Intellectual Property & its management in agriculture

PGS503 Digest

Things that won't be taught in classrooms

You are all welcome to contribute or comment

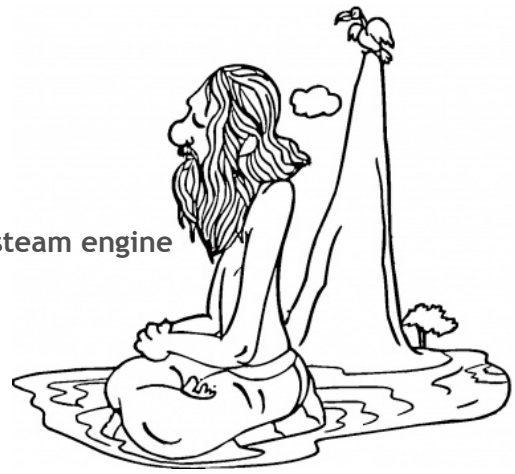
Issue 1 September 2010

It is argued that its only in an utopian world that intellectual property and IPR regime encourage innovation and bring prosperity to the society. Inescapably, in the context of developing countries, the ownership of, and access to, intellectual assets can take on ethical, ideological, and political connotations. Therefore, it is relevant to explore how to use the existing IPR system in a practical way to support the goal of shifting a technology from research and development towards deployment so that it has expected impact on development.

Committing innovations to the public domain need not be beneficial all the time. Old timer innovators employed "trade secret" as an informal way of protecting IP. A price tag ensures quality control, continuous improvement and ensures technology development out of concepts. IP instruments need not be viewed as *good* or *bad* but should be deemed as necessary tools. State's role is to administer equal opportunity for all to use or to produce and to rein in exploitation.

Past experience teaches pros and cons of a decision without actually making one. History is an excellent reference material. In the era of information tsunami, sifting and selecting relevant ones become a challenge. The PGS503 DIGEST is an attempt to learn beyond normative syllabus.

Contents



jai hind

The dark side of the patent regime: The story of steam engine

In late 1764, while repairing a small Newcomen steam engine, the idea of allowing steam to expand and condense in separate containers sprang into the mind of James Watt. He spent the next few months in unceasing labor building a model of the new engine. In 1768, after a series of improvements and substantial borrowing, he applied for a patent on the idea, requiring him to travel to London in August. He spent the next six months working hard to obtain his patent. It was finally awarded in January of the following year. Nothing much happened by way of production until 1775. Then, with a major effort supported by his business partner, the rich industrialist Matthew Boulton, Watt secured an Act of Parliament extending his patent until the year 1800. The great statesman Edmund Burke spoke eloquently in Parliament in the name of economic freedom and against the creation of unnecessary monopoly – but to no avail. The connections of Watt's partner Boulton were too solid to be defeated by simple principle.

Once Watt's patents were secured and production started, a substantial portion of his energy was devoted to fending off rival inventors. In 1782, Watt secured an additional patent, made "necessary in consequence of ... having been so unfairly anticipated, by [Matthew] Wasborough in the crank motion."More dramatically, in the 1790s, when the superior Hornblower engine was put into production, Boulton and Watt went after him with the full force of the legal system.

During the period of Watt's patents the U.K. added about 750 horsepower of steam engines per year. In the thirty years following Watt's patents, additional horsepower was added at a rate of more than 4,000 per year. Moreover, the fuel efficiency of steam engines changed little during the period of Watt's patent; while between 1810 and 1835 it is estimated to have increased by a factor of five.
After the expiration of Watt's patents, not only was there an explosion in the production and efficiency of engines, but steam power came into its own as the driving force of the industrial revolution. Over a thirty year period steam engines were modified and improved as crucial innovations such as the steam train, the steamboat and the steam jenny came into wide usage. The

key innovation was the high-pressure steam engine – development of which had been blocked by Watt's strategic use of his patent.

