conflict avoiding effect of this commitment has never appeared because of the lack of common rules for determining what FRAND actually means. Thus the proprietor of an essential IPR is further able to make use of the thread of an injunction in order to impose excessive royalties upon the implementers of a standard, without any substantial hindrance and without infringing on its own FRAND obligation.

This background sheds another light to the task assignment in UPR Art. 9(1) lit. c), because UPC Art. 9(1) lit c) sets the registering of the FRAND-Commitment in an immediate connection to the legally binding statement on licenses of right provided by UPR Art. 8 (1). According to that rule an IPR proprietor may file a statement with the EPO to the effect that the proprietor is prepared to allow any person to use the invention as a licensee in return for appropriate consideration.

From this statement it follows that a (contractual) license will come into effect only by a notification against the proprietor and the commencement of making use of the invention. Though, to be clear, such license is not on a royalty free basis rather the licensee must pay a reasonable royalty. But, and that is the crucial point in that matter, the proprietor who made such a statement is no longer entitled to achieve an injunction against the user of its IPR. He is rather limited to the legal enforcement of a reasonable royalty.

Having said that, it is not claimed that the FRAND licensing commitment shall – from now on – have an identical effect like the licensing statement according to UPR Art. 8 (1). It just lacks of a legal basis for doing so. But the immediate and textual connection within the UPR Art. 9 shows that the legislator regards both instruments as similar and thus wants that both instruments are at least similar treated — although only with respect to the register. That could be interpreted as a first step to help the FRAND licensing commitment achieve more effectiveness on a legal basis.

8. Polarizing Intellectual Property

Free thinking gave our society the agency to return ownership of inventions to inventors. But it also opened doors for other schools of thought, and often with cascading ideological implications. For instance, as we learned to value individual talents, we also saw how these talents are made through, and for, society. Whereas previous beliefs invalidate ownership by virtue of religious faith, newer ideologies either: call to consign the rights to the general public, thereby removing profit from the inventor; or advocate for private ownership of an invention.

While equally valid in their own right, these polarized approaches to Intellectual Property are to become the pillars of modern debates. The latter eventually evolved into legislation, while the former defined alternative social ideation.

9. Intellectual Property Act in India

M Elangovan* & P Kiran Babu1 *Senior Scientist & 1-Research Associate, Directorate of Sorghum Research (DSR), Hyderabad 500030 (AP), India Intellectual property (IP) is a legal concept which refers to creations of the mind for which exclusive rights are recognized. Under intellectual property law, owners are granted certain exclusive rights to a variety of intangible assets, such as musical, literary, and artistic works; discoveries and inventions; and words, phrases, symbols, and designs. Common types of intellectual property rights include copyright, trademarks, patents, industrial design rights, trade dress, and in some jurisdictions trade secrets. Various IP laws enacted by the Government of India are listed below. Main IP Laws: enacted by the Legislature (Date of current version) • The Patents Act, 1970 (1970) • Patents (Amendment) Act, 1999 (1999) • Patents (Amendment) Act, 2002 (2002) • Patents (Amendment) Act, 2005 (2005) • Protection of Plant Varieties and Farmers' Rights Act, 2001 (2001) • The Semiconductor Integrated Circuits Layout-Design Act, 2000 (2000) • The Designs Act, 2000 (2000) • Copyright (Amendment) Act, 1999 (1999) • The Geographical Indications of Goods (Registration and Protection) Act, 1999 (1999) • The Trade Marks Act, 1999 (1999) • Copyright Act, 1957 (1999) • Copyright (Amendment) Act, 1994 (1994) IP-related Laws: enacted by the Legislature (Date of current version) • The Cable Television Networks (Regulation) Act, 1995 (2002) • Cable Television Networks (Regulation)

Amendment Act, 2000 (2000) • Cable Television Networks (Regulation) Amendment Act, 2002 (2002) • The Cable Television Networks (Regulation) Amendment Act, 2007 (2007) • The Code of Criminal Procedure, 1973 (2006) • Biological Diversity Act, 2002 (2002) • The Information Technology Act, 2000 (2000) • The Telecom Regulatory Authority of India Act, 1997 (1997) • The Telecom Regulatory Authority of India (Amendment) Ordinance, 2000 (2000) • The Arbitration And Conciliation Act, 1996 (1996) • Drugs and Cosmetics Act, 1940 (1995) • The Cinematograph Act, 1952 (1984) • The Code of Civil Procedure, 1908 (1980) • The Seeds Act 1966 (1966) • The Seeds (Amendment) Act, 1972 (1972) • The Customs Act, 1962 (1962) • The Indian Wireless Telegraph Act, 1933 (1933) • The Indian Penal Code (1860) Implementing Rules/Regulations Intellectual Property (Date of current version) • The Protection of Plant Varieties and Farmer's Rights Rules, 2003 (2003) • Protection of Plant Varieties and Farmers' Rights Regulations, 2006 (2006) • Protection of Plant Varieties and Farmers Rights (Criteria for DUS for Registration) Regulations, 2009 (2009) • The Protection of Plant Varieties and Farmers' Rights (Second Amendment) Rules, 2009 (2009) • Direction of The Telecom Regulatory Authority of India (2008) • Designs (Amendment) Rules, 2008 (2008) • Circular on Implementing the Intellectual Property Rights (Imported Goods) Enforcement Rules, 2007 (2007) • Intellectual Property Rights (Imported Goods) Enforcement Rules, 2007 (2007) • Patents Rules 2003 (2003) • Patents (Amendment) Rules, 2005 (2004) • Patent (Amendment) Rules, 2006 (2006) • Biological Diversity Rules, 2004 (2004) • The Drugs and Cosmetics Rules, 1945 (as corrected up to November 30, 2004) (2004) • The Geographical Indications of Goods (Registration and Protection) Rules, 2002 (2002) • Trade Marks Rules, 2002 (2002) • Semiconductor Integrated Circuits Layout-Design Rules, 2001 (2001) • The Designs Rules, 2001 (2001) • Information Technology (Certifying Authorities) Rules, 2000 (2000) • Copyright Rules, 1958 (1958) • The International Copyright Order, 1999 (1999) 1. The Patents Act, 1970 A patent is a form of intellectual property. It consists of a set of exclusive rights granted by a sovereign state to an inventor or their assignee for a limited period of time, in exchange for the public disclosure of the invention. An invention is a solution to a specific technological problem, and may be a product or a process. The procedure for granting patents, requirements placed on the patentee, and the extent of the exclusive rights vary widely between countries according to national laws and international agreements. Typically, however, a patent application must include one or more claims that define the invention. These claims must meet relevant patentability requirements, such as novelty and non-obviousness. The exclusive right granted to a patentee in most countries is the right to prevent others from making, using, selling, or distributing the patented invention without permission. Under the World Trade Organization's (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights, patents should be available in WTO member states for any invention, in all fields of technology, and the term of protection available should be a minimum of twenty years. Nevertheless, there are variations on what is patentable subject matter from country to country.

9.1. Protection of Plant Varieties and Farmers' Rights Act, 2001

The Government of India enacted "The Protection of Plant Varieties and Farmers'

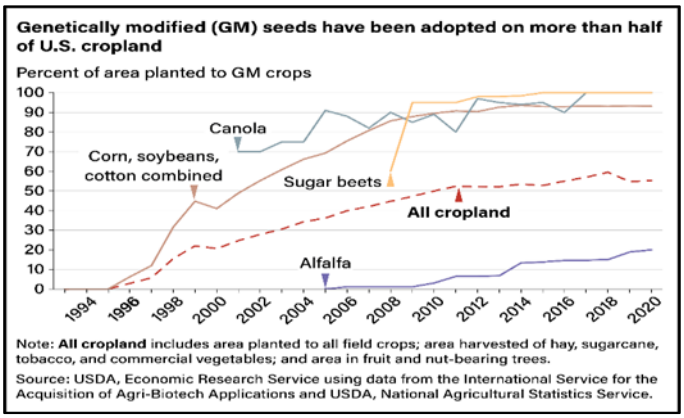
Rights (PPV&FR) Act, 2001" adopting sui generis system. Indian legislation is not only in conformity with International Union for the Protection of New Varieties of Plants (UPOV), 1978, but also have sufficient provisions to protect the interests of public sector breeding institutions and the farmers. To implement the provisions of the Act the Department of Agriculture and Cooperation, Ministry of Agriculture established the Protection of Plant Varieties and Farmers' Rights Authority on 11th November, 2005. The main functions of the PPF&FRA are • Registration of new plant varieties, essentially derived varieties (EDV), extant varieties; • Developing DUS test guidelines • Developing characterization and documentation of varieties registered; • Compulsory cataloguing facilities for all variety of plants; • Documentation, indexing and cataloguing of farmers' varieties; • Recognizing and rewarding farmers, community of farmers engaged in conservation, improvement; • Preservation of plant genetic resources of economic plants and their wild relatives; • Maintenance of the National Register of Plant Varieties and • Maintenance of National Gene Bank.

