Article **Journal of Urban and Sustainable Development**
June 2023 Vol.9 No.24 23-34

Export of vegetables in the rural development district of Tecamachalco, Puebla, within the framework of the USMCA

Exportación de hortalizas en el distrito de desarrollo rural, Tecamachalco Puebla, en el marco del T-MEC

XIMITL-ISLAS, Iván*†, RODRÍGUEZ-DE LA VEGA, Marisol, CABILDO-OREA, Alejandra and MACHORRO-DÍAZ, Rafael

Universidad Tecnológica de Tecamachalco, Avenida Universidad N° 1, Colonia La Villita, C.P. 75483. México.

ID 1st Author: *Iván, Ximitl-Islas* / **ORC ID**: 0000-0002-6525-5106, **Researcher ID Thomson:** S-7952-2018, **CVU CONACYT ID:** 168266

ID 1st Co-author: *Marisol, Rodríguez-De La Vega* / **ORC ID:** 0000-0002-0263-4504, **Researcher ID Thomson:** S-7774-2018, **CVU CONACYT ID:** 424632

ID 2nd Co-author: *Alejandra, Cabildo-Orea* / **ORC ID:** 0000-0002-6088-5707, **Researcher ID Thomson:** S-7798-2018, **CVU CONACYT ID:** 947359

ID 3rd Co-author: *Rafael, Machorro-Díaz* / **ORC ID:** 0000-0002-1776-7174, **Researcher ID Thomson:** S-7910-2018, **CVU CONACYT ID:** 947608

DOI: 10.35429/JUSD.2023.24.9.23.34 Received: March 10, 2023; Accepted June 30, 2023

Abstract

This research addresses the problems faced by exporters of vegetables in the Rural Development District of Tecamachalco, Puebla. In the international framework of the USMCA, the marketing process is complicated due to the certification of the products that have to be regularized for export through SENASICA, HACCP, and PRIMUS LAB, whose marketing channels have been established through intermediaries, so it has created a disparity between the producer and the final consumer. The nationwide marketing chain has been identified in three supply centers: Huixcolotla, the City of Puebla, and Iztapalapa, in CDMX, in addition to municipal markets and local flea markets. Also, it was identified that the most important means of international marketing is through land transport, and the main border cities are: Tijuana, Nuevo Laredo, Matamoros, Mexicali, Nogales, and Ciudad Juárez. Finally, the fieldwork was carried out with producers of the region in the municipalities of Tecamachalco, Acatzingo, Tochtepec, Tlacotepec, Tepeaca, and Huixcolotla, where a sample of 185 producers was applied through a questionnaire, which was used as an instrument in the regional level survey.

Export, Vegetables, Intermediary, Commercialization, and Border

Resumen

La presente investigación aborda la problemática que enfrentan los exportadores de hortalizas en el Distrito de Desarrollo Rural de Tecamachalco, Puebla. En el marco internacional del T-MEC, el proceso de comercialización es complicado debido a la certificación de los productos que deben de estar regularizados para la exportación por medio de SENASICA, HACCP y PRIMUS LAB, cuyos canales de comercialización se han establecido por medio de intermediarios, lo que ha creado una disparidad entre el productor y el consumidor final. La cadena de comercialización a nivel nacional se ha identificado en tres centrales de abasto: Huixcolotla, la Ciudad de Puebla, e Iztapalapa en CDMX además de mercados municipales y tianguis locales, el mercado de hortalizas para la exportación es muy exclusivo. Se identificó que el principal medio de comercialización internacional es mediante transporte terrestre y las principales ciudades fronterizas son: Tijuana, Nuevo Laredo, Matamoros, Mexicali, Nogales, Ciudad Juárez. El trabajo de campo se realizó con los productores de la región en los municipios: Tecamachalco, Acatzingo, Tochtepec, Tlacotepec, Tepeaca y Huixcolotla, donde se aplicó a una muestra de 185 productores mediante un cuestionario que fungió como instrumento en una encuesta a nivel regional.

Exportación, hortalizas, Intermediario, comercialización, frontera

Citation: XIMITL-ISLAS, Iván, RODRÍGUEZ-DE LA VEGA, Marisol, CABILDO-OREA, Alejandra and MACHORRO-DÍAZ, Rafael. Export of vegetables in the rural development district of Tecamachalco, Puebla, within the framework of the USMCA. Journal of Urban and Sustainable Development. 2023. 9-24:23-34.

*Correspondence to the author (e-mail: ivanximitl@gtmail.com)
† Researcher contributing as first author

Introduction

This paper addresses the performance of Mexico's vegetable exports to the USA, with the objective of assessing the competitiveness of the main vegetable products in the US markets, by contrasting the national and regional markets, in the period 2022. This document is divided into four sections:

1. Literature review, this section reviews different regional studies on vegetable exports that address the different regional studies on the object of study.

2. Methodology, which explains the theoretical underpinning of the methodological development, the sample design.

3. Results, this section presents the results obtained in the survey applied to the producers of the region in the Rural Development District of Tecamachalco, the marketing channels, the marketing routes, the production of the main vegetable crops, main border cities, states of the American Union that present the demand for vegetable crops, and the main markets of the region.

1. 4 Conclusions and References.

