

Characteristics and Main Effects of Contract Agriculture in La Costa de Hermosillo

María del Rosario FATIMA ROBLES-ROBLES* and
Rosalina JAIME-MEULY

Sonora State University, México

The Costa de Hermosillo is an agricultural region of the state of Sonora, Mexico, with a semi-desert climate which has been closed for water extraction for more than fifty years. This region played an important role as a barn in Mexico during the import substitution industrialization model, through the cultivation of grains and cotton, at the same time important organizations were formed that integrated producers, which mostly disappeared in the change of export-oriented economic model. The goal of this work is to analyze the actions taken by farmers in order to migrate to agriculture by contract and the effects of this form of production, by examining the main crops that are produced in the Costa de Hermosillo, Sonora under this modality. To achieve this goal, a qualitative cross-sectional research was followed, using semi-structured interview, as well as a desk research with data from government institutions. As a conclusion the farmers of the Costa de Hermosillo, facing a change of economic model, turned towards agriculture by contract, in order to have certainty in their production and the price in dollars agreed in advance. The observed effects are mixed. On one hand, Sonora state is the leader in the national production of agriculture by contract, as farmers have invested in infrastructure to improve their water use efficiency and develop more technified crops, in order to ensure quality as established in production contracts. On the other hand, the agreed production is almost entirely destined for foreign markets and local consumers have to pay higher prices for those products.

Keywords: contract farming, economic model, La Costa de Hermosillo

JEL Classification: A11, D41, E23, O15

* Corresponding Author:

María del Rosario Fatima Robles-Robles, Sonora State University, Hermosillo, Sonora, México

Article History:

Received 12 November 2019 | Accepted 13 December 2019 | Available Online 21 December 2019

Cite Reference:

Fatima Robles-Robles, M.R and Jaime-Meuly, R., 2019. Characteristics and Main Effects of Contract Agriculture in La Costa de Hermosillo. *Expert Journal of Economics*, 7(2), pp.66-74.

1. Introduction

This paper analyzes the step of an economic development model oriented towards the substitution of imports to another oriented to the export, in the agricultural producers of the Coast of Hermosillo, having as reference the agriculture by contract, a region is used as case study of Sonora, belonging to the municipality of Hermosillo, called Costa de Hermosillo. Considering that the changes in production are global and run in line with economic development models, thereby affecting all areas of the economy, in this case, the incidence of the crop-contracting model has as a reference the change of economic model that Mexico went through in the mid-1980s.

Agricultural production through the hiring of crops is one of the most used contractual tools to implement to face the current demands of the food production market. There are several factors that have led to changes in agricultural production, among the most notable are: the process of globalization, technological progress, increased demand and refining consumer preferences. In this regard Hernández (2019) points out that in the capitalist economy, agriculture has been subordinated through its industrialization, producing a world agri-food regime, in which agriculture depends heavily on technology.

2. Literature Review

The objective of this work is to analyze the effects and characteristics of the main crops that under contract farming are produced in the Coast of Hermosillo, Mexico. This region is taken as a sample because despite the serious deterioration of the aquifer and the salinization process of more than 50 years, agricultural producers in the mid-1980s oriented their crops towards export. Also, this semi-desert region which is close to the Sea of Cortez, it has witnessed changes in economic models, with their effects on production models and stakeholders. The importance of this study is relevant, because it seeks to reveal the strategies that actors follow to integrate into economic development models and in turn, the effects that these practices have on a given region. Contract farming, as a strategy to integrate into global agricultural production chains, has mixed results in the regions that need to be revealed and their results generalized. The study seeks to answer the research question that focuses on the characteristics and effects of contract farming on the Costa de Hermosillo.

This paper is structured as follows. In the first part of the article, the industrialization model by import substitution is briefly developed, as well as the organizations which are the product of said model. In the second part, contract farming is contextualized. In the third part, the territory of the Costa de Hermosillo and the aquifer are examined. In the fourth part, the main products that are produced under contract farming are characterized and in the last section we explore the main conclusions.

3. Models of Economic Development and their Organizations

The Costa de Hermosillo stands out nationally in the production of table grapes, industrial grapes, vegetables, citruses, fruits, and walnuts. However, before 1990 the farmers of the Hermosillo Coast focused on the production of grains like wheat and sorghum, which they sold directly to parasternal companies and they were oriented towards the domestic market, while being organized under companies and institutions that coalesced and facilitated financing. Some of the companies of those times and that disappeared in the change of this model were: Union of Colonists of the Coast of Hermosillo, the Cooperative of Production of the Coast of Hermosillo, Union of Agricultural and Industrial Credit of the Pitic, Union of Agricultural and Industrial Credit Hermosillense, Agricultural Credit Union of Hermosillo (Grijalva, 2016), among others.

All these associations and unions of agricultural producers characterized an industrialization production model by import substitution and the agricultural entrepreneur fruit of that model, which, through government support, guarantee prices, business networks that wove at that time, achieved position the state of Sonora as the "granary of Mexico" and forming an agricultural vocation that reached a 24% contribution to the GDP of the primary sector.