6. The Semiconductor Integrated Circuits Layout-Design Act, 2000

A common sui generis design right protects the design or topography of semiconductor materials, particularly integrated circuits. These are protected internationally by the IPIC Treaty of 1989, and in the European Union by Directive 87/54/EEC. The reproduction of a protected topography is prohibited, as is the import of infringing materials (Art. 5). Protected topographies may be identified by a capital T in a variety of forms, including T* (Art. 9). The exclusive rights of the designer last for ten years from the first commercial exploitation or for fifteen years from the first creation for topographies that are not exploited (Art. 7)

9.2. The Designs Act, 2000

An industrial design right is an intellectual property right that protects the visual design of objects that are not purely utilitarian. An industrial design consists of the creation of a shape, configuration or composition of pattern or colour, or combination of pattern and colour in three dimensional form containing aesthetic value. An industrial design can be a two- or three-dimensional pattern used to produce a product, industrial commodity or handicraft.

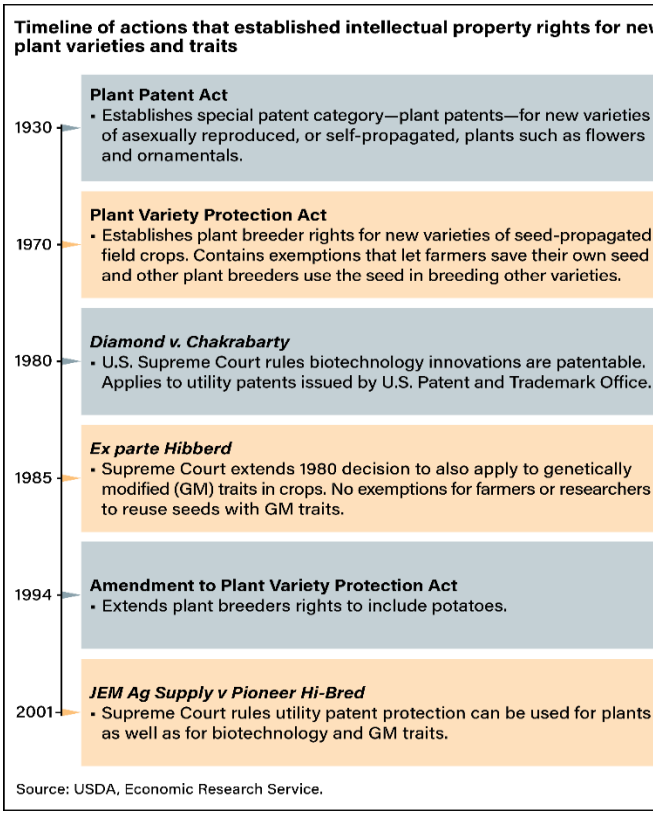


Under the Hague Agreement Concerning the International Deposit of Industrial Designs, a WIPO-administered treaty, a procedure for an international registration exists. An applicant can file for a single international deposit with WIPO or with the national office in a country party to the treaty. The design will then be protected in as many member countries of the treaty as desired. Design rights started in the United Kingdom in 1787 with the Designing and Printing of Linen Act and have expanded from there

9.3. Copyright Act, 1957

Copyright is a legal concept, enacted by most governments, giving the creator of an original work exclusive right to it, usually for a limited time. Generally, it is "the right to copy", but also gives the copyright

holder the right to be credited for the work, to determine who may adapt the work to other forms, who may perform the work, who may financially benefit from it, and other related rights. It is a form of intellectual property (like the patent, the trademark, and the trade secret) applicable to any expressible form of an idea or information that is substantive and discrete. Copyright initially was conceived as a way for government to restrict printing; the contemporary intent of copyright is to promote the creation of new works by giving authors control of and profit from them. Copyrights are said to be territorial, which means that they do not extend beyond the territory of a specific state unless that state is a party to an international agreement.



Today, however, this is less relevant since most countries are parties to at least one such agreement. While many aspects of national copyright laws have been standardized through international copyright agreements, copyright laws of most countries have some unique features. Typically, the duration of copyright is the whole life of the creator plus fifty to a hundred years from the creator's death, or a finite period for anonymous or corporate creations. Some jurisdictions have required formalities to establishing copyright, but most recognize copyright in any completed work, without formal registration. Generally, copyright is enforced as a civil matter, though some jurisdictions do apply criminal sanctions. Most jurisdictions recognize copyright limitations, allowing "fair" exceptions to the creator's exclusivity of copyright, and giving users certain rights. The development of digital media and computer network technologies have prompted reinterpretation of these exceptions, introduced new difficulties in enforcing copyright, and inspired additional challenges to copyright law's philosophic basis. Simultaneously, businesses with great economic dependence upon copyright have advocated the extension and expansion of their intellectual property rights, and sought additional legal and technological enforcement.

9.4. The Geographical Indications of Goods (Registration and Protection) Act, 1999

A geographical indication (GI) is a name or sign used on certain products which corresponds to a specific geographical location or origin (e.g. a town, region, or country). The use of a GI may act as a certification that the product possesses certain qualities, is made according to traditional methods, or enjoys a certain reputation, due to its geographical origin.

10. Historical Evolution of IPR in Agriculture

The WTO-TRIPS agreement of 1995 (WTO,2016), which is binding on all

member countries including India, provided for minimum norms and standards in respect of protection of IPR in several categories: patents, copyrights, trademarks, plant varieties, geographical indications, industrial designs, layout designs of integrated circuits, and trade secrets. This agreement led India to put in place a set of appropriate and compliant mechanisms and instruments. Some of the legal instruments passed by the Indian Parliament as part of compliance process to the TRIPS include The Patents Act, 1970 (39 of 1970), The Patents (Amendment) Act, 1999 (17 of 1999), The Patents (Amendment) Act 2002 (38 of 2002), The Patents (Amendment) Act 2005 (15 of 2005), The Geographical Indications of Goods (Registration & Protection) Act, 1999 (Office of Controller General of Patents Designs and Trade Marks,2016) and The Protection of Plant Varieties and Farmers Rights Act, 2001 (PPV FR Act) (53 of 2001) (PPV&FR Authority. 2016.) Apart from these, the Government of India also enacted an umbrella legislation called the Biological Diversity Act, 2002 (No.18 of 2003). (NBA, 2008) as part of the country's commitment to Convention of Biological Diversity (CBD). There is no specific IPR Act to provide protection for undisclosed information (trade secret). The Indian Contract Act of 1872 and common law have provisions covering this with the Ministry of Law and Justice as the nodal agency (Sudhir Kochhar, 2008). A compilation of the major types of IP assets in agriculture R&D with their qualifying attributes under relevant legislations in India is presented in Annexure. The broad institutional mechanisms, legislative provisions and potential returns to the stakeholders of agri value chain are also depicted. Considering special nature of use of bio resources and traditional knowledge (TK) in agriculture, the various provisions and legal mechanisms for protection of these are also enumerated.