Literature review

Mexico has been the main supplier of fresh vegetable imports to the United States. Today, this dynamic and competitive trade has led to other countries also having a presence in the US fresh vegetable markets. Such is the case of: Canada, Honduras, Dominican Republic, Spain and Holland, which stand as some examples of the competition faced by Mexican exports, to such an extent that they concur with homogeneous product in terms of: health, quality and safety, eventually influencing a reduction of the market share that our country was serving. (Borbón, et, al, 2018: 43.) The comparative advantages among vegetable producing countries are established on the basis of climate, soil fertility, labour, inputs, availability of irrigation water.

One of the main problems faced by producers in the state of Puebla is the lack of diagnostics for the design of public policies, because the lack of technical assistance and financing is reflected in the volumes of production and sales, the export context is very limited to certain producers who have the requirements for international marketing, Only a few producers can have access to international trade in vegetables; certifications range from irrigation water analysis, field crops, food safety, traceability of batches, the cold chain to maintain the products at a certain temperature until they reach the final consumer, are some of the difficulties to be able to market in the different marketing channels.

Comparative advantage is a concept of great importance for economic theory, since with an empirical measurement it is possible to identify the direction and intensity with which a country invests and trades with a product, good or service, thus taking advantage of the difference it possesses in a factor or product with respect to other countries. Similarly, with a disaggregated calculation of this type of advantage, socially desirable specialisation patterns can be assessed (Vollrath, 1991). Comparative advantages in the T-MECS are not only important for manufacturing in the industrial sector, the agricultural sector in Mexico is also a business opportunity, in terms of competitiveness, which is why this paper addresses the macroeconomic context and competitiveness in international trade.

In the T-MEC Framework, Chapter 3, Agriculture of the T-ECM, establishes in Article 3.7 the Agricultural Trade Committee and in Article 3.8 the Agricultural Advisory Committees. (T-MEC, 2018: 149-151).

Article 3.7: Committee on Agricultural Trade

1. The Parties hereby establish a Committee on Agricultural Trade (Agricultural Committee), composed of representatives of each Party.

2. The functions of the Committee on Agriculture shall include: (a) promoting trade in agricultural goods between the Parties under this Agreement; (b) overseeing and promoting cooperation in the implementation and administration of this Chapter; (c) providing a forum for the Parties to consult and seek to address trade issues or barriers and to improve access to their respective markets, in

ISSN 2414-4932

coordination or in conjunction with other committees, working groups, or any other subsidiary bodies established under this Agreement; and (d) seeking to exchange information on trade in agricultural goods between the Parties, including information covered by Article 3. 10. 1 (Transparency and Consultations) or any other relevant transparency provisions in this Chapter; (e) foster cooperation between the Parties in areas of mutual interest, such as rural development, technology, research and development, and capacity building, and the creation of joint programs as mutually agreed between the agencies involved in agriculture, among others; (f) carry out additional tasks, including those that may be assigned to it by the Commission or referred to it by any other committee; (g) recommend to the Commission any amendments or additions to this Chapter; and (h) report annually to the Commission on its activities.

3. The Agricultural Committee shall establish its terms of reference at its first meeting and may revise those terms as necessary.

4. The Agricultural Committee shall meet within one year of entry into force of this Agreement and once a year thereafter, unless the Parties decide otherwise.

Article 3.8: Agricultural Consultative Committees

1. The activities of the Agricultural Advisory Committees (AACs) set out in:

(a) the Terms of Reference of the Canada-U.S. Agricultural Consultative Committee pursuant to the Memorandum of Understanding between the Government of the United States of America and Canada Regarding Agricultural Trade Areas (ROU) of December 4, 1998;

(b) the Memorandum of Understanding between the United States Department of Agriculture and the Office of the United States Trade Representative, and the Secretaría de Agricultura, Ganadería, Desarrollo Rural y Pesca y Alimentación de los Estados Unidos Mexicanos Relating to Food and Agricultural Trade Areas (US-MX MOU) of 1 October 2001 and re-established on 6 March 2007; and (c) the Memorandum of Understanding between the United States Department of Agriculture and the Office of the United States Trade Representative, and the Secretaría de Agricultura, Ganadería, Desarrollo Rural y Pesca y Alimentación de los Estados Unidos Mexicanos Relating to Food and Agricultural Trade Areas (US-MX MOU) of 1 October 2001 and re-established on 6 March 2007;

and (c) the Memorandum of Understanding between the Secretaría de Agricultura, Ganadería, Desarrollo Rural y Pesca y Alimentación de los Estados Unidos Mexicanos and the Department of Agriculture and Agribusiness Canada for the Establishment of the Mexico-Canada Agricultural Consultative Committee (MDE MX-CA) of February 1, 2002 and re-established on March 6, 2006, shall, upon entry into force of this Agreement, be organised in accordance with this Agreement.

1.The CCAs shall be governed and operated in accordance with the respective ROU or MOU and all implementing or administrative documents, including any amendments thereto.

2.The CCAs may report to the Committee on Agriculture, the Committee on Sanitary and Phytosanitary Measures, or the Committee on Technical Barriers to Trade on their activities.

The treaty was signed on 30 July 2018, to enter into force on 1 July 2020, the treaty is intended to keep the efforts of these 3 countries in an international trade environment at the forefront of the global market.