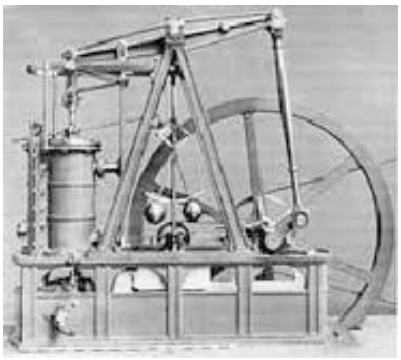
Many new improvements to the steam engine, such as those of William Bull, Richard Trevithick, and Arthur Woolf, became available by 1804: although developed earlier these innovations were kept idle until the Boulton and Watt patent expired. None of these innovators wished to incur the same fate as Jonathan Hornblower.

Ironically, not only did Watt use the patent system as a legal cudgel with which to smash competition, but his own efforts at developing a superior steam engine were hindered by the very same patent system he used to keep competitors at bay. An important limitation of the original Newcomen engine was its inability to deliver a steady rotary motion. The most convenient solution, involving the combined use of the crank and a flywheel, relied on a method patented by James Pickard, which prevented Watt from using it. Watt also made various attempts at efficiently transforming reciprocating into rotary motion, reaching, apparently, the same solution as Pickard. But the existence of a patent forced him to contrive an alternative less efficient mechanical device, the "sun and planet" gear. It was only in 1794, after the expiration of Pickard's patent that Boulton and Watt adopted the economically and technically superior crank.

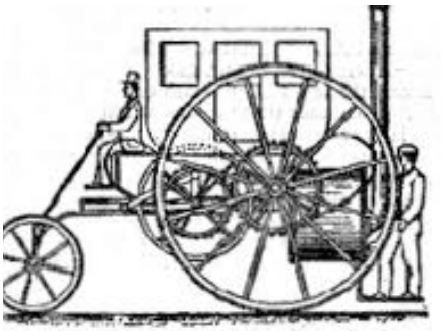
In fact, it is only after their patents expired that Boulton and Watt really started to manufacture steam engines. Before then their activity consisted primarily of extracting hefty monopolistic royalties through licensing. Independent contractors produced most of the parts, and Boulton and Watt merely oversaw the assembly of the components by the purchasers.

In most histories, James Watt is a heroic inventor, responsible for the beginning of the industrial revolution. The facts suggest an alternative interpretation. Watt is one of many clever inventors working to improve steam power in the second half of the eighteenth century. After getting one step ahead of the pack, he remained ahead not by superior innovation, but by superior exploitation of the legal system. The fact that his business partner was a wealthy man with strong connections in Parliament, was not a minor help.

Was Watt's patent a crucial incentive needed to trigger his inventive genius, as the traditional history suggests? Or did his use of the legal system to inhibit competition set back the industrial revolution by a decade or two? More broadly, are the two essential components of our current system of intellectual property – patents and copyrights – with all of their many faults, a necessary evil we must put up with to enjoy the fruits of invention and creativity? Or are they just unnecessary evils, the relics of an earlier time when governments routinely granted monopolies to favored courtiers? That is the question we seek to answer.



In the specific case of Watt, the granting of the 1769 and especially of the 1775 patents likely delayed the mass adoption of the steam engine: innovation was stifled until his patents expired; and few steam engines were built during the period of Watt's legal monopoly. From the number of innovations that occurred immediately after the expiration of the patent, it appears that Watt's competitors simply waited until then before releasing their own innovations. This should not surprise us: new steam engines, no matter how much better than Watt's, had to use the idea of a separate condenser. Because the 1775 patent provided Boulton and Watt with a monopoly over that idea, plentiful other improvements of great



social and economic value could not be implemented. By the same token, until 1794 Boulton and Watt's engines were less efficient they could have been because the Pickard's patent prevented anyone else from using, and improving, the idea of combining a crank with a flywheel.