Key: Intellectual property

Authors' rights
Copy left
Copyright
Database right
Farmers' rights
Geographical indication
Indigenous intellectual property
Industrial design right
Integrated circuit layout design protection
Moral rights
Patent
Peasants' rights
Plant breeders' rights
Plant genetic resources
Related rights
Supplementary protection certificate
Trade dress
Trade secret
Trademark
Utility model

Related topics

Abandon ware
Artificial intelligence and copyright
Brand protection
Copyright abolition
Copyright troll
Criticism of copyright
Bioprospecting
Biopiracy
Idea–expression distinction
Limitations and exceptions to copyright
Fair dealing
Fair use
Paraphrasing
Right to quote

Orphan work
Patent troll
Pirate Party
Public domain
Outline of intellectual property
Outline of patents

10. IP and Technology Management in ICAR System

The IP&TM scheme launched by the ICAR during 2008 is a driver towards implementation of the policy (ICAR, 2014). Capacity building of the manpower engaged in the scheme formed the primary focus of the initial implementation process leading to series of awareness building and sensitization programmes. These initiatives resulted in emergence of a pool of about 100 trained IP professionals across the system. Notwithstanding initial apprehensions on IP protection towards stimulate investment in research in agriculture (Kumar and Sinha, 2015), these initial steps of ITMU scheme grants led to the building of vibrant IP ecosystem in the NARES. In terms of visible gains, the number of filings under various IP categories have increased significantly in last ten years (ICAR, 2014c). The recent recognition of ICAR as an organisation through grant of the „Thomson Reuters India Innovation award 2015" is yet another testimony to this fact (Thomson Reuters 2016). Thus a viable governance mechanism (ICAR, 2014a) gives a conducive environment for and necessitate an understanding of regulatory and statutory laws in the country for better positioning of technologies and related products and services in markets. Only then can it lead to trigger better opportunities for business in this sector. Recent reports of agri-start-ups successfully bringing new technologies in markets signify this fact. For example, the success of Barix, a start-up advocating eco-friendly, low cost crop protection methods to increase crop produce and quality at low cost. (Amit Tiwari, 2016) There are other successful start-ups like BIOSAT which uses Biochar based organic Soil Amendment Technology as an soil additive, Nashik-based start-up, MITRA (Machines, Information, Technology, Resources for Agriculture) which works on improving mechanization at horticulture farms with the use of R&D and high quality farm equipment like sprayers (Rashmi Ramesh, 2015). These instances are early-stage successes of technologies in agriculture leading to commercialization and setting of agri-start-ups. In the current ecosystem, start-up trend in India is picking up in academic and R&D institutions (Raghavi Rao Kodati, 2016), where researchers are looking beyond just publishing or licensing technologies to the industry. This is also relevant for technologies applicable in agri. and food sector. The Convention establishing the World Intellectual Property Organization (1967) gives the following list of the subject matter protected by intellectual property rights: • literary, artistic and scientific works; • performances of performing artists, phonograms, and broadcasts; • inventions in all fields of human endeavour; • scientific discoveries; • industrial designs; • trademarks, service marks, and commercial names and designations; • protection against unfair competition; and • "all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields."

With the establishment of the world trade Organization (WTO), the importance and role of the intellectual property protection has been crystallized in the Trade-Related Intellectual Property Systems (TRIPS) Agreement. It was negotiated at the end of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) treaty in 1994. The TRIPS Agreement en-

compasses, in principle, all forms of intellectual property and aims at harmonizing and strengthening standards of protection and providing for effective enforcement at both national and international levels. It addresses applicability of general GATT principles as well as the provisions in international agreements on IP (Part I). It establishes standards for availability, scope, use (Part II), enforcement (Part III), acquisition and maintenance (Part IV) of Intellectual Property Rights. Furthermore, it addresses related dispute prevention and settlement mechanisms (Part V). Formal provisions are addressed in Part VI and VII of the Agreement, which cover transitional, and institutional arrangements, respectively. The TRIPS Agreement, which came into effect on 1 January 1995, is to date the most comprehensive multilateral agreement on intellectual property.

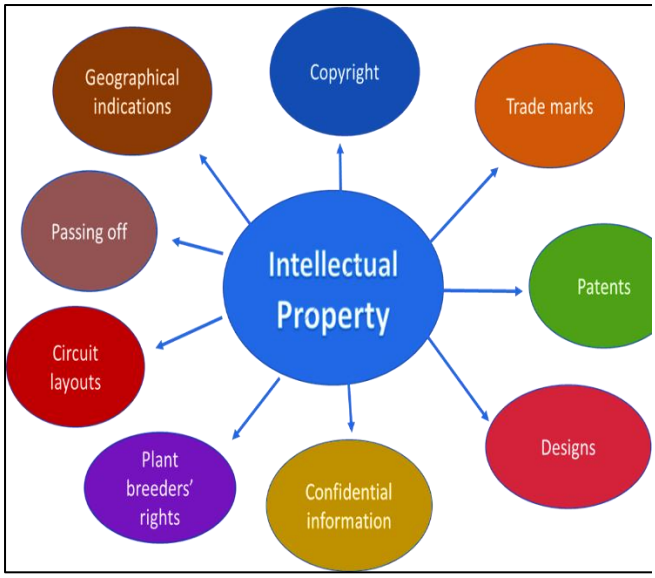


Fig 4: Flow Charts of Intellectual Property Rights

The areas of intellectual property that it covers are:

1. Copyright and related rights (i.e. the rights of performers, producers of sound recordings and broadcasting organisations);
2. Trademarks including service marks;
3. Geographical indications including appellations of origin;
4. Industrial designs;
5. Patents including protection of new varieties of plants;
6. The lay-out designs (topographies) of integrated circuits;
7. The undisclosed information including trade secrets and test data.

Key: IPR

1. Prior to General Agreement on Tariffs and Trade (GATT), intellectual property rights were not subject to formal international trade negotiations.
2. Rather, intellectual properties were subject only to international conventions like Berne and Rome conventions concerning Copyrights.
3. The agreement on TRIPS (Trade Related Intellectual Property Rights) was negotiated with other international trade agreements during the URUGUAY round trade organizations of the GATT from 1986 to1994.
4. The TRIPS agreement sets minimum standards in the field of Intellectual Property protection that all WTO member countries have to respect.
5. To achieve this goal, WTO members have to modify their Intellectual Property laws to make them consistent with the new WTO standards.
6. The TRIPS agreement states that all patents shall be available for at least 20 years from filing date, whereas before the TRIPS agreement the patent term varied greatly among the countries (7, 10, 17 or 20 years).
7. All WTO member countries have to incorporate this 20 years patent term in their patent.

11. Intellectual Property System in India

As discussed above, historically the first system of protection of intellectual property came in the form of (Venetian Ordi-

nance) in 1485. This was followed by Statute of Monopolies in England in 1623, which extended patent rights for Technology Inventions. In the United States, patent laws were introduced in 1760. Most European countries developed their Patent Laws between 1880 to 1889. In India Patent Act was introduced in the year 1856 which remained in force for over 50 years, which was subsequently modified and amended and was called "The Indian Patents and Designs Act, 1911". After Independence a comprehensive bill on patent rights was enacted in the year 1970 and was called "The Patents Act, 1970". Specific statutes protected only certain type of Intellectual output; till recently only four forms were protected. The protection was in the form of grant of copyrights, patents, designs and trademarks. In India, copyrights were regulated under the Copyright Act, 1957; patents under Patents Act, 1970; trademarks under Trade and Merchandise Marks Act 1958; and designs under Designs Act, 1911. With the establishment of WTO and India being signatory to the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), several new legislations were passed for the protection of intellectual property rights to meet the international obligations. These included: Trade Marks, called the Trade Mark Act, 1999; Designs Act, 1911 was replaced by the Designs Act, 2000; the Copyright Act, 1957 amended a number of times, the latest is called Copyright (Amendment) Act, 2012; and the latest amendments made to the Patents Act, 1970 in 2005. Besides, new legislations on geographical indications and plant varieties were also enacted. These are called Geographical Indications of Goods (Registration and Protection) Act, 1999, and Protection of Plant Varieties and Farmers' Rights Act, 2001 respectively. Over the past fifteen years, intellectual property rights have grown to a stature from where it plays a major role in the development of global economy. In 1990s, many countries unilaterally strengthened their laws and regulations in this area, and many others were poised to do likewise. At the multilateral level, the successful conclusion of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) in the World Trade Organization elevates the protection and enforcement of IPRs to the level of solemn international commitment. It is strongly felt that under the global competitive environment, stronger IPR protection increases incentives for innovation and raises returns to international technology transfer.