Moreno, 2015, in his research determines the comparative advantages between Mexico, China and the USA, in a global market, analysing the demand for agricultural products in the various marketing channels, that is, at the forefront of international trade.

ISSN 2414-4932

Mexico and China have the best prospects for growth in the US agricultural market. China has concentrated its trade in the categories and sub-categories containing the products with the longest shelf life and in processed products; in some cases its growth has been thanks to the loss of the Canadian market. In this sense, despite the fact that Chinese exports of fresh fruit and vegetables to the United States have grown in absolute and relative terms, especially in the case of vegetables, the subcategories are different from those exported by Mexico, so there is no direct competition between China and Mexico globally, although it is relevant locally, as some of the products exported by China are important for some regions of Mexico, such as garlic, onions and spring onions. On the other hand, Chinese exports face important obstacles, such as safety, mainly related to pesticide and antibiotic residues, as well as the depletion of aquifers and the possible appreciation of the Chinese currency (Moreno, et al, 2015:145).

One of the contributions in international trade are the clusters, in the case of northern Mexico due to its proximity to the USA, the marketing chains have been structured according to the demand for agricultural products, an investigation carried out in Baja California Norte in the export of tomatoes shows us the opportunities, in a study carried out in the Rural Development District 001 in Ensenada in the valleys of San Quitín and Meneadero, a methodology is used to carry out a regional diagnosis:

a cluster is understood as the associativity of companies in the same sector or activity operating within a radius of 300 km in which service providers, suppliers of raw materials, any entity related to the sector, and the government are interconnected in order to obtain competitive advantages. Cooperation is a practice that characterises industrial organisation through clusters and is an exercise contrary to the basic principles that govern capitalist enterprise, whose activity is based on competition (Velázquez, et al., 2012: 46).

Currently, there are many advantages of tomato production in Mexico, such as those derived from the North American Free Trade Agreement (NAFTA), since Mexican producers (Sinaloa and Baja California) have lower production costs than their main foreign competitors, according to their comparative and competitive advantages. However, their weaknesses are evident, which affect the sector due to: the concentration of exports in the United States, the low participation of Mexican businessmen in marketing, and the fact that they have not been able to penetrate the market with processed products; in addition, there is a marked dependence on other agents, as seed, machinery and other indispensable inputs for production are imported (Macías, 2003).

Another issue to be addressed are the networks of producers and marketers, although in the process of production and marketing of vegetables, they are not homogeneous, asymmetries are recurrent, in addition to the levels of investment and availability of resources, Lugo Morín, 2011, indicates:

Within horticultural production there are various social and economic actors; from producers, suppliers of agricultural goods and services and marketers (local intermediaries and trading companies, exporters and agro-packers). These groups of actors have led to struggles for the appropriation of the economic surpluses generated by the horticultural system, observed in relations of negotiation and subordination, forming asymmetrical social networks. These asymmetrical social networks are formed between differentiated social groups and their axis is economic motivation. While symmetrical social networks are those that occur between social groups of equal status and their articulating axes are kinship, friendship, neighbourliness or geographical proximity, as well as religion or cultural aspects (Lugo Morín et al., 2011).

Agricultural activity in the RDD of Tecamachalco, Puebla, is strategic, since around 158,000 ha are planted, 36% of which are irrigated, the rest being rainfed (SIAP, 2012). According to these statistics, the Rural Development District (RDD) of Tecamachalco is characterised by the production of vegetables, mainly under the irrigation modality thanks to the availability of more than 700 deep water wells in the region (CONAGUA, 2009).

ISSN 2414-4932

In the state of Puebla, the economic and social importance of this group of vegetables is considerable due to their level of profitability, sown area, jobs generated, investment required in the purchase of raw materials and inputs for production and harvesting (Arvizu et al., 2014). The importance of determining the social networks will allow us to create associations with established objectives to enter national and international markets based on the laws in force, or to apply technology transfer schemes appropriate to the regions according to their production needs.

Methodology

The information collected was classified into primary and secondary, the first concerns obtaining information through questionnaires, interview forms, research guides, ordinary observation, the second refers to that which is extracted from documentary sources, censuses, vital statistics, through statistical tables, the secondary information serves as a basis for the analysis of the problem, in the collection of information producers and leaders of organisations in the region were interviewed who provided first-hand information on the different aspects of the study.

The field work was carried out by means of a random sample of producers with which it is possible to make inferences from the results obtained in the survey applied to the target population.

Technique and instrument used

The technique of either survey, structured interview, or observation has its own limitations in the research. The survey was used to explore certain aspects of the population, observation and key informant interviews were also required. As far as experience in economic studies is concerned, the selected technique was the survey, this technique consists in the collection of a part of the population called sample, data, opinions, through questions formulated on various indicators, the information obtained is processed in a quantitative analysis, in order to identify and know the magnitude of the problem, the instrument used was the questionnaire.

In such a way that the elaboration of the questionnaire directed towards representatives of organisations and producers, where the questions formulated were directed to know the specific aspects of the variables, the exploration of the same can be with one or more questions and sometimes a single question was used to investigate in one or more variables.

