

Economic prospects and current situation of the planter manufacturing industry in Mexico

Abstract

Mexico imports 14 million pesos in seeders of which 53% is from the United States, 16.6% from France, 11.4 from Italy, 8.7 from Brazil, 5.5% from Spain and 4.7% from others countries. Donoso¹ It is estimated that there is a market of Seeders of about 3,000 machines/year. About 1800 imported and another 1200 of national manufacture, of them 500 of Direct Sowing approximately. The objective of this work is to analyze the situation of the planter manufacturing industry and its economic prospects for the future in Mexico. Mexico in the segment of planters unlike the segments of tractors and combine harvesters, in which in the first only meet manufacturers and in the second it does not even exist in the country, has a national industry of manufacturing of planters strongly rooted in the country with its own technology. This situation was evidenced by not allowing the emergence of Argentine planters, as well as infrastructure to continue the research and development of new designs of seeders in the four agricultural institutions led by the Universidad Autonoma Chapingo. It must be invested in Precision Agriculture technology With seeders with intelligent metering so as not to be left behind this industry. If this condition is put into practice the economic outlook is very encouraging for this segment of the national agricultural machinery industry.

Keywords: seeders, planters industry, mexico, agricultural machines, manufacturing

Volume 2 Issue 3 - 2018

Jaime Cuauhtemoc Negrete

Department of Agronomy, Agrarian Autonomous Antonio Narro University, Brazil

Correspondence: Jaime Cuauhtemoc Negrete, Department of Agronomy, Independent researcher on issues of agricultural Mechatronics, Graduate in Agrarian Autonomous Antonio Narro University, Brazil, Email temoneg@gmail.com

Received: July 11, 2017 | **Published:** June 25, 2018

Introduction

Mexico imports 14 million pesos in seeders of which 53% is from the United States, 16.6% from France, 11.4 from Italy, 8.7 from Brazil, 5.5% from Spain and 4.7% from others countries. Donoso¹ It is estimated that there is a market of Seeders of about 3,000 machines / year. About 1800 imported and another 1200 of national manufacture, of them 500 of Direct Sowing approximately. Predominates the need for planter of coarse grain - conventional - and direct seeding of fine and coarse grain with fertilization. In Mexico, the production of seeders is mainly oriented to the domestic market, but sporadically they are exported. As in other markets, the segment of planters and agricultural implements has more local characteristics, with medium-sized manufacturers that also export and import. The number one seed vendor is Monosem (of French origin), with three-point machines and fertilization with pneumatics distribution. In Mexico, about 180 machines of this brand are sold per year. They are 2 and 4 rows and in a small scale the 6 rows. The price varies from 7000\$ US, the two-row; To 13,000 the four-row. Another machine that has wide diffusion is the GEHO_PRECISA of 4 pneumatic grooves with hoe or double disc. The most sold seed brands are: Monosem, Gheo, Terramac, Gallinagini, Sampopa, Dobladence, FAMAQ, etc. Bragachini² Seeders. They are machines designed to dispense a certain amount of seed and place them on the ground, according to a certain standard of distribution.³ They can be of direct or conventional seeding, fine or coarse grain, precision or bytrickle, mechanical or pneumatic. Optionally, they have single or double localized fertilization systems (solid or liquid) and / or application of pesticides (solids or liquids). With the diffusion of direct sowing, the work destined to the preparation of the seed bed, which is characteristic of the traditional method such as the primary plow and the mechanical control of weeds, was significantly reduced. Direct sowing, unlike the conventional system, requires seeders that allow to implant the crops in batches with surface stubble treated with agrochemicals. In this case, the planter deposits the seeds with the necessary fertilizer for their development in a narrow strip of soil

prepared by a series of implements (chisels, discs and others) placed in front of the sowing bodies.

In turn, they can be of fine grain (wheat) or coarse (soybean and corn), depending on the size of the seed and its distribution in the land. The first ones deposit the seeds uniformly in line on the surface of the lot, for which they count with a hopper with dosage to trickle or of precision, whereas those of coarse grain distribute the seeds in rows with a certain distance of separation between them. The latter have individual seed bodies fed hoppers that dose the amount of seeds deposited in each row. The objective of this work is to analyze the situation of the planter manufacturing industry and its economic prospects for the future in Mexico.

Materials and methods

A thorough search was carried out indatabases internet of things, libraries, etc., in indexed journals, periodicals, and other available databases.