12. Standing Committee Report Summary

Committee Report: Review of the Intellectual Property Rights Regime. The Standing Committee on Commerce (Chair: Mr. Vijayasai Reddy) submitted its report on the subject 'Review of the Intellectual Property Rights (IPR) Regime in India'. IPR are rights given to creators of goods gained from scientific development, artistic work, or original research, which give the creators exclusive right over its use for a certain period. Key observations and recommendations include:

12.1. Role of IPR: The Committee noted that an improvement in protection of IPR increases Foreign Direct Investment (FDI) and inflow of foreign exchange. For instance, an improvement of 1% in protection of copyrights increases FDI by 6.8%.

12.2. Investment in R&D: The Committee noted that India grants a low number of patents (as compared to China and the USA), which can be attributed to low spending on research and development

(0.7% of the GDP). It recommended: (i) allocating funds to each government Departments for research, (ii) providing incentives to private companies for undertaking research, and (iii) directing large industries to give Corporate Social Responsibility funds for research.

12.3. Encouraging IPR: The Committee noted that only 36% of patents filed in India are filed by domestic entities. It attributed this to lack of awareness of IPR, and recommended the Department for Promotion of Industry and Internal Trade (DPIIT) to increase awareness among small businesses, artisans, and establishments in remote areas with participation of non-governmental organisation.

12.4. National IPR Policy, 2016: The Policy was adopted to provide the legal and administrative framework to manage IPR. The Committee recommended its reassessment in light of new trends in innovation and to identify challenges in implementation of the policy. It suggested involving state governments in framing IPR policies.

12.5. IP Financing: The Committee noted that the use of IP backed financing (use of IP to gain financial benefits, credit or revenue) can enhance financial innovation, availability of credit, and increase capital base. It recommended: (i) amending the Insurance Act, 1938 to minimise monetary risks from infringement of IPR, (ii) devising a uniform system of valuation of IP, (iii) enacting legislation to protect and determine standards for financing, and (iv) adopting risk-sharing policies with companies.

12.6. Counterfeiting and piracy: To curb piracy and counterfeiting, the Committee recommended: (i) implementation of stringent legislation through strong inter-Departmental coordination, (ii) increasing the capacity of enforcement agencies (such as IPR cells in the state police), and (iii) establishing a method to estimate revenue loss from it. It recommended labelling products as 'patent pending' (patent applied, but not yet granted) to deter misuse and yield marketing benefits.

12.7. IP Appellate Board: The Committee noted that the Board had dealt with complex issues on IPR disputes and financing efficiently. It recommended reconsidering its abolition under the Tribunals Reforms (Rationalisation and Conditions of Service) Ordinance, 2021, as this may further increase judicial pendency. It recommended undertaking a Judicial Impact Assessment and consultations before abolishing it. It also recommended reforms in the Board, including greater structural autonomy, infrastructural and administrative reforms, and timely appointment of officials and manpower.

12.8. Regulation: The Committee examined and recommended changes to: (i) the Patent Act, 1970, (ii) the Trademarks Act, 1999, and (iii) the Copyright Act, 1957. It recommended changes to: (i) encourage registration of patents (by checking on the power to decline patents, and decreasing penalty for furnishing false information), (ii) fast-tracking patent applications (by shortening timelines for filing documents), (iii) prioritising trademarks for export-oriented products by creating a separate category, and (iv) increase compliance (by deploying trained police officers, and streamlining process for search and seizure). It recommended incorporating work from the internet and digital broadcasters under licenses for copyright. A separate framework for protecting trade secrets may be established.

12.9. COVID-19: The Committee recommended waiving off patent rights for COVID-19 related drugs and vaccines temporarily, to address inadequate availability. It recommended avoiding any delays in invoking compulsory licenses on crucial drugs and vaccines in emergency like situations in the future.

12.10. Sector-specific recommendations: The Committee recommended creating a separate category of rights for Artificial Intelligence and related innovations, owing to its significant benefits and applications. It also suggested focusing pharmaceutical research towards niche segments and discovery of new drugs.

History of Indian Patent System

1856: The Act VI of 1856 on protection of inventions based on the British Patent Law of 1852. Certain exclusive privileges granted to inventors of new manufacturers for a period of 14 years.

1859: The Act modified as act XV Patent monopolies called exclusive privileges (making. Selling and using inventions in India and authorizing others to do so for 14 years from date of filing specification).
1872: The Patterns & Designs Protection Act.
1883: The Protection of Inventions Act.
1888: Consolidated as the Inventions & Designs Act.
1911: The Indian Patents & Designs Act.
1999: On March 26, 1999 Patents (Amendment) Act, (1999) came into force from 01-01-1995.
2002: The Patents (Amendment) Act 2002 came into force from 20th may 2003
2005: The Patents (Amendment) Act 2005 effective from 1st January 2005

Brief about Indian Patent System

The first legislation in India relating to patents was the Act VI of 1856. The objective of this legislation was to encourage inventions of new and useful manufactures and to induce inventors to disclose secret of their inventions. The Act was subsequently repealed by Act IX of 1857 since it had been enacted without the approval of the British Crown. Fresh legislation for granting 'exclusive privileges' was introduced in 1 859 as Act XV of 1859. This legislation contained certain modifications of the earlier legislation, namely, grant of exclusive privileges to useful inventions only and extension of priority period from 6 months to 12 months. This Act excluded importers from the definition of inventor. This Act was based on the United Kingdom Act of 1852 with certain departures which include allowing assignees to make application in India and also taking prior public use or publication in India or United Kingdom for the purpose of ascertaining novelty.

In 1872, the Act of 1859 was consolidated to provide protection relating to designs. It was renamed as "The Patterns and Designs Protection Act" under Act XIII of 1872. The Act of 1872 was further amended in 1883 (XVI of 1883) to introduce a provision to protect novelty of the invention, which prior to making application for their protection were disclosed in the Exhibition of India. A grace period of 6 months was provided for filing such applications after the date of the opening of such Exhibition.

This Act remained in force for about 30 years without any change but in the year 1883, certain modifications in the patent law were made in United Kingdom and it was considered that those modifications should also be incorporated in the Indian law. In 1888, an Act was introduced to

consolidate and amend the law relating to invention and designs in conformity with the amendments made in the U.K. law.

The Indian Patents and Designs Act, 1911, (Act II of 1911) replaced all the previous Acts. This Act brought patent administration under the management of Controller of Patents for the first time. This Act was further amended in 1920 to enter into reciprocal arrangements with UK and other countries for securing priority. In 1930, further amendments were made to incorporate, inter-alia, provisions relating to grant of secret patents, patent of addition, use of invention by Government, powers of the Controller to rectify register of patent and increase of term of the patent from 14 years to 16 years. In 1945, an amendment was made to provide for filing of provisional specification and submission of complete specification within nine months.

After Independence, it was felt that the Indian Patents & Designs Act, 1911 was not fulfilling its objective. It was found desirable to enact comprehensive patent law owing to substantial changes in political and economic conditions in the country. Accordingly, the Government of India constituted a committee under the Chairmanship of Justice (Dr.) Bakshi Tek Chand, a retired Judge of Lahore High Court, in 1949 t o review the patent law in India in order to ensure that the patent system is conducive to the national interest. The terms of reference included —

- To survey and report on the working of the patent system in India;
- To examine the existing patent legislation in India and to make recommendations for improving it, particularly with reference to the provisions concerned with the prevention of abuse of patent rights;
- To consider whether any special restrictions should be imposed on patent regarding food and medicine;
- To suggest steps for ensuring effective publicity to the patent system and to patent literature, particularly as regards patents obtained by Indian inventors;
- To consider the necessity and feasibility of setting up a National Patents Trust;
- To examine the working of the Patent Office and the services rendered by it to the public and make suitable recommendations for improvement; and
- To report generally on any improvement that the Committee thinks fit to recommend for enabling the Indian Patent System to be more conducive to national interest by encouraging invention and the commercial development and use of inventions.

The committee submitted its interim report on 4th August, 1949 with recommendations for prevention of misuse or abuse of patent right in India and suggested amendments to sections 22, 23 & 23A of the Patents & Designs Act, 1911 on the lines of the United Kingdom Acts 1919 and 1949. The committee also observed that the Patents Act should contain clear indication to ensure that food and medicine and surgical and curative devices are made available to the public at the cheapest price commensurate with giving reasonable compensation to the patentee.