Also, we see that Watt's inventive skills were badly allocated: we find him spending more time engaged in legal action to establish and preserve his monopoly than he did in the actual improvement and production of his engine. From a strictly economic point of view Watt did not need such a long lasting patent – it is estimated that by 1783 – seventeen years before his patent expired – his enterprise had already broken even. Indeed, even after their patent expired, Boulton and Watt were able to maintain a substantial premium over the market by virtue of having been first, despite the fact that their competitors had had thirty years to learn how to make steam engines.

The wasteful effort to suppress competition and obtain special privileges is referred to by economists as rent-seeking behavior. History and common sense show it to be a poisoned fruit of legal monopoly. Watt's attempt to extend the duration of his 1769 patent is an especially egregious example of rent seeking: the patent extension was clearly unnecessary to provide incentive for the original invention, which had already taken place. On top of this, we see Watt using patents as a tool to suppress innovation by his competitors, such as Hornblower, Wasborough and others.

Hornblower's engine is a perfect case in point: it was a substantial improvement over Watt's as it introduced the new concept of the "compound engine" with more than one cyclinder. This, and not the Boulton and Watt design, was the basis for further steam engine development after their patents expired. However, because Hornblower built on the earlier work of Watt, making use of his "separate condenser" Boulton and Watt were able to block him in court and effectively put an end to steam engine development. The monopoly over the "separate condenser," a useful innovation, blocked the development of another equally useful innovation, the "compound engine," thereby retarding economic growth. This retardation of innovation is a classical case of what we shall refer to as Intellectual Property-inefficiency, or IP inefficiency for short.

Finally, there is the slow rate at which the steam engine was adopted before the expiration of Watt's patent. By keeping prices high and preventing others from producing cheaper or better steam engines, Boulton and Watt hampered capital accumulation and slowed economic growth.

The story of James Watt is a damaging case for the benefits of a patent system, but we shall see that it is not an unusual story. A new idea accrues almost by chance to the innovator while he is carrying out a routine activity aimed at a completely different end. The patent comes many years after that and it is due more to a mixture of legal acumen and abundant resources available to "oil the gears of fortune" than anything else. Finally, after the patent protection is obtained, it is primarily used as a tool to prevent economic progress and hurt competitors.

While this view of Watt's role in the industrial revolution may appear iconoclastic, it is neither new nor particularly original. Frederic Scherer, a prestigious academic supporter of the patent system, after going through the details of the Boulton and Watt story, concluded his 1986 examination of their story with the following illuminating words

Had there been no patent protection at all,...Boulton and Watt certainly would have been forced to follow a business policy quite different from that which they actually followed. Most of the firm's profits were derived from royalties on the use of engines rather than from the sale of manufactured engine components, and without patent protection the firm plainly could not have collected royalties. The alternative would have been to emphasize manufacturing and service activities as the

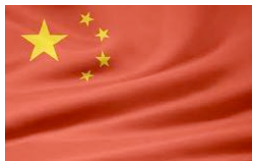
principal source of profits, which in fact was the policy adopted when the expiration date of the patent for the separate condenser drew near in the late 1790s.... It is possible to conclude more definitely that the patent litigation activities of Boulton & Watt during the 1790s did not directly incite further technological progress.... Boulton and Watt's refusal to issue licenses allowing other engine makers to employ the separate-condenser principle clearly retarded the development and introduction of improvements.

Excerpts from **Boldrin & Levine: Against Intellectual Monopoly**

Pictures are from various sources with due thanks

http://www.dklevine.com/papers/imbookfinalall.pdf

China's patent Shop



During its relatively brief history of IP (intellectual property) rights protection, China has achieved early success, thanks to the strengthening of governmental IP rights legislation, the establishment of an IP rights management system, the promotion of public knowledge about IP rights, and increasing opportunities for international exchange and cooperation. IP rights protection in the fields of health and agriculture has increased investment in these sectors, encouraged innovation in health and agricultural science, increased farmers' incomes, and improved the quality of life for Chinese citizens. Dramatic increases in patent applications in China suggest that widespread implementation and greater enforcement of IP rights are stimulating inventive activity, encouraging technology transfer, and driving greater and greater innovation.