Imports and exports

Table 1

Table 1 Imports, exports of planters from 2000 to 2008. Own elaboration with data from FAO stat

| planters | imports | exports |
|----------|---------|---------|
| 2008 | 5541 | 96039 |
| 2007 | 15328 | 89262 |
| 2006 | 4718 | 119407 |
| 2005 | 4966 | 130412 |
| 2004 | 4030 | 72575 |
| 2003 | 2271 | 35974 |
| 2002 | 2296 | |
| 2001 | 82206 | |
| 2000 | 47993 | |

Manufacture in the country

This is done without the participation of large brands, which is why Mexico should take advantage of this situation and develop the agricultural machinery industry in this sector, and strongly support the industries that are engaged in this, such as local manufacturers Of seeders that are 5 in the area of Bajío or center of the country, in addition to others in other regions of the country, among them produce about 1500 seeders of which a good amount are for Direct seeding. The seeders that produce are all of 3 points, those of coarse grain with mechanical distributor and pneumatic of national origin. They are of 2 and 4 furrows to 80 cm with robust construction, with distributor of fertilizer to the broadcast and located. The fine-grained ones are crawling. The design technology is rudimentary, but the product is adapted to the conditions of production of the Bajío and to the idiosyncrasy of the local producer. Bragachini² The companies that are dedicated to the production of seeders are the following:

Doblados seeders

It is a 100% Mexican company located in Manuel Doblado Gto. Of the manufacturer Gelario Preñado that at the beginning of 1976 begins with the manufacture of mills of nixtamal, and of grains, later it begins with the manufacture of disk plows, nevertheless to not having results it begins with the manufacture of seeders of corn what Is a success, and it was in 1979 when the machining of molds for seeders began, in 1980 the brand registration is acquired and an increase in demand is seen, so that there is a need to expand the small facilities that at that time worked for The first factory was inaugurated in 1985. In addition to the maize planters, we also manufacture plows, rakes, levelers, edgers, edgers, cultivators, in 1991 the first demonstrations are started, in direct sowing, redesigning The direct-seeding maize planter, and when it is decided to specialize in seeders, which in 1997 required more advanced technology and state-of-the-art equipment, it offers 4 models of traditional seeders, 7 direct mechanical and pneumatic seed models, fine grains Of direct sowing 3 models and of traditional sowing 2 models

Del bajío seeders

It is a 100% Mexican company located in Manuel Doblado Gto. Founded on November 9, 1999 by Baltasar Preciado dedicated to the manufacture of agricultural machinery of direct planting, started work in a temporary warehouse in the ranch Vallado de la Prisión, at the same time began the construction of a suitable factory, eleven people started Production and currently exceeds 190 elements

Famaq seeders

The company began its work in the agricultural turnaround in 1994, in Pénjamo Gto by a group of visionary shareholders committed to their community and country. Led by Juan Carlos Díaz. At that time, the company used its productive capacity for the design and

manufacture of agricultural implements. Currently FAMAQ is the only company in the republic that has certified seeders from OCIMA. It has 10 models of seeders of direct seeding as traditional, in mechanical and pneumatic models. NegreteSeeders Industries of Mr. Manuel Negrete have their facilities in Pénjamo Gto ZetaSeeders, S.a. De C.V. Manufacture of seeders for maize, sorghum and beans. Traditional seed drill, z-3000, zero tillage in Guadalajara, Jalisco

Lucatero seeders

Owner Gabriel Lucatero Who makes seeders in Morelia, Michoacán

Vázquez seeders and implements factory

It had its beginnings in the year of 1937. In Sonora state of Mexico at first it counted on only a blacksmith shop in charge of SR. Pedro Vázquez García. By the year 1950, the technology of the time that was implemented allowed the workshop to be possible to repair agricultural implements and, thanks to the momentum of agriculture in those years, the workshop grew to become a successful company itself That in the year of 1962 took the commercial name of Industrias Vázquez SA At that time, the company was attended and managed by Mr. Pedro Vázquez García and son. In 1967, the commercial success of the company in conjunction with the growing activity of the Yaqui Valley allowed the acquisition of a land located in Norman E. Borlaug #5801 where later it was founded a plant of production of agricultural implements and parts of the company, Which increased the penetration and sales of the company allowing other members of the family Vázquez Garcia to join the administration with what the commercial name of the company changed to what we all know today; Industrias Vázquez S.A. Of C.V. Manufactures wheat seeders and seeders of minimum tillage. The prototype of a seeder for permanent beds that was developed in Mexico, is being manufactured in several workshops. The Vázquez seeder and implements plant is manufacturing the seeders following the recommendations of the International Maize and Wheat Improvement Center (CIMMYT) and is marketing them in the north of the Mexican Republic. There are also other companies that have shown interest and are developing their own versions.