The collection of information from secondary sources

The first phase consisted of the collection of bibliographical information referring to the research problem in books, newspapers, theses and magazines, in the libraries of the B.U.A.P., El Colegio de Postgraduados and newspaper libraries. Subsequently, secondary or statistical information was collected in I.N.E.GI. (Censuses, Yearbooks and municipal notebooks) in the city of Puebla, as well as the consultation via Internet of the official pages of I.N.E.G.I., SADER, for this stage the method of bibliographic synthesis was used, using the instrument called bibliographic work sheet, with the obtained information a data base will be made to interpret the situation of the coffee production at national, state and municipal level.

Recording of information collected through direct observation

The second phase involved trips to the study municipalities, in order to have contact with key informants: municipal authorities, representatives of farmers' organisations, intermediaries and producers. The purpose of this activity was to identify the regional marketing channels, as well as to identify the main points of sale, in central supply centres inside and outside the State of Puebla, and to find out where these organisations sell the product at wholesale and retail.

Registration of direct information from primary sources

The third phase consisted of the elaboration of questionnaires to be applied in the organisations in the municipalities of study, the interviews were carried out in the second half of July and the first half of August, applied in the municipality of Tecamachalco. The interview technique was used, using a field notebook and questionnaire guide.

ISSN 2414-4932

Coding and processing of the information

The next phase was the emptying of the information obtained in the questionnaires into tabular sheets, to create a database by key, after which the data was analysed in the program Statstical Pachage for the Social Sciences (S.P.S.S.).

The sample design

The sample size of producers

When analysing the information it was determined that the appropriate sampling scheme for these data was a sampling for complex studies, due to the differences in the population sizes of each stratum it was decided to allocate proportionally to each of the municipalities.

The sample design (Rojas, 2013: 304) was carried out according to the methodology in the sample design for "complex studies".

a). A small population, less than 10,000 elements.

b). Several groups among which the sample will be fixed.

c). A questionnaire with more than 50 questions.

d) Numerous open questions

Where: N=2,325 Producers in the study region. This is an estimate, based on the number of hectares. In Puebla there are 487,000 agricultural producers (SDR 2023).

Z is the confidence level = 1.96, Error level 10%, probability p = .6 and q = .4.

$$n = \frac{\frac{Z^2 q}{E^2 p}}{1+\frac{1}{N}\left[\frac{Z^2 q}{E^2 p}-1\right]}$$

$$n = \frac{\frac{(1.96)^2(0.4)}{(.10)^2(0.6)}}{1+\frac{1}{2{,}325}\left[\frac{(1.96)^2(0.4)}{(0.10)^2(0.6)}-1\right]}$$

n = 255 The survey was applied to 185 producers.

The survey was applied to 185 producers.

The fieldwork was carried out in the Rural Development District of Tecamachalco, in the municipalities of Tecamachalco 26%, Quecholac18% Acatzingo 15%, Tochtepec 14%, Tepeaca 10%, Huixcolotla 9%, Tlacotepec 8%. In the first half of 2023.

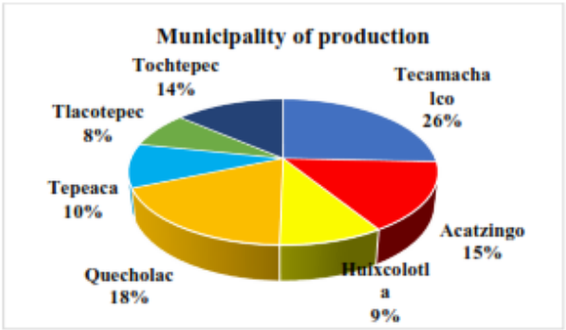


Figure 1
Source: Own elaboration, obtained in the field, 2023.

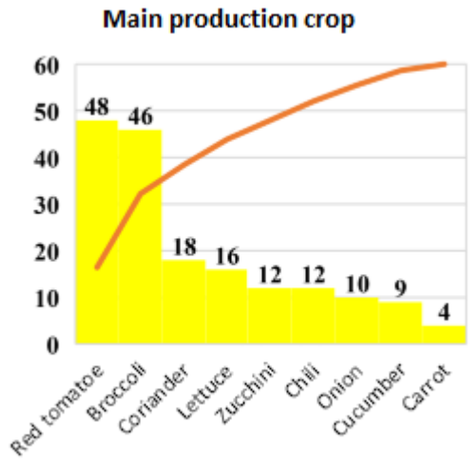
Figure 1 Broccoli crop
Source: Own elaboration, obtained in the field, 2023

The research was carried out in the field, with vegetable producers, who use greenhouses and most of them are in the open air, in the municipalities of the Rural Development District of Tecamachcalco, where the region has irrigation systems, and innovative methods and techniques in intensive production, also the strategic location of the supply centres of Huixcolotla, Puebla and Mexico City, the markets are predominantly local, due to the connectivity between federal roads and highways, between the capital of the Mexican Republic and the southeast. The road network is one of the strategies in the commercialisation process.

ISSN 2414-4932

Figure 2 Field research
Source: Own elaboration, obtained in the field, 2023.