The China Patent Administration (CPA) was founded in 1980. China joined the World Intellectual Property Organization (WIPO) in March 1980. The first Chinese patent law was passed in March 1984 and became effective on 1 April 1985. China joined the Patent Cooperation Treaty (PCT) in 1994, indicating that China's IP rights legislation was consistent with international standards. China became a member of the World Trade Organization (WTO) in 2002 and pledged to follow the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) while promoting the development of its own IP rights protection system. The CPA was renamed the State Intellectual Property Office (SIPO) in 1998.

China's patent system has developed quickly in the past 20 years. IP rights regulations, management systems, and publicly available information have gradually improved. In 2006, China ranked fifth in the world for the number of patent applications filed. Chinese IP rights protection covers the following five categories of intellectual property: (1) patents and technological secrets; (2) trademarks and business secrets; (3) software; (4) copyrights; and (5) know-how about technologies, information, instructions, and so on involved in cooperation activities that need to be kept confidential.

In 2006, 573,178 patent applications were filed for three kinds of patents (invention, utility-model, and design). This figure was 4.6 times the number of patent applications filed in 1998. Numbers of patent applications increased by an average of 19.4% each year from 1998 to 2006. There was an average annual increase of 23.9% for inventions, 14.0% for utility models, and 21.4% for designs.

Between 1985 and 2006, the total number of patent applications was 3,334,374, including 1,089,521 inventions (32.6%), 289,868 utility models (38.7%), and 954,985 designs (28.7%). The total number of patents granted by the SIPO from 1998 to 2005 was 1,469,502, including 238,717 inventions (16.2%), 730,573 utility models (49.7%), and 500,212 designs (34.1%). In 2006, 82% of patent applications came from domestic applicants; 18% came from foreign applicants. The number of foreign applications (all of them for inventions) was four times higher in 2006 than it was in 1985.

The Patent Law of the People's Republic of China, passed in 1984, stipulated regulations for IP protection of plant varieties. China entered the International Union for the Protection of New Varieties of Plants (UPOV) in April 1999 as its 39th member. The State Regulation for Protection of Place of Origin and Products was issued in 1995 and the Seed Law was passed in 2000. To date, China has granted protection for a total of 62 categories and species of crops and 78 species of trees. In the agricultural sector, there are more than 150 kinds of products protected by trademarks, and more than 600 varieties have plant variety protection certificates.

New regulations that protect plant varieties have encouraged investment in agricultural research and development. A survey conducted by the Ministry of Agriculture (MOA) of more than 500 patent applications and patent grants revealed that companies contributed 83% of the money invested in the research and development of new plant varieties; the government contributed only 17%. These new regulations have promoted agricultural innovation. In the last 40 years, China has successfully cultivated more than 40 new varieties of different crops and more than 6,000 new varieties. One outcome of this innovation is a 30-40% of increase in grain production in recent years.

The regulations mean that plant breeders have begun to receive economic benefits for their work, which in turn has encouraged them to put still more effort into research and innovation, thus benefiting farmers. As a result, farmers' incomes have increased. In addition, the MOA survey mentioned earlier found that nearly 43 million hectares (ha) had been planted with new plant varieties, increasing yields by 56.3 million tons and increasing farmers' profits by US$2,886 million. Another investigation found that the new, protected varieties of paddy rice protected by IP rights could produce an average profit of US$562 per ha in east China's Jiangsu Province; while ordinary varieties of rice produce an average profit of only US$420 per ha, which is US$142, or 13%, less. The investigation also indicated that the new varieties of paddy rice in southwest China's Sichuan Province produced a 37% higher yield than ordinary varieties.