Research on seeders

Also there are investigations in seeders made by different authors and institutions; in the Antonio Narro Agrarian Autonomous University has given impetus to research in the evaluation system of metering precision seed allows monitoring the quality and efficiency of metering mechanisms for service industry agricultural machinery as well as facilitate the teaching and research systems varying doses of seeds, planting prescriptions changes.⁴ In the autonomous university chapingo has been given due importance to the design and innovation of seeders, as shown in the following Table 2 is the institution that most thesis design of seeders has.

Table 2 Bachelor's and master's thesis developed at UAAAN, UNAM, Autonomous Chapingo University and University of Guanajuato

| | | |
|--------------------------------|------------------------|---|
| Autonomous Chapingo University | Torres ⁵ | Intelligent Seed and Fertilizer Dosing System in Seeders-Fertilizers |
| Autonomous Chapingo University | Perez ⁶ | Design of an air-assisted direct seed drill |
| Autonomous Chapingo University | Rosales ⁷ | Design of a wheat planter coupled to a two wheels tractor |
| Autonomous Chapingo University | Lopez ⁸ | Development and evaluation of a multi-purpose seeder operated by a two-wheeled tractor |
| Autonomous Chapingo University | Fernández ⁹ | Design of a stationary planter of garlic cloves (<i>Allium sativum</i>) with apex orientation |
| Autonomous Chapingo University | Flores ¹⁰ | Design of a mycorrhizal doser coupled to a mechanical seed drill |

Table Continued...

| | | |
|--------------------------------|-------------------------------------|---|
| Autonomous Chapingo University | Mendieta ¹¹ | Corn seed metering mechanism or fertilizer for versatile sowing |
| Autonomous Chapingo University | García ¹² | Design of a pneumatic seed metering mechanism for double-row grain planting |
| Autonomous Chapingo University | Sanvicente, Merino ¹³ | Design of a fertilizer planter, pesticide applicator for conservation tillage |
| Autonomous Chapingo University | Martínez ¹⁴ | Design of a sowing machine associated with animal traction (maize and bean) |
| Autonomous Chapingo University | Balderas ¹⁵ | Design of a small-grain planter for the multi-plow |
| Autonomous Chapingo University | Salazar ¹⁶ | Design of a bean planter (<i>Phaseolus vulgaris</i> L.) |
| Autonomous Chapingo University | Ramírez ¹⁷ | Design of a lentil planter for animal traction |
| Autonomous Chapingo University | Martínez ¹⁸ | Design of a unit seed drill |
| UAAAN | Reynolds ¹⁹ | Design of an intelligent pneumatic seed dosing system |
| UAAAN | Segundo ²⁰ | Design of an Intelligent Seed Dosing System, Based on the Use of Microcontrollers (Phase I: Evaluation of Pneumatic Dosifiers). |
| UAAAN | Santos ²¹ | Design, Construction and Evaluation of a Manually Arranged Vegetable Seeder |
| UAAAN | Arellanes ²² | Redesign of a planter coupled to a two-wheeled tractor for walnut |
| University of Guanajuato | Prieto ²³ | Design of a seed drill for granulated material |
| University of Guanajuato | Chavez ²⁴ | Design of the drive system of a precision pneumatic seed drill for garlic |
| University of Guanajuato | Ferreira ²⁵ | Design and construction of an amaranth planter coupled to an agricultural tractor |
| University of Guanajuato | Gomez ²⁶ | Design, construction and testing of a prototype animal draft planter for intercropping |
| University of Guanajuato | Marquez ²⁷ | Construction of a lentil planter for animal traction |
| University of Guanajuato | Venegas ²⁸ | Adapting a seed drill to a high clearance two wheels tractor |
| University of Guanajuato | Palafox ²⁹ | Design of a seeder for the tractor SIDENA 310 |
| UNAM | Torrez ³⁰ | Design and construction of a portable maize seed drill |
| UNAM | Olivera ³¹ | Design, construction and testing of a seed drill |
| UNAM | Toro ³² | Design of a garlic planter |

