

Patents in a public research center: the case of the national institute of forestry, agricultural and livestock (INIFAP)

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Abstract

In this paper various documents were analyzed to determine the state of the art industry-wide patents and plant variety to compare the situation in Mexico with selected countries and the importance for a country to develop its scientific - technological apparatus and contribute to there being less technological dependence to try to bridge the gap between developed and developing countries.

Patents, Plant breeder's right, Plant Varieties, Information and State

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Introduction

The word patent derives from the Latin *patens*, *-entis* emerged for more than 2,500 years ago in the Greek city of Sibaris. In the year of 1427, the Venetian Republic decreed the obligation to inform the State all inventions that were taken to the practice and in the year of 1623, England sets a Statute, which established that only the patents may be granted to inventive projects (Rangel, 2009). According to the Royal Academy of the Spanish Language, the meaning of patent is being discovered, manifest (DRAE, 2015). On the other hand, at the global level, a patent is defined as a right granted by the government to an inventor or his successor in title (secondary holder).

This right allows the owner to prevent third parties making use of the technology. The owner of the patent is the only one who can take advantage of the technology that is claimed in the patent or authorizes others to deploy under the conditions that the holder attach.

Patents are granted by States for a limited period of time that currently, according to the rules of the TRIPS agreement, is twenty years. After the expiration of the patent, any person can make use of the technology without the consent of the holder. The invention enters then to the public domain (Free Encyclopedia 2015).

In Mexico, the institution responsible for granting the patent rights is the Mexican Institute of Industrial Property (IMPI, 2015). This entity points out that the patent is the certification that the Government grants, to both individuals and groups, to allow them to exploit inventions exclusively consisting of new products or processes for a non-extendable period of 20 years counted from the corresponding request (Sanchez, 2015).

On the other hand, and because the INIFAP works primarily with vegetable organisms, the instance that is responsible for granting the rights to inventions is the National Seed Inspection and Certification System (SNICS) from the Secretariat of Agriculture, Livestock, Rural Development, Fishing and Food (SAGARPA). The plant breeder's right (TO) is the term used and awarded by the SNICS that grants the rights over an innovation and gives recognition to the person or group of people responsible. To obtain a plant breeder's right, individuals need to demonstrate a process of improvement and development of a vegetal variety, of any genus and species, which must be new, different, stable and homogeneous (SNICS, 2015).

Patents allow countries to encourage the generation of inventions that subsequently would stimulate innovation.

Therefore, they are expected to boost the economy of the country by generating value, sources of employment, earning foreign currency, track exports or reduction of the output of the same through imports, a situation that in a combined way favors the trade balance of nations.

Also, patents, as a result of innovation, can increase productivity in different economic sectors. The interest in this study is the primary sector (agriculture, livestock, and forestry). In the scope of INIFAP, because of its research and innovation activities, its greater effort, regarding obtaining patents, focuses on the achievement of the Plant breeder's right that the SNICS grants. Achievement of these breeder's right gives to INIFAP the following privileges:

- To have recognition of being the owner of a plant variety.
- Breeder's rights are not portable (correspond only to the INIFAP) and imprescriptible.

- To develop and exploit, in an exclusive fashion and on a temporary basis, by itself or by third parties with your consent, a plant variety, and its propagation material, to their production, reproduction, distribution or sale, as well as for the production of other plant varieties and hybrids for commercial purposes.

These rights have a period of protection of 15 years for short-cycle species (grasses, vegetables) and 18 years for perennial species (forestry, fruit vines, ornamental) and their rootstocks by the Law of Plant Varieties. These terms will have validity from the date of issue of the Plant breeder's right, and after expiration, the plant variety, use, and exploitation would pass to the public domain. The present study aims to give knowledge about the current and future importance of the development of innovative projects have for research, innovation and transfer of technology centers. This paper also discusses the importance of financial aid to support innovative research projects, its positioned in the market and its future accessibility to the public domain (mainly primary producers).

Methodology

The methodological process of the literature review consisted of three phases:

Integration of a multidisciplinary work team composed of three entities; two institutions of higher education and one of agricultural research and forestry with national coverage. Likewise, three investigators and two research assistants of the organizations referred before made contributions with their experience in various disciplines such as economics, agriculture, and livestock farming, agro-industries, strategic planning, farm management, rural development, analysis of strings, statistics, and prospective studies.