Based on the above recommendation of the Committee, the 1911 Act was amended in 1950(Act XXXII of 1950) in relation to working of inventions and compulsory licence/revocation. Other provisions were related to endorsement of the patent with the words 'licence of right' on an application by the Government so that the Con-

troller could grant licences. In 1952 (Act LXX of 1952) an amendment was made to provide compulsory licence in relation to patents in respect of food and medicines, insecticide, germicide or fungicide and a process for producing substance or any invention relating to surgical or curative devices. The compulsory licence was also available on notification by the Central Government. Based on the recommendations of the Committee, a bill was introduced in the Parliament in 1953 (Bill No.59 of 1953). However, the Government did not press for the consideration of the bill and it was allowed to lapse.

In 1957, the Government of India appointed Justice N. Rajagopala Ayyangar Committee to examine the question of revision of the Patent Law and advise government accordingly. The report of the Committee, which comprised of two parts, was submitted in September, 1959. The first part dealt with general aspects of the Patent Law and the second part gave detailed note on the several clauses of the lapsed bills 1953. The first part also dealt with evils of the patent system and solution with recommendations in regards to the law. The committee recommended retention of the Patent System, despite its shortcomings. This report recommended major changes in the law which formed the basis of the introduction of the Patents Bill, 1965. This bill was introduced in the Lok Sabha on 21st September, 1965, which however lapsed. In 1967, again an amended bill was introduced which was referred to a Joint Parliamentary Committee and on the final recommendation of the Committee, the Patents Act, 1970 was passed. This Act repealed and replaced the 1911 Act so far as the patents law was concerned. However, the 1911 Act continued to be applicable to designs. Most of the provisions of the 1970 Act were brought into force on 20 th April 1972 with publication of the Patent Rules, 1972.

This Act remained in force for about 24 years without any change till December 1994. An ordinance effecting certain changes in the Act was issued on 31 st December 1994, which ceased to operate after six months. Subsequently, another ordinance was issued in 1999. This ordinance was subsequently replaced by the Patents (Amendment) Act, 1999 that was brought into force retrospectively from 1 st January, 1995. The amended Act provided for filing of applications for product patents in the areas of drugs, pharmaceuticals and agro chemicals though such patents were not allowed. However, such applications were to be examined only after 31-12-2004. Meanwhile, the applicants could be allowed Exclusive Marketing Rights (EMR) to sell or distribute these products in India, subject to fulfilment of certain conditions.

The second amendment to the 1970 Act was made through the Patents (Amendment) Act, 2002 (Act 38 0f 2002). This Act came into force on 20 th May 2003 with the introduction of the new Patent Rules, 2003 by replacing the earlier Patents Rules, 1972

The third amendment to the Patents Act 1970 was introduced through the Patents (Amendment) Ordinance, 2004 w.e.f. 1 st January, 2005. This Ordinance was later replaced by the Patents (Amendment) Act 2005 (Act 15 of 2005) on 4 th April, 2005 which was brought into force from 1-1-2005.

Patents Rules

Under the provisions of section 159 of the Patents Act, 1970 the Central Government is empowered to make rules for imple-

menting the Act and regulating patent administration. Accordingly, the Patents Rules, 1972 were notified and brought into force w.e.f. 20.4.1972. These Rules were amended from time to time till 20 May 2003 when new Patents Rules, 2003 were brought into force by replacing the 1972 rules. These rules were further amended by the Patents (Amendment) Rules, 2005 and the Patents (Amendment) Rules, 2006. The last amendments are made effective from 5 th May 2006.

13. Development of trips complied regime in India

The establishment of WTO as a result of institutionalization of international framework of trade calls for harmonization of several aspects of Indian Law relating to Intellectual Property Rights. The TRIPS agreement set minimum standards for protection for IPR rights and also set a time frame within which countries were required to make changes in their laws to comply with the required degree of protection. In view of this, India has taken action to modify and amend the various IP Acts in the last few years. Patents Act, 1970 After India became a signatory to the TRIPS agreement forming part of the Agreement establishing the World Trade Organization (WTO) for the purpose of reduction of distortions and impediments to international trade and promotion of effective and adequate protection of intellectual property rights, the Patents Act, 1970 has been amended in the year 1995, 1999, 2002 and 2005 to meet its obligations under the TRIPS agreement. The Patents Act has been amended keeping in view the development of technological capability in India, coupled with the need for integrating the intellectual property system with international practices and intellectual property regimes. The amendments were also aimed at making the Act a modern, harmonized and user-friendly legislation to adequately protect national and public interests while simultaneously meeting India's international obligations under the TRIPS Agreement. Subsequently the rules under the Patent Act have also been amended and these became effective from May 2003. These rules have been further amended by Patents (Amendment) Rules 2005 w.e.f 01.01.2005. Thus, the Patent Amendment Act, 2005 is now fully in force and operative.

13.1. Trade Mark Act, 1999

The law of trademarks is also now modernized under the Trademarks Act of 1999. A trademark is a special symbol for distinguishing the goods offered for sale or otherwise put on the market by one trader from those of another. In India the trademarks have been protected for over four decades as per the provisions of the Trade and Merchandise Mark (TMM) Act of 1958. India became a party to the WTO at its very inception. One of the agreements in that related to the Intellectual Property Rights (TRIPS). In December, 1998 India acceded to the Paris Convention. Meanwhile, the modernisation of Trade and Merchandise Marks Act, 1958 had been taken up keeping in view the current developments in trading and commercial practices, increasing globalisation of trade and industry, the need to encourage investment flows and transfer of technology, need for simplification of trademark management system and to give effect to important judicial decisions. To achieve these purposes, the Trademarks Bill was introduced in 1994. The Bill pointed towards the changes which were contemplated and were under consideration of the Government of India, but it lapsed in 1994. A comprehensive review was made of the existing laws in view of the developments in trading and commer-

cial practices, and increasing globalization of trade and industry. The Trademarks Bill of 1999 was passed by Parliament that received the assent of the President on 30th December, 1999 as Trade Marks Act, 1999 thereby replacing the Trade and Merchandise Mark Act of 1958. The important salient features of the Act inter-alia include:

• It broadens the definition of infringement of a registered trademark to include action against the unauthorized use of a confusingly similar mark, not only in respect of the goods and services covered by registration, as was previously the case, but also in respect of goods and services which are so similar that a likelihood of deception or confusion exists.

• An action for infringement will also be available against the unauthorised use of a mark in relation to dissimilar goods, if such mark is similar to a registered mark that is well known in India and the interest of the owner is likely to be affected adversely. The remedy for infringement of a trademark is also strengthened under the new law by authorising the police with the power to seize infringing articles without a warrant. The Designs Act, 2000 The Designs Act of 1911 has been replaced by the Designs Act, 2000. In view of considerable progress made in the field of science and technology, a need was felt to provide more efficient legal system for the protection of industrial designs in order to ensure effective protection to registered designs, and to encourage design activity to promote the design element in an article of production. In this backdrop, the Designs Act, 2000 has been enacted essentially to balance these interests and to ensure that the law does not unnecessarily extend protection beyond what is necessary to create the required incentive for design activity while removing impediments to the free use of available designs. The new Act complies with the requirements of TRIPS and hence is directly relevant for international trade. Industrial Design law deals with the aesthetics or the original design of an industrial product. An industrial product usually contains elements of both art and craft, that is to say artistic as well as functional elements. The design law excludes from its purview the functioning features of an article and grants protection only to those which have an aesthetic appeal. For example, the design of a teacup must have a hollow receptacle for holding tea and a handle to hold the cup. These are functional features that cannot be registered. But a fancy shape or ornamentation on it would be registrable. Similarly, a table, for example, would have a flat surface on which other objects can be placed. This is its functional element. But its shape, colour or the way it is supported by legs or otherwise, are all elements of design or artistic elements and therefore, registrable if unique and novel.

14. Intellectual Property Rights Policy Management: There are following types of intellectual property rights covered under Intellectual Property Rights Policy Management (IPRPM) framework: (i) Patents, (ii) Trade mark, (iii) Industrial Designs, (iv)Copyrights, (v) Geographical Indications, (vi) Semiconductor Integrated Circuit Layout Design, (vii) Trade Secret, and (viii) Plant Varieties.