Discussion

Here in this segment of capital goods whose useful life is approximately 20 years according to Lopez & Hetz³³ it is important to highlight the research work that is being carried out by a team of Argentine researchers led by the expert in precision agriculture Mario Bragachini and who has already Fruitful to get 3 Argentine companies to join to enter the Mexican market of seeders. This team already identified the need for Mexican agriculture in; Seeders of Direct Seeding of 4 and 6 rows of drag to 76cm with wheel adapted to the irrigation gauge by furrow 1.5m, with fertilization and equipment of Precision Agriculture (variable dose). The companies are; Crucianelli or Metar SRL (Armstrong), Apache (Las Parejas) and VHB (Oncativo, Córdoba) which, from a strategic union, proposed the following objective: to design, manufacture and export Direct Seeding equipment to compete with conventional seeders that exist in the Mexican market. There, the agricultural production units require machinery of smaller size than those that are manufactured for Argentine producers. The project is called "315", and aims to develop a seed drill with a working width of 3.15 meters and a smaller number of grooves, suitable for floors with unevenness such as those in Mexico. The equipment also has the technological contribution of the company Verium, which is dedicated to the equipment of variable seed metering mechanisms, finally developed the seed drill NSFS 2400 As far as the characteristics of the seed drill, besides being of three points, it presents / displays equipment developed for widths of Work up to 4,50 mts; Fulfills the functions of sowing, fertilization

and refertilization; Possibility of lodging between 2 and 8 lines of planting; Can work in drag condition or coupled to a 3 point hitch; Suitable for the assembly of a tank for liquid fertilization, among others. Given the large structural differences and the regional disparity, which hinder the productivity of the sector, there are initiatives that increase the performance of farms and modernize the work processes, as the decapitalization of the countryside and in general of agriculture continues, With the polarization of capital by industry and commerce.

In order to carry out the above, it will be necessary to have new technology and capital goods such as agricultural machinery, because as Lavarello³⁴ states, the persistence of the capital goods industry as a vector of diffusion of technical progress is The primary reason to promote it, for which we must establish strategies as are the manufacturers of Argentine planters to advance in the competitive globalized world today, in our case CIMMYT can coordinate the domestic manufacturers to strengthen in the Mexican market, As well as to make alliances with the Argentine manufacturers that are leaders in direct sowing at international level, in manufacturing of harvesters they have the experience of a century at the same time that the transnational companies, and in tractors they have the impetus of realizing alliances to remake its National manufacturing industry of tractors, since they have been together with Brazil in Latin America those who have had a local industry of manufacturing of tractors, at present Pauny and Agrinar make them in Argentina, later the same can be done for the other goods of capital in agriculture such as plows, harrows, sprays and other agricultural implements.

Conclusion

Mexico in the segment of planters unlike the segments of tractors and combine harvesters, in which in the first only meet manufacturers and in the second it does not even exist in the country, as a national industry of manufacturing of planters strongly rooted in the country with its own technology. This situation was evidenced by not allowing the emergence of Argentine planters, as well as infrastructure to continue the research and development of new designs of seeders in the four agricultural institutions led by the Autonomuos Chapingo University. It must be invested in Precision Agriculture technology With seeders with intelligent metering so as not to be left behind this industry. If this condition is put into practice the economic outlook is very encouraging for this segment of the national agricultural machinery industry.

Acknowledgements

None.

Conflict of interest

Author declares that there is no conflict of interest.