Identification and review of documents that are related to the themes of patents and achievement of Plant breeder's right. The search centralized information of the Mexican Institute of Industrial Property (IMPI) and the National Service for Seed Inspection and Certification (SNICS), as well as various educational institutions, articles, magazines and internet searches.

Classification and analysis of the information for which there was a distribution of documents between the research team. The information was classified in historic character data, conceptual framework, and statistics at global, national and INIFAP level. First, a bibliographic tab on a card was made with a summary for later and in the event of data of statistical data dump information in an Excel sheet to subsequently make the graphics. To facilitate understanding, the conceptual framework of the patents is presented in Figure 1.

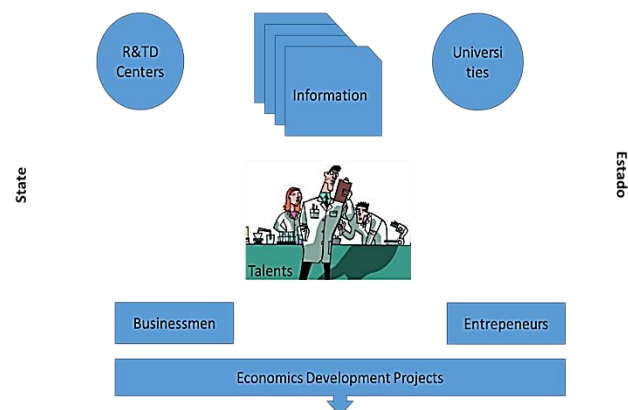


Figure 1 A theoretical model of a key factor in the patents development

The talent of the investigators is the motor shaft to make patents since ideas are generated through them for new products or processes considered would be of benefit to the society they serve.

The information is essential in the process of patents, as it allows to know the state of the art of the big issues that act as a framework and inspiration to sustain the ideas.

The Centers for Research, Innovation and Technological Development National, and International together with the public and private educational institutions, are the spaces favorable to the exchange of ideas, experiences and methodologies to develop the experiments, prototypes, or technological innovation projects. The entrepreneurs, as well as the entrepreneurs in occasions, are linked to these institutions are devoted to generating the prototypes for being able to carry them out at the level of pilot testing and propose the results to test the market and its possible acceptance by consumers or users.

What is expected of the innovations, i.e., patents, it is to generate economic development projects in the field of their implementation. In the case of the INIFAP, the targets are the primary producers of the rural environment and preferably smallholders with few levels of use of technological packages to increase the production of their crops. All this is framed within the governmental sphere that is responsible for governing and regulating the activities for patenting; in the case of industrial and services, the entity that controls is the IMPI and in the agricultural sector, the SAGARPA is supported mainly in the registration of new plant varieties by the SNICS.

Development and Results

Global patents, based on information from the World Intellectual Property Indicators (WIPO) in its report 2014, recorded 2.6 million patents in the world and 81% of them in 2013 were conducted in five countries: China, United States of America, Japan, Republic of Korea and the European Community.

The growth in the number of patents in the previous year (2012) was 9 percent and the countries that showed the highest growth rates are shown in Table 1.

Countries	Growing rate. 2013 to 2012 difference
China	26.4
Australia	12.7
The Republic of Korea	8.3
Hong Kong	7.1
Republic Islamic Irán	5.3

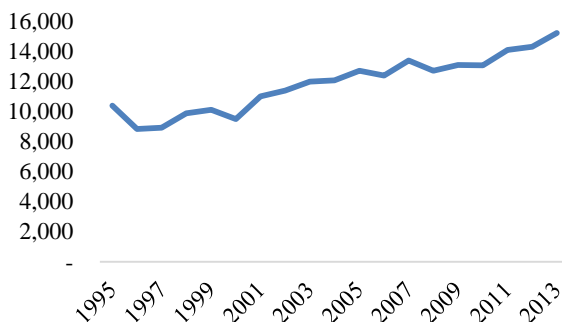
Table 1 Growing rate in percentage (2013 to 2012 difference), five leading countries *Source: WIPO. 2013*

The fields of knowledge that provided the highest growth were five and between them covered 28 per cent of the applications in the patents and these areas were as shown in Table 2.