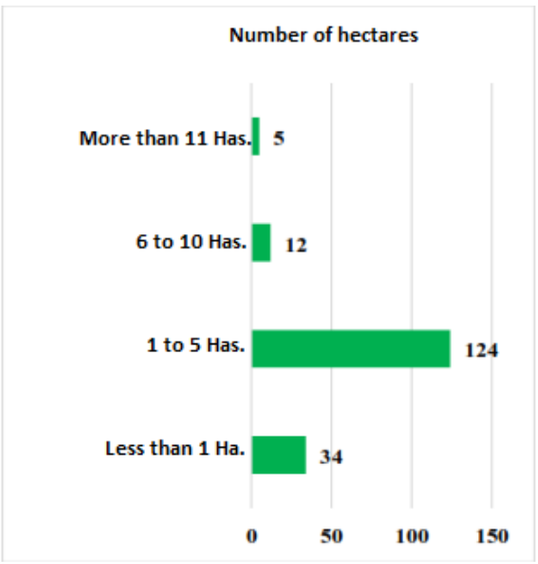
The main crops produced were as follows: 48 cases red tomato, 46 cases broccoli, 18 cases coriander, 16 cases lettuce, 12 cases courgette, 10 cases onion, 9 cases cucumber, and 4 cases reported carrot production, the production corresponds to the demand that is presented in the market, the information obtained in the field, shows us the production at regional level that is produced according to the established markets.



Graphic 2
Source: Own elaboration, obtained in the field, 2023.

Figure 3 Greenhouses
Source: Own elaboration, obtained in the field, 2023

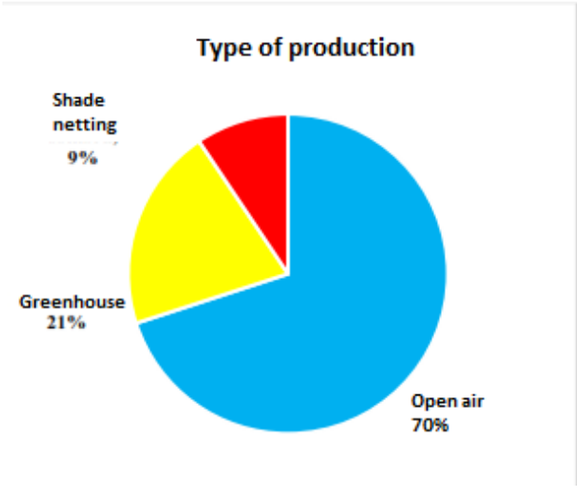
The number of hectares cultivated in the representative sample, which has the highest frequency is from 1 to 5 hectares, with 124 cases, 34 producers reported that they produce in less than 1 hectare, the frequency of 6 to 10 hectares was indicated in 12 cases and only 5 producers produced in more than 11 hectares, which indicates that the production is not in large extensions, most of the production is between 1 to 5 hectares.



Graphic 3
Source: Own elaboration, obtained in the field, 2023

ISSN 2414-4932

As far as production is concerned, 70% produce in the open air, 21% in greenhouses and 9% in shade nets, which shows that vegetable production is extensive and not intensive.



Graphic 4
Source: Own elaboration, obtained in the field, 2023.

According to the volume of production, the crop with the highest production in tonnes is broccoli with 540.8 tonnes, followed by onion with 419.5 tonnes, tomato with 374 tonnes, lettuce with 236.5 tonnes, carrot with 157 tonnes and chilli with 147 tonnes, and the rest of the crops produce less than 100 tonnes. This allows us to analyse the demand among the main products in the market. The main range of hectares per producer is 1 to 5 ha.

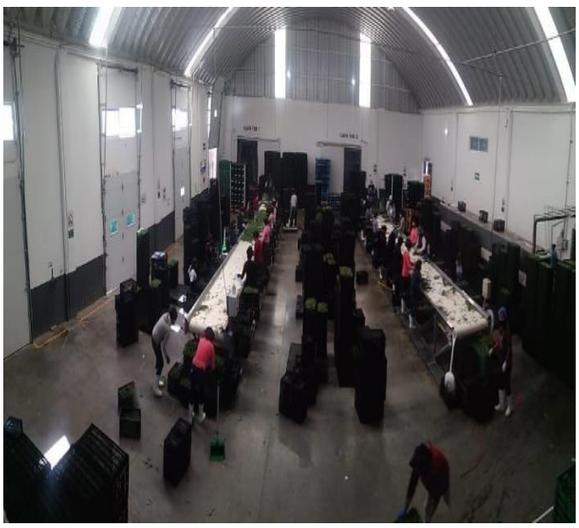
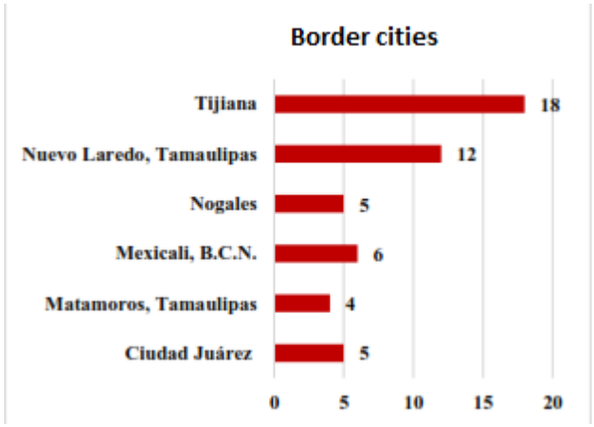


Figure 4 Packing house
Source: Own elaboration, obtained in the field, 2023

Figure 5 Marketing process
Source: Own elaboration, obtained in the field, 2023

The main border cities for the commercialisation of vegetables are the following: Tijuana 18 cases, Nuevo Laredo Tamaulipas 12 cases, Mexicali, Baja California Norte, 6 cases, Nogales Sonora, 5 cases, Ciudad Juarez Chihuahua, 5 cases and Matamoros Tamaulipas with 4 cases.