The number of agricultural patent applications has steadily increased. There were 6,802 applications filed in 2005, 4.4 times the number of applications filed in 1994. In 2005, the total number of patents granted was 3,157, which was 4.5 times the number granted in 1984. China is one of the most prolific filers of applications for IP protection of new plant varieties. According to statistics provided by MOA, the number of applications for variety rights protection increased from 115 applications in 1999 to nearly 1,000 in 2006. There were 3,879 variety rights applications filed in the period from 1999 to the end of 2006, and 899 patents were eventually granted. During the same period, foreign applicants filed 144 patents and five patents were granted (see Table 5). Most applications for variety rights are filed for field crops (90.5%); paddy rice accounts for 31.5% and corn accounts for 39.5%.

Genetically modified cotton: China has a long history of producing cotton and has been a major cotton-producing country for some time. After China joined the WTO, Monsanto quickly established two subcompanies in China and introduced its transgenic pest-resistant (GMPR) cotton. Ninety-six percent of the cotton planted in Hebei Province from 1999 to 2001 was American GMPR cotton. In 1999, 400,000 ha of Chinese soil was planted with American GMPR cotton. In 1999, 65% of the pest-resistant cotton planted was American GMPR cotton; 80% was American GMPR cotton in 2000. Monsanto has since obtained a total of nine biosafety certificates from the MOA: four for corn, one for soybeans, one for oilseeds, and three for cotton. The Chinese government realized that it was important to protect the pest-resistant cotton varieties developed by Chinese scientists. Less American GMPR cotton is now planted, and there is healthy competition between Chinese and American scientists for the GMPR cotton business. To date, China has protected 55 new varieties of GMPR cotton, which makes up 10% of the total amount of all cultivated cotton. More than 6.7 million ha of Chinese GMPR have been planted, yielding profits of close to US$2 billion.

Hybrid rice: Hybrid rice has contributed remarkably to Chinese food security. To date, hybrid rice has been planted on more than 300 million ha of Chinese soil. The current annual yield has been increasing since 1976, and it now feeds 60 million people per year. After approval by the Ministry of Agriculture and the State Import & Export Commission, U.S. Western Petroleum's Ring Round Co. paid for the rights of transferring the Hybrid-Rice Technology via the China Seed Corporation in March 1980. It was the first time in China's history that it made such a paid-technology transfer to the outside. Since the passage of the Regulation for the Protection of New Variety of Plants of the People's Republic of China, a total of 3,879 patent applications have been received for plant varieties; 899 patents have been granted, 280 of them for paddy rice. The Food and Agriculture Organization of the United Nations has listed Chinese hybrid rice as the most important technology for combating food insecurity in developing countries, especially low-income and food-deficit countries.

http://www.iphandbook.org/handbook/ch17/p03/

Class schedule

Topic
Introduction to the course: Scope, objectives, topics
Concept of IP, need for IPRs, various legal instruments to protect IPRs
International Treaties and Conventions affecting agriculture innovation system
Institutional mechanism of the IPR regime in India: Legislation and authorities
Types of agricultural technologies that can be IP enabled
Plant variety protection, Farmers' rights, PPVFR Authority, implementation and implications of rights
IP management structure in publicly funded agricultural research systems: a case study of ICAR
Management of IPs: (i) Assessment of technology and IP audit (ii) Licensing strategies, technology transfer and commercialization (iii) Alliances and partnerships
Interface between IPR regime, public good, biodiversity and environment
Prior art search, filing of application, examination, grant of IPR: A generic overview
Case studies

India's GM seed piracy

BBC science correspondent Pallab Ghosh reveals the extent of GM piracy in Gujarat, India

The farmers here like genetic modification (GM). In fact, they like it so much they are illegally cross-breeding Monsanto's insect-resistant cotton with local plants to create their own GM varieties.