Technological fields	Growing rate from five technical areas
Measurement	21.7
Machinery and electronic devices	18.4
Information technologies	13.6
Digital communication	12.5
Medical technology	10.0

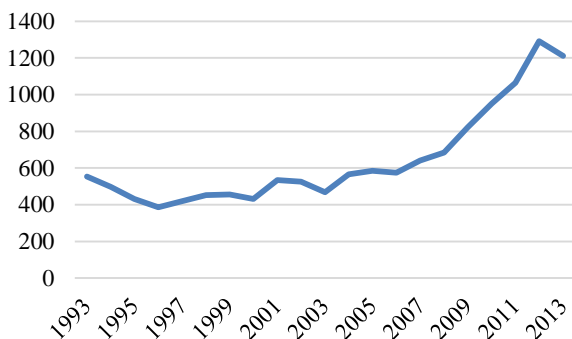
Table 2 Primary fields of knowledge with the highest growth rate in 2013 regard to 2012. *Source: WIPO. 2013*

Regard to plant varieties, in the period 1995-2013, arose from 10,390 to 15,200 rights, which represented an average annual growth rate of 2.02 percent as shown in Graphic 2.



Graphic 1 Plant breeder's rights of the world during the period 1995-2013.

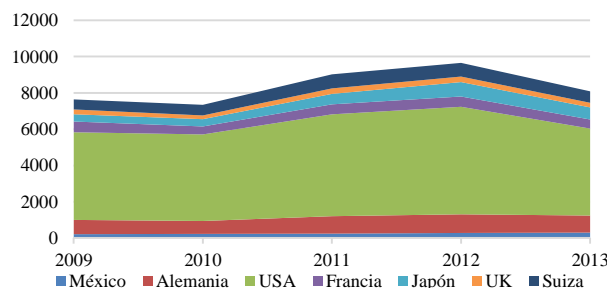
It is shown in Graphic 1 a favorable trend with falls in the years 1996, 2000, 2006, 2008 and 2010 but a slope of active type during the period indicated. In the case of Mexico, during the period 1993 to 2013 (21 years), the behavior of invention applications is shown in Graphic 2.



Graphic 2 Invention application numbers during the 1993-2013 period. *Source: IMPI. 2013*

Graphic 2 shows the number of inventions that are registered in Mexico. The graph leads to a picture where there is a little culture on patenting inventions that will lead the country to position itself as a competitive nation at the global scale. Figure 3 shows two phases, the period 1993 - 2006 in which virtually decreases to its minimum in 1996, with 386 requests and reaches 2006 virtually to their 1993 level.

However, at that moment, the second phase shows an active growth, which reached its highest level in the year 2012 with 1292 requests. As a way of comparison and with data of IMPI, Graphic 3 shows the number of patents granted per country during the period of the past five years.



Graphic 3 Patents issued per country 2009 – 2013. *Source: IMPI. 2013*

The contribution of Mexico in the world concert of patents is subtle, as noted in the first line of Figure 4; since its involvement about the global total is only 2.9 percent. The country that stands out is the United States of America with the 46.3% of the total patents granted.

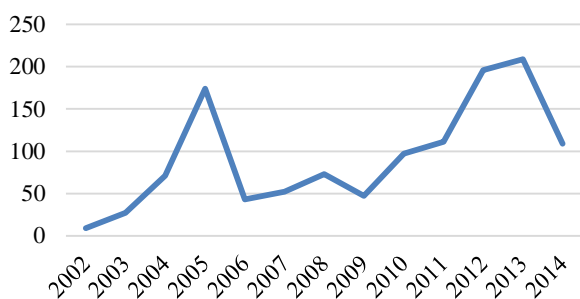
In the case of Plant breeder's rights in Mexico, the information generated by the National Service for Seed Inspection and Certification from the SAGARPA was taken as reference (Table 3).

Application status	Number	Percentage
Breeder's rights issued	1,217	65.6
Certificates on record	147	7.8
Expirations	272	14.6
Desistances	73	3.9
Negative opinion	49	2.6
Waiting for approval	100	5.4
Total	1,858	100.0

Table 3 Applications presented during 1996 al 2014. *Source: SNICS*

From the table above, more than half of the applications were issued as breeder's rights of various plant varieties. A little less than 15% are rights that already fulfilled its period of validity, and now they are available to all types of public. In order of importance, 247 applications, which represent 13.2% of the universe, are in the process of being qualified as Certificates on record or are in the course of being evaluated. Only 6.5% of the applications represents withdrawal and negative opinions.