The framework was launched in the form of National IPR Policy 2016 encompassing all IPRs into a single vision document setting in place an institutional mechanism for implementation, monitoring and review of IP laws. The policy has seven objectives designed for creating an environment that encourages innovation and creativity by providing stronger protection and incentives

for inventors, artists, and creators. There are several measures undertaken to achieve the given objectives. Among measures taken are compliance and timeline reduction in IP filing and disposal, fee rebate for Start-ups, MSMES, Educational Institutions and expedited examination for certain categories of applicants.

14.1. Details on objectives and activities undertaken under the National IPR Policy

Appropriate amendment in IPR Laws and Rules - improving procedural requirements in processing of applications to speed up grant and disposal.

Modernisation & Digitisation of IP offices - improvement in functioning and performance of IP Offices as well as streamlining workflow processes. Scheme for Facilitating Start-Ups Intellectual Property Protection (SIPP) to encourage filling of Patent applications by Start-ups.

Reduction in filing Fees for Start-ups, MSMEs, and educational Institutes to encourage Patent filling.

Expedited Examination for certain category of applicants, such as Start-ups, small entities, women inventors for expeditious grant of Patents.

Awareness initiatives and Programs for stakeholders with an intent to inculcate importance of protecting their IPR at an early stage in the business development cycle.

National Intellectual Property Awareness Mission (NIPAM), a flagship program to impart IP awareness and basic training in educational institutes.

National Intellectual Property (IP) Awards are conferred every year to recognize and reward the top achievers comprising individuals, institutions, organizations and enterprises, for their IP creations and commercialization.

Patent Facilitation Programme has been revamped to scout patentable inventions and provide full financial, technical and legal support in filing and obtaining patents.

14.2. Expand Knowledge Capacity & Skill Building: To promote the study, research, and development of IPR in higher educational institutions, IPR chairs have been set up across the country under the Scheme for Pedagogy & Research in IPRs for Holistic Education and Academia (SPRIHA). Currently, 37 IPR Chairs are incorporated. These Chairs have facilitated 146 Patent filings and 424 Patents registered, 215 IP works published, 1373 total IP Programs conducted, 238 Pedagogy activities undertaken during 2020-21 and 2022-23.

14.3. Commercialization of IP: Technology Innovation Support Centres (TIS) have been set us in various Central and State Universities and State Council for Science & Technology across the country for supporting IPR education, boosting IP filings and enhancing IP commercialization. Since 2020, 12 established TISCs have filed 734 patents, conducted 1752 IP awareness programs, and commercialized 99 patents. Additionally, 901 applications for trademarks, designs and copyright were also filed. The network has been further expanded with 22 new TISCs across 20 states in the country. Technology Transfer Organizations (TTOs) & Incubators are also working in around 150 research institutions and more than 1000 Universities for commercializing IP. These right areas are governed through respective Acts and Rules framed thereunder.

The details of legal and regulatory consid- erations are given are below:

Table 1: Details of legal and regulatory considerations for different IP areas.

Right Area	**Legal provision**	**Subject**	**Term of Protection**
Patent	Patent Act, 1970 & Patent Rules, 2003 amended in 2014, 2016, 2017, 2019, 2020 and 2021.	Must qualify quirements of being novel, Inventive and having industrial utility	20 years
Trademarks	Trademark Act 1999 & Trademark Rules 2017	Protects brand name , logo, design for a business or commercial enterprise	10 years ; renewed for 10 years on payment of additional fees
Designs	Designs Act 2000 & Designs (Amendment) Rules 2021	New or original designs (ornamental / visual appearance discernible to the human eye) which can be replicated industrially	10 + 5 years
Copyrights	Copyrights Act 1957 &	Creative, artistic, literary,	Authors - Lifetime+ 60 years;

	Copy-rights Rules 2013 amended in 2021.	Musical and audio-visual works	Producers – 60 years Performers – 50 years;
Geo-graphical Indi-cati-ons	Geo-graphical Indica-tions Act 1999 & GI Rules 2002 amended in 2020.	Goods bear-ing uni que characteris is-tics due to geograph-ical link-age - agri-cultural goods, natural goods, manufac-tured goods, handi-crafts and foodstuff	10 years, Re-newed for 10 years on pay-ment of ad ditional fees
Sem-icon-duc-tor Inte-grat-ed Cir-cuits Lay-out De-sign	Semicon-ductor Integrat-ed Cir-cuits Lay-out De-sign Act 2000 & Rules 2001	A layout of transis-tors and other cir-cuitry el-ements including lead wires connecting such ele-ments and expressed in any manner in semicon-ductor in-	10 Years.

		tegrated circuits.	
Trade Secret	Common Law approach covered through IPC, Contract Act, IP Act and Copyright	Confidential information having commercial value	Till the time Confidentiality is safeguarded.
Plant Varieties	Protection of Plant Varieties and Farmers Rights Act (PPVFRA), 2001	Traditional varieties and landraces, all developed varieties (non-traditional and non-landrace) in trade/use for older than 1 year and not older than 15 years or 18 years (in case of trees and vines), and new plant varieties.	6-10 years.

15. What Is An Ipr?

Intellectual Property Rights are legal rights, which result from intellectual activity in industrial, scientific, literary & artistic fields. These rights Safeguard creators and other producers of intellectual goods & services by granting them certain time-limited rights to control their use. Protected IP rights like other property can be a matter of trade, which can be owned, sold or bought. These are intangible and non-exhausted consumption.

16. Purpose of Ipr

1. IPR (Intellectual property Rights) is a general term covering patents, copyrights, trademarks, industrial designs, geographical indications, layout design of integrated circuits and protection of undisclosed information (trade secrets).
2. Protection for idea/material.
3. The owner can usually decide whether or not to license its use to someone else (OR) to sell it to someone else through proper channel.

16.1. Types/Tools of IPRs:

a. Patents. b. Trademarks. c. Copyrights and related rights. d. Geographical Indications. e. Industrial Designs. f. Layout Design for Integrated Circuits.

a. Patent

A patent is an exclusive right granted for an invention, which is a product or a process that provides a new way of doing something, or offers a new technical solution to a problem. It provides protection for the invention to the owner of the patent. The protection is granted for a limited period, i.e 20 years. Patent protection means that the invention cannot be commercially made, used, distributed or sold without the patent owner's consent. A patent owner has the right to decide who may - or may not - use the patented invention for the period in which the invention is protected. The patent owner may give permission to, or license, other parties to use the invention on mutually agreed terms. The owner may also sell the right to the invention to someone else, who will then become the new owner of the patent. Once a patent expires, the protection ends, and an invention enters the public domain, that the owner no longer holds exclusive rights to the invention, which becomes available to commercial exploitation by others.

b. Trademarks

A trademark is a distinctive sign that identifies certain goods or services as those produced or provided by a specific person or enterprise. It may be one or a combination of words, letters, and numerals. They may consist of drawings, symbols, three dimensional signs such as the shape and packaging of goods, audible signs such as music or vocal sounds, fragrances, or colours used as distinguishing features. It provides protection to the owner of the mark by ensuring the exclusive right to use it to identify goods or services, or to authorize another to use it in return for payment. It helps consumers identify and purchase a product or service because its nature and quality, indicated by its unique trademark, meets their needs. Registration of trademark is prima facie proof of its ownership giving statutory right to the proprietor. Trademark rights may be held in perpetuity. The initial term of registration is for 10 years; thereafter it may be renewed from time to time. c. Copyrights and related rights: Copyright is a legal term describing rights given to creators for their literary and artistic works. The kinds of works covered by copyright include: literary works such as novels, poems, plays, reference works, newspapers and computer programs; databases; films, musical compositions, and choreography; artistic works such as paintings, drawings, photographs and sculpture; architecture; and advertisements, maps and technical drawings. Copyright subsists in a work by virtue of creation; hence it’s not mandatory to register. However, registering a copyright provides evidence that copyright subsists in the work & creator is the owner of the work. Creators often sell the rights to their works to individuals or companies best able to market the works in return for

payment. These payments are often made dependent on the actual use of the work, and are then referred to as royalties. These economic rights have a time limit, (other than photographs) is for life of author plus sixty years after creator's death.