A BBC investigation has confirmed widespread use of pirate seeds.

Our Delhi correspondent, Geeta Pandey, and I went to the town of Mansa, which is the centre of the trade, to see if we could track down some of the illegal material.

The market town is in the agricultural heart of Gujarat; it is in the wild west of India with its own set of rules and its own set of values.

Last year, Gujarat was one of first Indian states to grow Monsanto's novel cotton crop.

Local requirements

The plant contains genetic material taken from a bacterium. The modification makes the cotton plant's tissues lethal to insect pests, including the economically damaging bollworm.

But farmers here claim to have been using their own illegal versions of this so-called BT Bollgard for several years. And it is thought that a half of all the GM seed now sold in the state is pirated.

As we walked along the bustling high street, we came across a stall belting out the latest Hindi hits - no doubt the usual pirate copies. This is very much the chaotic Indian way: pirate tapes, pirate designer clothes and now pirate GM seeds.

We continued on until we came to one of the many seed shops in Mansa. Geeta applied her charm and persuaded the manager to bring out some of the pirated seed, supposedly "bought from a nearby stall".

The seed is made from cross-fertilising the Bollgard plant with local cotton varieties more suited to the unique Gujarat climate - or so it is claimed.

Old ways, new ways

The pirate seed was half the price of the Monsanto product - and as the shop owner became less coy, he explained how last year the illegal varieties had done better than the US agro-giant's original version.

He said he had begun planting illegal seed himself and took us off to see his two-hectare (five acres) farm.

As we walked along the fields, one of the manager's friends told us there were now several illegal varieties containing the bacterium gene. The fields around us had become an unregulated, open-air laboratory for genetic engineering.

Eventually, we arrived at the manager's small plot. The seed had just begun to sprout and to be frank it looked less healthy than the official Monsanto crop planted in a neighbouring field. But as he emphasised to us, his seed was cheaper and he was a poor farmer.

The leader of the Gujarat farmers, Lalshankar Upadhyay, is pressing the state government to legalise seed piracy. As far as he is concerned, farmers have been creating their own varieties to suit their needs for centuries. It is just that now they are doing it with GM.

We asked him if he could take us to the man who is alleged to have started seed piracy in India - DB Desai. He has become known as the "Robin Hood of GM".

Unforeseen consequences

We followed Mr Upadhyay's car as it hurtled along at 100 kilometres per hour to an unknown location.

We met Mr Desai, who said he was not able to give an interview for legal reasons - but he did serve us a very pleasant cup of tea.

I asked him if he liked being called a Robin Hood. "I don't know," he said. "All these legal problems I have..."

I interjected: "But you are popular." He replied: "No one can doubt that." And he laughed.

The trade in illegal seed has become a major issue of concern for Monsanto. The company's director of communication here, Ranjana Smetcheck, said it feared unregulated GM planting could lead to crop failures.

Monsanto's Indian partner has now lodged an official complaint with the Gujarat government, asking it to clamp down on seed piracy.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/2998150.stm

Published: 2003/06/17 20:29:43 GMT

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A peek into the patent portfolio

PAT. NO.	Title
7,787,887	Providing location-based services via wireless networks
7,783,613	Context-aware middleware platform for client devices
7,739,647	Methods and system for configurable domain specific abstract core
7,735,068	Automated relationship traceability between software design artifacts
7,716,254	System for modeling architecture for business systems and methods thereof
7,716,151	Apparatus, method and product for optimizing software system workload performance scenarios using multiple criteria decision making
7,675,946	System and method for managing playout time in packet communication network
7,664,989	Automated software testing architecture using a multi-level framework
7,546,222	System for performance and scalability analysis and methods thereof
7,286,546	Method and system for providing reliable and fast communications with mobile entities
7,209,269	Displaying holographic three dimensional images
6,751,297	Method and system for multimedia network based data acquisition, recording and distribution