The number of Plant breeder's rights and its evolution from 2002 to 2014 is shown in Graphic 4.



Graphic 4 Plant breeder's rights granted by SNICS during the period 2002 to 2014. *Source: SNICS*

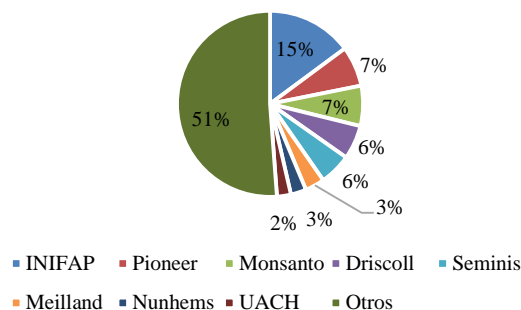
The growing trend of the registration of plant varieties in the Mexican agricultural sector is highlighted, except the falls in the years 2006, 2009 and 2014. From the rights that were awarded, the leading country that recorded before the SNICS was Mexico with 35%. The United States of America with 33% were very close. Meanwhile, the Netherlands with 17%, and France with 4% followed in order of importance respectively. Germany showed 2% and other countries accounted the remaining 8%. Grouping by type of crops, the following are highlighted regarding percentage: agricultural 41%, ornamental 24% and fruit vegetables 13%.

To classify breeder's right by breeder, institutions and companies that stand out are the ones shown in Table 4.

Institution or Enterprise	Numbers
National Institute for Forestry, Agriculture and Livestock Research	276
Pioneer Hi-bred International	130
Seeds and Agro products Monsanto	130
Driscoll Strawberry Associates, Inc	110
Seminis Vegetables Seeds, Inc	103
Meiland International, S. A.	63
Nunhems B. V.	50
Chapingo Autonomous University	45
Other breeders	951

Table 4 Organizations that developed breeder's rights. *Source: SNICS*

From table 4. INIFAP is at the top of the list followed by six transnational corporations and the Chapingo Autonomous University appears after as another actor within the registration process of plant varieties to boost the Mexican countryside. Graphic 5 shows the participation of each of the actors involved in the patents (plant breeder's rights) of the agricultural sector.



Graphic 5 Percentage participation of research centers, private sector and academic institutions over plant breeder's rights applications. *Source: SNICS*

At the INIFAP level, the involvement in the field of patents is minimal as can be seen in Table 5.

Description	2010	2011	2012	2013	2014
Plant breeder's right	37	41	43	64	10
Copyright	82	108	25	27	
Patents					2
Trademark	2	2			
Total	121	151	68	91	12

Table 5 Industrial and vegetable property: INIFAP period 2010 – 2014. *Fuente: SNICS*

According to Table 5, INIFAP has a weak contribution in the field of patents with only two registered in the period studied, and they refer to vaccines for cattle. In plant varieties, the situation is different, as mentioned earlier, INIFAP occupies a predominant place in the field of seeds.

Conclusions

Mexico, as many developing countries have a reduced participation in the global process of patents, as their presence is a little less than 3%. However, the country possesses an important piece of infrastructure coming from research centers in science, technological development, and innovation, and centers of education at higher levels, both public and private, globally recognized that in some cases placed Mexico at the level of developed countries.

Another significant strength is the body of talents from various disciplines with proven ability to develop research projects of high quality. The regulatory framework is executed with adequate management using two institutions: the Mexican Institute of Industrial Property and the National Service for Seed Inspection and Certification. The first one is dedicated to the industrial and service sector, the former to the primary sector, within the scope of the development and improvement of new varieties. A body whose head of the area is the SAGARPA.

INIFAP, as Public Research Center (ICC), has a national coverage which allows covering the four agro-ecological regions and using genetic improvement and recently through biotechnology, develops plant varieties that fundamentally are registered within the sectoral program of the SAGARPA, as strategic products. This allows INIFAP to position itself at the head of the entities that work in the development of varieties, including companies which exceed regarding budget for these activities. The plant varieties that INIFAP develops are released under an agreement of goodwill with national and international seed businesses and are put to the scope of the food producers to improve their quality and productivity which will impact on an improvement of their income and their welfare.

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