Graphic 5
Source: Own elaboration, obtained in the field, 2023

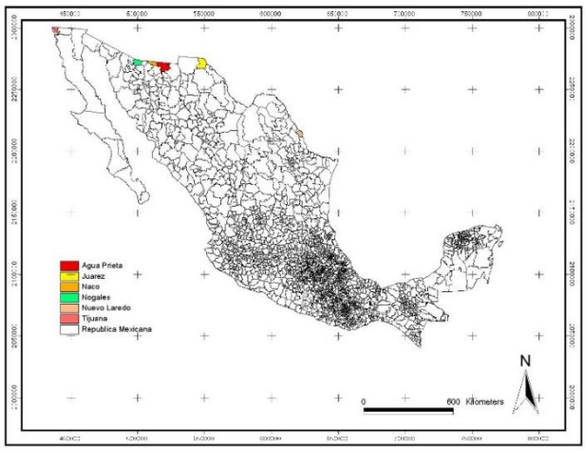


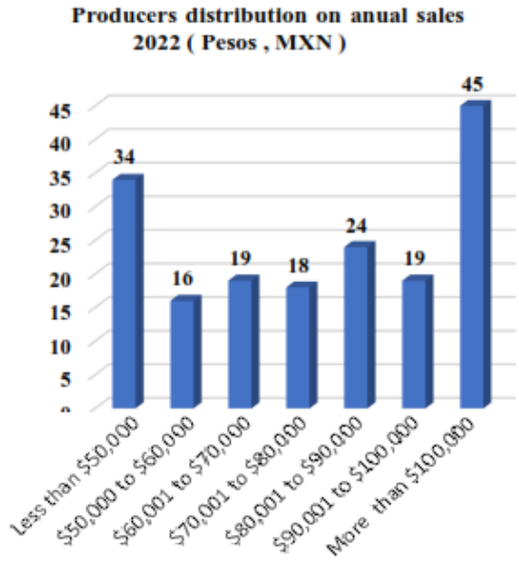
Figure 6 Border cities
Source: Own elaboration, obtained in the field, 2023

ISSN 2414-4932

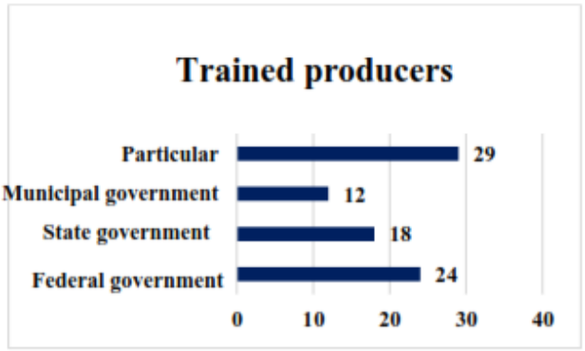
The main US states detected in the field research were the packing houses and intermediaries that have certifications to be able to export, only one case was found of a packing house that started with the procedures to export broccoli to Canada, the main states of the American Union were the following: California 17 cases, Texas 12, New Mexico 9, Arizona 7, Illinois 5, Florida 4 and 3 in New York, this indicates that the main market are the border states and part of the east coast of the USA.

Graphic 6
Source: Own elaboration, obtained in the field, 2023

In terms of annual revenues in 2022, 45 cases reported sales greater than $100,000 MXN, 19 cases from $90,001 to $100,000 MXN, 24 cases from $80,001 to $90,000 MXN, 18 cases from $70,001 to $80,000, 19 cases from $60,001 to $70,000 MXN, 16 cases from $50,001 to $60,000 and 34 cases reported less than $50,000 annually.

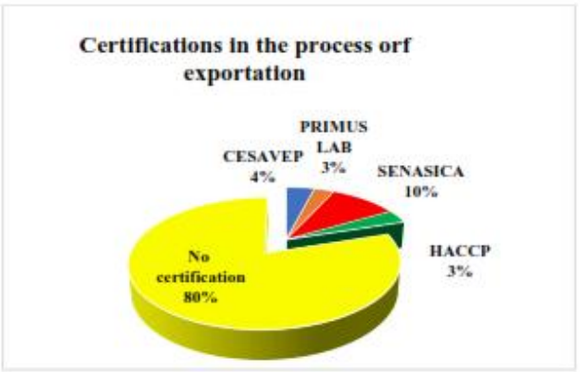


Graphic 7
Source: Own elaboration, obtained in the field, 2023



Graphic 8
Source: Own elaboration, obtained in the field, 2023

Regarding training, 29 cases indicated that they received technical assistance in a particular way, 24 cases through the federal government, 18 through the state government and 12 through the federal government, the rest did not receive any training, this is another of the problems in the vegetable export value chain, due to the lack of technical assistance that allows better control of quality from planting, harvesting and post-harvesting.