d. Geographical Indications (GI): GI are signs used on goods that have a specific geographical origin and possess qualities or a reputation that are due to that place of origin. Agricultural products typically have qualities that derive from their place of production and are influenced by specific local factors, such as climate and soil. They may also highlight specific qualities of a product, which are due to human factors that can be found in the place of origin of the products, such as specific manufacturing skills and traditions. A geographical indication points to a specific place or region of production that determines the characteristic qualities of the product that originates therein. It is important that the product derives its qualities and reputation from that place. Place of origin may be a village or town, a region or a country. It is an exclusive right given to a particular community, hence the benefits of its registration are shared by the all members of the community. Recently the GIs of goods like Chanderi Sarees, Kullu Shawls, and Wet Grinders etc have been registered. e. Industrial Designs: Industrial designs refer to creative activity, which result in the ornamental or formal appearance of a product, and design right refers to a novel or original design that is accorded to the proprietor of a validly registered design. Industrial designs are an element of intellectual property. Under the TRIPS Agreement, minimum standards of protection of industrial designs have been provided for. As a developing country, India has already amended its national legislation to provide for these minimal standards. The essential purpose of design law it to promote and protect the design element of industrial production. It is also intended to promote innovative activity in the field of industries. The existing legislation on industrial designs in India is contained in the New Designs Act, 2000 and this Act will serve its purpose well in the rapid changes in technology and international developments. India has also achieved a mature status in the field of industrial designs and in view of globalization of the economy, the present legislation is aligned with the changed technical and commercial scenario and made to conform to international trends in design administration. This replacement Act is also aimed to enact a more detailed classification of design to conform to the international system and to take care of the proliferation of design related activities in various fields.

f. Trade Secrets:

It may be confidential business information that provides an enterprise a competitive edge may be considered a trade secret. Usually these are manufacturing or industrial secrets and commercial secrets. These include sales methods, distribution methods, consumer profiles, and advertising strategies, lists of suppliers and clients, and manufacturing processes. Contrary to patents, trade secrets are protected without registration. A trade secret can be protected for an unlimited period of time but a substantial element of secrecy must exist, so that, except by the use of improper means, there would be difficulty in acquiring the information. Considering the vast availability of traditional knowledge in the country the protection under this will be very crucial in reaping benefits from such type of knowledge. The Trades secret, traditional knowledge

are also interlinked / associated with the geographical indications

g. Layout Design for Integrated Circuits: Semiconductor Integrated Circuit means a product having transistors and other circuitry elements, which are inseparably formed on a semiconductor material or an insulating material or inside the semiconductor material and designed to perform an electronic circuitry function. The aim of the Semiconductor Integrated Circuits Layout-Design Act 2000 is to provide protection of Intellectual Property Right (IPR) in the area of Semiconductor Integrated Circuit Layout Designs and for matters connected therewith or incidental thereto. The main focus of SICLD Act is to provide for routes and mechanism for protection of IPR in Chip Layout Designs created and matters related to it. The SICLD Act empowers the registered proprietor of the layout-design an inherent right to use the layout-design, commercially exploit it and obtain relief in respect of any infringement. The initial term of registration is for 10 years; thereafter it may be renewed from time to time. Department of Information Technology Ministry of Communications and Information Technology is the administrative ministry looking after its registration and other matters.

16.2. Plagiarism

Plagiarism is the "wrongful appropriation" and "stealing and publication" of another author's "language, thoughts, ideas, or expressions" and the representation of them as one's own original work. Many people think of plagiarism as copying another's work, or borrowing someone else's original ideas. But terms like "copying" and "borrowing" can disguise the seriousness of the offense: According to the Merriam-Webster Online Dictionary, to "plagiarize" means 1) to steal and pass off (the ideas or words of another) as one's own 2) to use (another's production) without crediting the source 3) to commit literary theft 4) to present as new and original an idea or product derived from an existing source. In other words, plagiarism is an act of fraud. It involves both stealing someone else's work and lying about it afterward. But can words and ideas really be stolen?

Types of Plagiarism

"The Ghost Writer" - The writer turns in another's work, word-for-word, as his or her own. "The Photocopy" - The writer copies significant portions of text straight from a single source, without alteration. "The Potluck Paper" - copying from several different sources, tweaking the sentences to make them fit together while retaining most of the original phrasing. "The Labour of Laziness" – The writer takes the time to paraphrase most of the paper from other sources and make it all fit together, instead of spending the same effort on original work. "The Self-Stealer" - The writer "borrows" generously from his or her previous work, violating policies concerning the expectation of originality adopted by most academic institutions. Copyright laws exist to protect our intellectual property. They make it illegal to reproduce someone else's expression of ideas or information without permission. This can include music, images, written words, video, and a variety of other media. As with any wrongdoing, the degree of intent (see below) and the nature of the offense determine its status. When plagiarism takes place in an academic setting, it is most often handled by the individual instructors and the academic institution involved. If, however, the plagiarism involves money, prizes, or job placement, it constitutes a crime punishable in court.

17. Academic Punishments

Most colleges and universities have zero tolerance for plagiarists. In fact, academic standards of intellectual honesty are often more demanding than governmental copyright laws. If you have plagiarized a paper whose copyright has run out, for example, you are less likely to be treated with any more leniency than if you had plagiarized copyrighted material. A plagiarized paper almost always results in failure for the assignment, frequently in failure for the course, and sometimes in expulsion. Works that are no longer protected by copyright, or never have been, are considered "public domain." This means that you may freely borrow material from these works without fear of plagiarism, provided you make proper attributions. Giving credit to the original author by citing sources is the only way to use other people's work without plagiarizing. But there are a number of other reasons to cite sources: • Citations are extremely helpful to anyone who wants to find out more about your ideas and where they came from. • Not all sources are good or right – your own ideas may often be more accurate or interesting than those of your sources. Proper citation will keep you from taking the rap for someone else's bad ideas. • Citing sources shows the amount of research you've done. • Citing sources strengthens your work by lending outside support to your ideas

18. Overview of laws related to intellectual property rights in India:

The Rules and Laws governing Intellectual Property Rights in India are as follows**:**
1. The Copyright Act, 1957, The Copyright Rules, 1958 and International Copyright Order, 1999 **2.** The Patents Act, 1970 the Patents Rules, 2003, the Intellectual Property Appellate Board (Patents Procedure) Rules, 2010 and the Patents (Appeals and Applications to the Intellectual Property Appellate Board) Rules, 2011 **3.** The Trade Marks Act, 1999, the Trade Marks Rules, 2002, the Trade Marks (Applications and Appeals to the Intellectual Property Appellate Board) Rules, 2003 and the Intellectual Property Appellate Board (Procedure) Rules, 2003

4. The Geographical Indications of Goods (Registration and Protection) Act, 1999 and the Geographical Indications of Goods (Registration and Protection) Rules, 2002
5. The Designs Act, 2000 and The Designs Rules, 2001
6. The Semiconductors Integrated Circuits Layout-Design Act, 2000 and the Semiconductors Integrated Circuits Layout-Design Rules, 2001
7. The Protection of Plant varieties and Farmers' Rights Act, 2001 and The Protection of Plant varieties and Farmers Rights' Rules, 2003
8. The Biological Diversity Act, 2002 and the Biological Diversity Rules, 2004
9. **Intellectual Property Rights (Imported Goods):** Rule Copyright law in India. The Copyright Act of 1957, The Copyright Rules, 1958 and the International Copyright Order, 1999 governs the copyright protection in India. It came into effect from January 1958. The Act has been amended in 1983, 1984, 1992, 1994 and 1999. Before the Act of 1957, copyright protection was governed by the Copyright Act of 1914 which was the extension of British Copyright Act, 1911. The Copyright Act, 1957 consists of 79 sections under 15 chapters while the Copyright Rules, 1958 consists of 28 rules under 9 chapters and 2 schedules. Meaning of copyright According to Section 14 of the Act, "copyright" means the exclusive right subject to the provisions of this Act, to do or authorise the doing of any of the

