

THE ROLE OF AGRICULTURAL MECHANIZATION IN FOOD SECURITY

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ABSTRACT

Currently, despite what the government suggests that there is no food insecurity in our country, this is latent due to the political conditions in the region, where the pressure for the production of highly profitable food economically prevails over the production of basic foodstuffs. Currently, despite what the government suggests that there is no food insecurity in our country, this is latent due to the political conditions in the region, where the pressure for the production of highly profitable food economically prevails over the production of basic foodstuffs. The literature review clearly shows that there is a highly positive relationship between agricultural mechanization and food security, so it is concluded and suggests that a study should be carried out to apply sustainable agricultural mechanization in an appropriate manner for each agricultural region of our country, with the proper machines and tools so as not to deteriorate the soil and significantly increase productivity, which will result in the production of food with less effort, and this will gradually lead to stable and permanent food security.

Key-words: Agricultural mechanization, food production, food security.

Introduction

Currently, despite what the government suggests that there is no food insecurity in our country, this is latent due to the political conditions in the region, where the pressure for the production of highly profitable food economically prevails over the production of basic foodstuffs. Food such as corn and beans are in the case of Mexico, wheat in most countries, rice in some countries in Asia, etc [1]. In addition to this is the constant deterioration of the agricultural area and its decline, in contrary to what this situation entails is the growth of the inhabitants in general and the decrease of the rural population due to migration to other countries and to the cities, for this reason the main challenge is to increase the productivity of agriculture in a sustainable manner so that achieve competitiveness [2]. Currently, despite what the government suggests that there is no food insecurity in our country, this is latent due to the political conditions in the region, where the pressure for the production of highly profitable food economically prevails over the production of basic foodstuffs [3].

This is the main objective of this work to demonstrate with a literature review the possibilities of sustainable agricultural mechanization to eliminate and mitigate food insecurity.

Methods and Materials

The information sources for data collection were mainly the Eighth National Agricultural Census conducted by the National Institute of Statistics, Geography and Informatics (INEGI), and FAO estimates. To collect information searches on agricultural mechanization in the country were made in printed data bases and the Internet, of importers and distributors, scientific journals, professional thesis, newspaper articles, etc.

1. Food security

The generally accepted definition of food safety refers to the access of all people to a safe and nutritious diet that allows them to lead a healthy life at all times; In addition, it is integrated by four dimensions: access, availability, stability of supply and optimal biological use [4].

2. Food security in mexico

The dimension of the availability of food security requires a nation to have food in sufficient quantities and quality, with easy physical access and in a stable manner to meet

the food needs of the population. Since the 80s of the 20th century, however, Mexico has not been able to produce the volume of food necessary to satisfy the consumption of its population and reduce dependence and food vulnerability from abroad, mainly on basic products. The demand for food in 2030, which will come from 138 million people, requires the country to develop new productive practices and technologies that allow increasing the volume of production in those products that report a high dependence on external supplies in order to achieve a level close to food self-sufficiency without the deterioration of soil quality [5].

3. *Agricultural mechanization*

The mechanization covers all levels of production and agricultural processing technologies, from simple hand tools to the most sophisticated motorized equipment. Mechanization facilitates and reduces heavy work, alleviates the lack of labor, improves productivity and opportunity of agricultural operations, improves the efficient use of resources, strengthens access to markets and contributes to the mitigation of climate-related threats. Sustainable mechanization considers aspects of the technological, social, environmental and cultural fields to contribute to the sustainable development of the agricultural and food sectors [4,5].

In general terms, mechanization reduces human physical work; It is less strenuous to drive a tractor, than to cultivate the field all day with a hoe or other hand tool. A tractor pulling a plow can grow an area larger than a man with a hand tool, at the same time, with the consequent increase in productivity and reduction in operating times. Integrating certain agricultural operations, through mechanical processes, such as planting and harvesting in a timely manner, increases yields considerably and covers a larger area [3,5].

Mechanization is not a process that occurs in isolation, there is a close relationship between the process as such and the characteristics of different crops, since they do not have the same requirements. These have different specificities, as well as different varieties of plants within the same species nor do they exhibit the same behavior, which in one way or another affects mechanization [6].

Agricultural mechanization is not an isolated activity, but part of a complex set of interactions among numerous participants. For its correct application requires a higher level of knowledge, better agricultural management systems and training. Agricultural machinery has revolutionized agriculture and alleviated the hard work of millions of families and agricultural workers, however the machinery of tomorrow will have to be more efficient and consider the sustainability of production and the protection of the environment [7].

4. *Productivity and agricultural mechanization*

One of the factors that have the greatest impact on the increase of agri-food productivity is the mechanization of agricultural work, according to the Operational Guide of the Program of Innovation, Research, Technological Development and Education of Sagarpa [8].