Graphic 9
Source: Own elaboration, obtained in the field, 2023

The main problem is certification because traceability goes from irrigation wells and crops, the value chain is registered with quality control up to the packing plants and customs before entering the United States. 80% of the producers interviewed are not certified, 10% are certified by SENASICA, 4% by CESAVEP, 3% by PRIMUS LAB and 3% HACCP, 3% in PRIMUS LAB and 3% HACCP, quality control in the processes is what allows to obtain markets at national and international level, food safety and traceability of the same is the way in which producers obtain better economic benefits, with the above mentioned, it is necessary the transfer of technology in terms of certification.

ISSN 2414-4932

Conclusions

In the study region most of the production is in the open air, 70%, greenhouse 21%, shade net 9%, so there is a great opportunity in the technification of irrigated agriculture, according to the results obtained, the main vegetable crops are: Red tomato, broccoli, coriander, lettuce, courgette, chilli, onion, cucumber and carrot, the main border cities in the marketing channels: Mexicali, Tijuana, Baja California Norte, Ciudad Juárez, Chihuahua, Nogales Sonora, Nuevo Laredo and Matamoros Tamaulipas. The main US states with which the producers of the Rural Development District of Tecamachalco trade are: Arizona, California, Florida, New Mexico and New York.

It is important to consolidate an agricultural policy for the consolidation of greenhouse production, for the production of vegetables with their respective transfer of technological packages in order to not only reinforce Mexico's competitiveness as a country, but also to promote the development of the regions through economic development and job creation. The design of public policies should be based on a diagnosis, to determine the problems, the variables that can be measured and evaluated with respect to the impact obtained for the production and commercialisation processes of vegetables, from the federal, state and municipal levels.

In the Rural Development District of Tecamachalco, the main market is national, the main supply centres in which they commercialise are: Huixcolotla, Puebla and Iztapalapa in CDMX, the purpose to promote the export of vegetables is to carry out good practices, traceability, certification, to have access to international markets.

The comparative advantages, so that regional agricultural development must be understood as a cross-cutting issue in which the institutions CONAGUA, SADER, as well as the interaction with foreign trade institutions such as the USDA in the USA, must intervene together to analyse the demand for fresh produce, within the framework of the TMEC. One of the main problems in the export of vegetables is certification, which is one of the requirements for the export of vegetables.

References

Arvizu Armenta, Marisol; Borbón Morales, Carlos G, “El retorno social de inversión de una empresa social agrícola en el sur de Sonora”, Revista Mexicana de Agronegocios, vol. 41, 2017 Sociedad Mexicana de Administración Agropecuaria A.C., México.

Arvizu Barrón, Ezequiel; Mayett Moreno, Yesica; Martínez Flores, José Luis; Olivares Benítez, Elías; Flores Miranda, Lizbeth Análisis de producción y comercialización hortícola del estado de Puebla: un enfoque de cadena de valor Revista Mexicana de Ciencias Agrícolas, vol. 6, núm. 4, mayo-junio, 2015, pp. 779-792 Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias Estado de México, México.

Borbón Morales, Carlos Gabriel; Arvizu Armenta, Marisol; García Figueroa, Alan; Robles Parra, Jesús Martín, “Ventajas comparativas del pepino mexicano de exportación hacia Estados Unidos”, Revista Mexicana de Agronegocios, vol. 43, 2018 Sociedad Mexicana de Administración Agropecuaria A.C., México.

Espinoza Arellano, José de Jesús; Lozada Cota, Michelle; Leyva Nájera, Saúl, “Posibilidades y restricciones para la exportación de Melón Cantaloupe producido en el municipio de Mapimí, Durango, México al mercado de los Estados Unidos”, Revista Mexicana de Agronegocios, vol. 28, enero-junio, 2011, pp. 593-604 Sociedad Mexicana de Administración Agropecuaria A.C. Torreón, México.

Figueroa-Rodríguez, Katia A.; Figueroa-Sandoval, Benjamín; Borja-Bravo, Mercedes; Carrillo-Hidalgo, Oscar M.; Hernández-Rosas, Francisco; Tobón-Olguín, Luis E., “Confianza y redes sociales en productores de hortalizas en San Luis Potosí, México”, Agricultura, Sociedad y Desarrollo, vol. 9, núm. 4, octubre-diciembre, 2012, pp. 441-453 Colegio de Postgraduados Texcoco, Estado de México, México.

ISSN 2414-4932

García-Flores, José C.; Gutiérrez-Cedillo, Jesús G.; Balderas-Plata, Miguel Á.; Araújo Santana, Maria R., "Estrategia de vida en el medio rural del Altiplano Central Mexicano: el huerto familiar", Agricultura, Sociedad y Desarrollo, vol. 13, núm. 4, octubre-diciembre, 2016, pp. 621-641 Colegio de Postgraduados Texcoco, Estado de México, México.

Gómez Carreto, Tlillalcapatl; Mena Cruz, Rosa Carmina; Moreno Vidal, Rocío, "Administración para el desarrollo local: experiencias de productores de hortalizas en la región III fronteriza de Chiapas", Revista Mexicana de Agronegocios, vol. 30, enero-junio, 2012, pp. 802-814 Sociedad Mexicana de Administración Agropecuaria A.C. Torreón, México.