References

- Donoso J. Situación del sector de maquinaria agrícola en América Latina. *Argentina*. 2007.
- Bragachini M. Informe del viaje a México. *Febrero de*. 2011; 2.
- Mialhe LG. Máquinas Agrícolas: ensaios & certificação. FEALQ. Piracicaba, SP. 1996. 772p.
- Campos MSG, Cadena ZM, Ramirez FG. Desarrollo de equipos, sensores e instrumentos para agricultura de precision y labranza de conservacion. *Premio Innavigro*. 2014.
- Torres SJ. Sistema inteligente de dosificación de semilla y fertilizante en sembradoras fertilizadoras. *Tesis de Maestría*. 2015.
- Perez RJL. Diseño de una sembradora de siembra directa asistido por aire. *Tesis (Ing. Mecánico Agrícola) UACH*. 2015.
- Rosales MDM. Diseño de una sembradora de de trigo acoplada a un minitractor. *Tesis (Ing. Mecánico Agrícola) UACH*. 2015.
- Lopez GJA. Desarrollo y evaluación de una sembradora multiuso-multicultivo accionada por un tractor de dos ruedas. Tesis (Maestro en Ingeniería Agrícola y Uso Integral del Agua) UACH. *Posgrado en Ingeniería Agrícola y Uso Integral del Agua*. 2014.
- Fernandéz SD. Diseño de una maquina sembradora estacionaria de dientes de ajo (*Allium sativum*) con orientación del ápice. *Tesis (Ing. Mecánico Agrícola) UACH*. 2013.
- Flores LD. Diseño de un dosificador de micorrizas acoplado a una sembradora mecánica. *Tesis (Ing. Mecánico Agrícola) UACH*. 2009.
- Mendieta AE. Dosificador de maíz o fertilizante para sembrador versatile. Tesis (M.C. en Ingeniería Agrícola y Uso Integral del Agua) UACH. 2009.
- García GR. Diseño de un dosificador neumático para la siembra de grano a doblehilera. *Tesis (Ing. Mecánico Agrícola) UACH*. 2008.
- Sanvicente LD, Merino SM. Diseño de una sembradora fertilizadora, aplicadora de plaguicidas para labranza de conservación. *Tesis (Ing. Mecánico Agrícola) UACH*. 2004.
- Martínez HR. Diseño de una sembradora de cultivos asociados de tracción animal (maíz y frijol). *Tesis (Ing. Mecánico Agrícola) UACH*. 2003.
- Balderas SF. Diseño de una sembradora de granos pequeños para el multiarado. *Tesis (Ing. Mecánico Agrícola) UACH*. 1995.
- Salazar Vilchis, Pablo. Diseño de una sembradora de frijol (*Phaseolus vulgaris L.*). *Tesis (Ing. Mecánico Agrícola) UACH*. 1995.
- Ramírez. Diseño de una sembradora de lenteja para tracción animal. Tesis (Ing. Mecánico Agrícola); UACH. Departamento de Ingeniería Mecánica Agrícola. 1994.
- Martínez JR. Diseño de un dosificador para sembradora unitaria. *Tesis (Ing. Mecánico Agrícola) UACH*. 1993.
- Reynolds CMA. Diseño de un sistema inteligente de dosificación neumático de semilla. *Tesis maestría UAAAN*. 2006.
- Segundo RG. Diseño de un sistema inteligente dosificador de semilla, basado en el uso de microcontroladores (FASE1: Evaluación de Dosificadores Neumaticos). *UAAAN:DIV-Ingenieria-Mecanico Agricola-Licenciatura*. 2004.
- Santos EA. Diseño, Construcción y Evaluación de una Sembradora de Hortalizas Acondicionada manualmente. *UAAAN:DIV-Ingenieria-Mecanico Agricola-Licenciatura*. 1993.
- Arellanes OJC. Rediseño de una sembradora mecánica acoplada a un motocultor para nogal L. *UAAAN:DIV-Ingenieria-Mecanico Agricola-Licenciatura*. 2006.
- Prieto GAC. Diseñoi de una sembradora para material granulado. *Tesis Licenciatura Universidad de Guanajuato división de ciencias de la vida*. 2015.
- Chavez EEP. Diseño del sistema de accionamiento de una sembradora neumática de precisión para ajo. *Tesis Licenciatura Universidad de Guanajuato división de ciencias de la vida*. 2007.
- Ferreya JJS. Diseño y construcción de una sembradora de amaranto aacoplada a un tractor agrícola. *Tesis Licenciatura Universidad de Guanajuato división de ciencias de la vida*. 2001.
- Gomez CA. Diseño, construcción y pruebas de un prototipo de sembradora de tiro animal para cultivos intercalados. *Tesis Licenciatura Universidad de Guanajuato división de ciencias de la vida*. 1998.
- Marquez CH. Construcción de una sembradora de lenteja para tracción animal. *Tesis Licenciatura Universidad de Guanajuato división de ciencias de la vida*. 1997.
- Venegas JC. Adaptacion de una sembradora a un motocultor de alto despeje. *Tesis Licenciatura Universidad de Guanajuato división de ciencias de la vida*. 1987.
- Palafox CT. Diseño de una sembradora para el tractor SIDENA 310. *Tesis Licenciatura Universidad de Guanajuato división de ciencias de la vida*. 1987.
- Torrez CD. Diseño y construcción de una sembradora portatil para maíz. *Tesis Maestría en Ingeniería (Mecánica) UNAM, Facultad de Ingeniería*. 2000.
- Olivera DLR. Diseno construccion y pruebas de una sembradora para semillas. *Tesis Ingeniero mecanico electricista UNAM, Facultad de Ingeniería*. 1982.
- Toro MJA. Diseno de una sembradora de ajo. *Tesis Maestría en Ingeniería (Mecánica) UNAM, Facultad de Ingeniería*. 1986.
- López Roudergue, MY Hetz, Huenchullan E. Efectos del uso anual y del método de depreciación sobre los costos fijos de operación de un tractor, sembradora y cosechadora de granos. *Agro Sur*. 1998;26(2):63–69.
- Lavarello PJ, Goldstein E. Dinámicas heterogéneas en la industria de maquinaria agrícola argentina. *Revista Problemas del Desarrollo*. 2011;42(166).