following acts in respect of a work or any substantial part thereof, namely:- (a) in the case of a literary, dramatic or musical work, not being a computer programme, (i) to reproduce the work in any material form including the storing of it in any medium by electronic means; (ii) to issue copies of the work to the public not being copies already in circulation; (iii) to perform the work in public, or communicate it to the public; (iv) to make any cinematograph film or sound recording in respect of the work; (v) to make any translation of the work; (vi) to make any adaptation of the work; (vii) to do, in relation to a translation or an adaptation of the work, any of the acts specified in relation to the work in sub-clauses (i) to (vi); (b) in the case of a computer programme,- (i) to do any of the acts specified in clause (a); (ii) to sell or give on commercial rental or offer for sale or for commercial rental any copy of the computer programme: Provided that such commercial rental does not apply in respect of computer programmes where the programme itself is not the essential object of the rental. (c) in the case of an artistic work,- (i) to reproduce the work in any material form including depiction in three dimensions of a two dimensional work or in two dimensions of a three dimensional work; (ii) to communicate the work to the public; (iii) to issue copies of the work to the public not being copies already in circulation; (iv) to include the work in any cinematograph film; (v) to make any adaptation of the work; (vi) to do in relation to an adaptation of the work any of the acts specified in relation to the work in sub-clauses (i) to (iv); Intellectual Property Rights (IPR) of Computer Software In India, the Intellectual Property Rights (IPR) of computer software is covered under the Copyright Law. Accordingly, the copyright of computer software is protected under the provisions of Indian Copyright Act 1957. Major changes to Indian Copyright Law were introduced in 1994 and came into effect from 10 May 1995. These changes or amendments made the Indian Copyright law one of the toughest in the world. The amendments to the Copyright Act introduced in June 1994 were, in themselves, a landmark in the India's copyright arena. For the first time in India, the Copyright Law clearly explained: • The rights of a copyright holder • Position on rentals of software • The rights of the user to make backup copies Since most software is easy to duplicate, and the copy is usually as good as original, the Copyright Act was needed. Some of the key aspects of the law are: • According to section 14 of this Act, it is illegal to make or distribute copies of copyrighted software without proper or specific authorization. 25 • The violator can be tried under both civil and the violator can be tried under both civil and criminal law. • A civil and criminal action may be instituted for injunction, actual damages (including violator's profits) or statutory damages per infringement etc. • Heavy punishment and fines for infringement of software copyright. • Section 63 B stipulates a minimum jail term of 7 days, which can be extended up to 3 Years.

19. Positive impacts of IPRs on the global agricultural economy

IPRs serve as incentives for innovation and technological advancements in agriculture (Spielman DJ, Ma X., 2016). By granting exclusive rights to inventors and creators, IPRs encourage them to develop new and improved agricultural technologies, methods, and products.

IPRs promote investment in research and development within the agricultural sector ensures that innovators and companies can recoup their investment and se-

cure returns, which incentivizes increased funding for agricultural research and development.

IPRs facilitate the commercialization of agricultural innovations by offering legal protection and market exclusivity (Chawla HS., 2007). This allows innovators and companies to monetize their inventions and technologies, leading to increased dissemination of these advancements in the agricultural sector.

IPRs can contribute to enhancing agricultural productivity and efficiency. By encouraging and protecting innovation, IPRs enable the adoption of new technologies and practices that can improve agricultural processes, increase yields, and optimize resource utilization (Zilberman D, Ameden H, Graff G and Qaim M, 2004). These advancements can ultimately benefit the global agricultural economy by generating higher productivity and more sustainable practices.

20. Negative impacts of IPRs on the global agricultural economy

One concern is that IPRs can restrict access to genetic resources and traditional knowledge (Aguilar G, 2001). This can limit the ability of farmers and communities to freely access and use genetic materials for breeding and traditional farming practices.

IPRs can also limit farmers' rights and impede traditional farming practices (. Brush SB., 2007). The enforcement of IPRs may restrict farmers from saving seeds, practicing seed exchange, or engaging in other customary agricultural activities, leading to a loss of agricultural diversity and cultural practices (Brush SB., 2007). Another negative impact of IPRs is the potential increase in costs and reduced affordability of agricultural technologies (De Janvry A, Graff G, Sadoulet E, Zilberman D., 2003). Exclusive rights granted by IPRs can result in higher prices for patented seeds, biotechnological advancements, and other agricultural innovations, making them less accessible for small-scale farmers with limited resources. IPRs can contribute to the concentration of power and market control in the hands of a few large corporations (Srinivasan CS., 2003). This can create barriers to entry for smaller players, limit competition, and result in monopolistic farmers and hinder agricultural development.

21. Summary and Conclusion:

Intellectual property has emerged as a crucial aspect in the agricultural sector, as it provides incentives for innovation, promotes technology transfer, and safeguards the rights of creators and inventors. This article analyses the effects of IPRs on agricultural research and development, farmers' access to seeds and genetic resources, and the overall competitiveness of the agricultural market. Additionally, it discusses the challenges and controversies associated with IPRs, such as potential negative effects on small-scale farmers and concerns regarding biodiversity conservation. Through a systematic analysis of scholarly articles, reports, and case studies, this review aims to shed light on the intricate relationship between intellectual property rights and the global agricultural economy, ultimately providing insights for policymakers, stakeholders, and researchers alike. Summarized below are few points for R&D professionals and technology developers engaged agricultural research in NARES to consider: i. Current legal framework India affords several opportunities for R&D outputs with applications in agricultural PCS to be protected. Multiple IPs and portfolio

building is possible and may be harnessed for building business models for technology developers. ii. Compliances with regulatory bodies on use of agro-biodiversity and related knowledge is mandatory. These should form part of SOP for due diligence during the entire process of technology development and its transfer. iii. Capacity building for R&D professionals in IP and technology commercialization should be intensified iv. Technology developers or seekers for plant protection technologies should be encouraged through enabling ecosystem and enter as start-ups. These should form part of curriculum at University level in line with National IP Policy. v. Encouraging the use of IP informatics for research projects proposals and execution as part of due diligence processes for understanding technology push and market –pull forces before R&D investments are made. This would more useful for technology development in SME sector. Thus, the early successes in transferring technologies as businesses signal positive returns on R&D investments. This is further accelerated through the fillip given by current GOI policies on innovation, incubation including building vibrant ecosystem for triggering start up culture in agriculture sector. Researchers and technology generators in agricultural sector need to recognise these opportunities and re-orient their R&D efforts. Such efforts will not only bring innovation to combat crop losses but also bring a more vibrancy and better returns in agribusinesses engaged in this sector.

22. Types of intellectual properties and their description

Originally, only patent, trademarks, and industrial designs were protected as 'Industrial Property', but now the term 'Intellectual Property' has a much wider meaning. IPR enhances technology advancement in the following ways.

1. It provides a mechanism of handling infringement, piracy, and unauthorized use.
2. It provides a pool of information to the general public since all forms of IP are published except in case of trade secrets.

IP protection can be sought for a variety of intellectual efforts including's:

1. Patents.
2. Industrial designs relates to features of any shape, configuration, surface pattern, composition of lines and colours applied to an article whether 2-D, e.g., textile, or 3-D, e.g., toothbrush.
3. Trademarks relate to any mark, name, or logo under which trade is conducted for any product or service and by which the manufacturer or the service provider is identified. Trademarks can be bought, sold, and licensed. Trademark has no existence apart from the goodwill of the product or service it symbolizes
4. Copyright relates to expression of ideas in material form and includes literary, musical, dramatic, artistic, cinematography work, audio tapes, and computer software
5. Geographical indications are indications, which identify as good as originating in the territory of a country or a region or locality in that territory where a given quality, reputation, or other characteristic of the goods is essentially attributable to its geographical origin
6. A patent is awarded for an invention, which satisfies the criteria of global novelty, non-obviousness, and industrial or commercial application. Patents can be granted for products and processes. As per the Indian Patent Act 1970, the term of a patent was 14 years from the date of filing except for processes for preparing drugs and food items for which the term was 7 years from the date of the filing or 5

years from the date of the patent, whichever is earlier. No product patents were granted for drugs and food items

7. A copyright generated in a member country of the Berne Convention is automatically protected in all the member countries, without any need for registration. India is a signatory to the Berne Convention and has a very good copyright

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