Therefore, if the use of machinery in agriculture increases, this will free young people and women from having to do the heavy work and, most importantly, increase agricultural productivity, and, therefore, the generation of income, always and when there is an organized value chain with the active participation of the private sector [9].

The results of the projections show that although Mexico has soil restrictions, the agricultural surface has the capacity to cover the internal demand of the products in which a deficit is foreseen, which would guarantee food security from the dimension of availability beyond solving the conditions of access. This could be achieved through increasing yields per hectare by incorporating technology that is sustainable, mainly those crops that have a deficit, under different scenarios, expanding the agricultural frontier by 8.6 million hectares, maintaining the same yield that has been observed in the analyzed period, or, from combining both mechanisms [9,5].

Several authors conclude that agricultural mechanization is necessary to increase the productivity of crops, among others [1,2,6,7,10,11,12].

5. *Food security and agricultural mechanization*

Of all the modern agricultural technologies introduced in developing countries, mechanization is probably the most controversial. What is now more important is to

promote the sustainable development of the private sector that can offer farmers the right choices of technology at the right prices to increase agricultural productivity, provide food security and reduce post-harvest losses [4].

Sustainable mechanization is a means to an end. Farmers who have access to improved agricultural tools and mechanized technologies can switch from subsistence agriculture to market agriculture, making the agricultural sector more attractive to rural youth. Sustainable mechanization supports the development of food supply chains through improved agricultural practices to increase production and improve food security [4].

Manual work, machinery and equipment are essential agricultural inputs, so remarkable that without them, agricultural production would not be possible. In some circumstances what hinders the production of crops, is not having enough labor, draft animals or machines to get the most out of the resources available. Therefore, the improvement and incorporation of mechanical technology and its efficient management generate alternatives to increase production and food safety [3]

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The global agricultural machinery industry should give more support to small farmers, designing equipment and models that are better suited to their needs and those of service providers. Without this change in the machinery sector, it is not possible to meet the needs of developing countries in terms of food security, poverty alleviation, economic growth and protection of the environment [13]

Conclusion

The literature review clearly shows that there is a highly positive relationship between agricultural mechanization and food security, so it is concluded and suggests that a study should be carried out to apply sustainable agricultural mechanization in an appropriate manner for each agricultural region of our country, with the proper machines and tools so as not to

deteriorate the soil and significantly increase productivity, which will result in the production of food with less effort, and this will gradually lead to stable and permanent food security.

References

- [1].Binswanger PH and Danovan G (1988). Agricultural Mechanization; Problems and Options, Washington D. C, World Bank.
- [2].Cadena ZM (1997). Situation of agricultural mechanization in Mexico, In: Agricultural Machinery, Anthology, DGETA, Mexico.
- [3].Cortés M, Elkin, Álvarez M, Fernando, González S, Hugo (2009). La mecanización agrícola: gestión, selección y administración de la maquinaria para las operaciones de campo. Revista CES Medicina Veterinaria y Zootecnia [en línea] 4.
- [4].FAO. Declaración de la Cumbre Mundial sobre la Seguridad Alimentaria. Italia, FAO, Roma, 2009.
- [5].Negrete JC (2018). Research Trends and perspectives of mechanization and agricultural machinery in Mexico for the 21st century. Jour Agri Crop Sci 1: 29-38.
- [6].Negrete JC (2006). Agricultural Mechanization in Mexico. Editor the Author. Mexico.
- [7].Shkiliova L, Fundora PR, Jarre CC (2014). El papel de la mecanización en la intensificación sostenible de la producción agrícola (ISPA) Revista la técnica N, pp. 32 - 43.
- [8].Rivera G (2015). Obsoleta, la mecanización del campo en México <https://manufactura.mx/industria/2015/08/31/mas-del-50-de-tractores-activos-ya-rebasaron-vida-util>
- [9].O'Leary M (2017). La mecanización agrícola ofrece oportunidades a los jóvenes de las zonas rurales de África. on line in <https://www.cimmyt.org/es/la-mecanizacion-agricola-ofrece-oportunidades-a-los-jovenes-de-las-zonas-rurales-de-africa/>
- [10].Soto SM (1983). Introduction to the Study of Agricultural Machinery, Mexico, Edit. Limusa. in Spanish.
- [11].Mialhe LG (1996). Agricultural Machinery Tests & Certification, Piracicaba, S.P. Brazil, Ed. Fundação de Estudos Agrários Luis de Queiroz, S.P. Brazil.
- [12].Ortiz MG (2016). Agricultural mechanization. Mexican council of social sciences 5th National Congress of Social Sciences "The emerging agenda of the

social sciences: Knowledge, criticism and intervention

[13].Kienzle J, Ashburner JE and Sims GB (2013). Mechanization for Rural Development: A review of patterns and progress from around the world mechanization for rural development.

plant production and protection division food and agriculture organization of the united nations rome.