Hernández-Rodríguez, María de Lourdes; Castellón Gómez, Juan J., "Distribución de la infraestructura para la pequeña irrigación en la campo poblano", Agricultura, Sociedad y Desarrollo, vol. 10, núm. 4, octubre-diciembre, 2013, pp. 433-441 Colegio de Postgraduados Texcoco, Estado de México, México.

Jaime Meuly, Rosalina; Hurtado Bringas, Beatriz Alejandra; Romero Vivar, Natalia Guadalupe, "La competitividad en la exportación de espárragos sonorense hacia los Estados Unidos en el marco del TLCAN", Revista Mexicana de Agronegocios, vol. 36, enero-junio, 2015, pp. 1265-1274 Sociedad Mexicana de Administración Agropecuaria A.C. Torreón, México.

Moreno-Ocampo, Argelia A.; Leos-Rodríguez, Juan A.; Contreras-Castillo, José M.; Cruz Delgado, Daniela, "Análisis comparativo del comerio agropecuario de tres países (México, Chinay Canadá) con Estados Unidos de América (1990 – 2011)", Agricultura, Sociedad y Desarrollo, vol. 12, núm. 2, abril-junio, 2015, pp. 131-146 Colegio de Postgraduados Texcoco, Estado de México, México.

Ramírez Abarca, Orsohe; Hernández Martínez, Juvencio; González Razo, Felipe de Jesús, "Análisis económico del Pepino Persa en condiciones de invernadero en Guerrero y Estado de México, 2020", Revista Mexicana de Agronegocios, vol. 48, 2021 Sociedad Mexicana de Administración Agropecuaria A.C., México.

Rojas Soriano Raúl, Guía para realizar investigaciones sociales, Trigésima octava impresión, Plaza y Valdéz, 2013, México.

Sánchez Toledano, Blanca I.; Zegbe Domínguez, Jorge A.; Rumayor Rodríguez, Agustín F.; Moctezuma López, Georgel, "Estructura económica competitiva del sector agropecuario de Zacatecas: un análisis por agrocadenas", Revista Mexicana de Agronegocios, vol. 33, julio-diciembre, 2013, pp. 552-563 Sociedad Mexicana de Administración Agropecuaria A.C. Torreón, México.

Soto Zapata, Manuel; Magaña Magaña, Eduardo; Licón Trillo, Lorena Patricia; Kiessling Davison, Christian Mauricio; Saenz Solis, Jorge Iram, "Estudio de mercado sobre la venta y consumo de hortalizas orgánicas en Ciudad Delicias, Chihuahua", Revista Mexicana de Agronegocios, vol. 35, julio-diciembre, 2014, pp. 1035-1042 Sociedad Mexicana de Administración Agropecuaria A.C. Torreón, México.

Lugo Morín, Diosey Ramón. 2011. Análisis de redes sociales en el mundo rural: guía inicial. Revista de Estudios Sociales. Vol., Núm. 38. pp: 129-142

Terrones Cordero, Aníbal; Sánchez Torres, Yolanda Análisis de la rentabilidad económica de la producción de jitomate bajo invernadero En Acaxochitlán, Hidalgo Revista Mexicana de Agronegocios, vol. 29, julio-diciembre, 2011, pp. 752-761 Sociedad Mexicana de Administración Agropecuaria A.C. Torreón, México.

Terrones Cordero, Anibal, "Producción de jitomate en invernadero en San Juan Tilcuautla, Hidalgo, México", Revista Mexicana de Agronegocios, vol. 44, 2019 Sociedad Mexicana de Administración Agropecuaria A.C., México.

Tomé-Hernández, Griselda; Méndez-Espinoza, José A.; Pérez-Ramírez, Nicolás; Ramírez-Juárez, Javier; Tornero-Campante, Mario A., "Estrategias de reproducción familiar en Santa María Moyotzingo, Puebla, México", Agricultura, Sociedad y Desarrollo, vol. 11, núm. 1, enero-marzo, 2014, pp. 93-111 Colegio de Postgraduados Texcoco, Estado de México, México.

ISSN 2414-4932

Tratado entre los Estados Unidos Mexicanos, Los Estados Unidos de América y Canadá, Tomo I, Capítulo 3, Agricultura, 2018: https://www.gob.mx/cms/uploads/attachment/file/708697/T.MEC_TOMO_I_CAP_TULO_1_AL_13.pdf

Velázquez Ochoa, Marcos Aurelio; Maldonado Radillo, Sonia Elizabeth; Rodríguez Rubio, Carlos, "Identificación de las causas determinantes de la formación del clúster de la agroindustria del jitomate: propuesta de un instrumento de medición", Revista Mexicana de Agronegocios, vol. 31, julio-diciembre, 2012, pp. 43-53 Sociedad Mexicana de Administración Agropecuaria A.C. Torreón, México.

Vollrath, T. L. 1991. A theoretical Evaluation of Alternative Trade Intensity Measures of Revealed Comparative Advantage. Weltwirtschaliches Archiv 130(2):265-279.

ISSN 2414-4932