However, these forms of organization and production failed to remain in place by changing the economic development model of Mexico. On the one hand this happened due to internal issues such as: changes in regulations and amount of delivery of economic support by the Mexican state, the disappearance of the prices of guarantee and of the institutions that supported this model and the changes in market demand. On the other hand,

it occurred due to external issues such as: the signing of the North American Free Trade Agreement (NAFTA) that placed farmers and peasants in a complex situation, which forced them to enter a market economy and improve their agricultural practices, in order to achieve the competitiveness that the market demanded and in which they entered into unequal conditions "NAFTA was the first regional integration agreement to subject the agricultural sector to a tariff reduction" (Puyana and Romero, 2008).

This is how the farmers of the Costa de Hermosillo, given this paradigm shift and facing the structural barriers involved and the challenges of the activity, gradually began in the 1990s to approach new ways of organizing and marketing their products and services in national and international markets, for this they partnered with capitalist partners, in order to be enabled with infrastructure and working capital.

This link between the producers and their contractors or marketers enabled the incursion into this activity of entrepreneurs who otherwise did not have the financial resources to invest in technification, on the other hand, subject the production of crops to the needs of contractors. In addition, not all entrepreneurs could migrate to these forms of production, which led to uneven development, among those who achieve this association with contract crops, with a security of placement of their products and those who remain behind, cultivating in traditional way, with the same products and in an uncertainty of their placement once harvested .

4. Contract Farming and the Hermosillo Coast

Contract farming can be defined "as an agreement between farmers and processing and / or marketing companies for the production and supply of agricultural products for future delivery, often at predetermined prices" (Eaton and Shepherd, 2002). In this definition we find two actors, the farmer who owns the land and who supplies the water and labor for the production of the goods and the company or the buyer. Contract arrangements or clauses commit the buyer to provide a certain degree of support represented, for example, in the supply of inputs and the provision of technical assistance. Eaton and Shepherd (2002, p.2) point out that the contractual arrangement varies according to the complexity and depth of the agreements in three main areas: 1. Market provisions: Agreements between the parties for the future sale and purchase of a crop or product; 2. Provisions on resources: Supply of inputs for the different stages of production and technical assistance. 3. Definitions on administration: The buyer recommends methods of production, inputs and specifications on cultivation and harvesting procedures and the producer undertakes to abide by said agreements.

Contract farming is not a new practice, however, it is in the first decades of the twentieth century that formal farmer-company agreements were established that served as the basis for the development of new modalities of contract farming. In the last decades of the twentieth century, "contract farming represents a crucial means by which agriculture is being industrialized and restructured. Hiring at the end of the twentieth century constitutes a form of industrial appropriation of activities within the framework of the production process" (Echanove and Riedemann, 2001).

Currently, economies worldwide are going through a series of changes, such as: the abandonment of government protectionist policies, new consumption habits, the emergence of new economies (China, India), and the growing demand for products with greater added value, production systems, and the production of exportable goods, among others. These changes in the international environment make competitiveness an indispensable condition for him access to these markets, for this it is essential to produce at low cost, have cutting-edge technology, ensure the production quotas demanded by the market and have logistic support among other. This process of liberalization of the economies does not only affect the industrial sectors, but also the primary sectors such as agriculture and livestock.

Contract production has become a modality that is not restricted to a single branch of production; industries such as textiles, construction, agriculture, livestock, large companies due to market needs and cost issues, are turning to a greater or lesser extent to this form of production, which has the characteristics of a large contracting company employing small contracted companies, this treatment is generally unequal (Hernandez, 2019). In Mexico and specifically in the state of Sonora, contract cultivation is an increasingly frequent practice; the situation of the countryside is no secret to anyone, seriously undercapitalized ejidatarios, without access to credit, to links with national and international markets and without technology, so necessary in a region with great lack of water. The above mentioned point makes it impossible for them to access higher-yield crops that require a higher risk and of course a strong initial capital investment, this is part of the problem that comes to solve contract

farming, on the other hand, there are a number of disadvantages or problems that farmers may face, such as: “Higher risks, inappropriate technology and crop incompatibility, quota manipulation, corruption, monopoly dominance, excessive indebtedness and dependence on advances” (Eaton and Shepherd, 2002). The Costa de Hermosillo aquifer is located in the middle portion of the state of Sonora; the region's climate is extremely typified as semi-dry, with an average annual rainfall of 200 millimeters (mm) and an average temperature of 24 degrees Celsius, which oscillate between -3 in winter and 46 C degrees Celsius in summer, with little rainfall especially in summer. The Costa de Hermosillo has been a cause for closure for the exploitation of groundwater, since 1951, 1954, 1963 and 1967 (CONAGUA, 2015), so that farmers turn to groundwater.

In 1981, the magazine notes the depletion of 105 wells, a problem that combined with salinity due to the proximity of 50 km from the Sea of Cortez and in a desert territory, caused the abandonment of 20,000 hectares. Agricultural in one of the most technician areas of the country. Likewise, the inequality that exists in this territory is indicated, where nine wells irrigate the properties of 280 families of ejidatarios and in other cases a well irrigates the property of a family.

According to Salazar, Moreno and Lutz (2012), two events that occurred since the 1990s modified the characteristics of Mexican agricultural production, influencing La Costa de Hermosillo. Specifically, the commercial opening with the signing of NAFTA, which placed producers in a situation of high competitive demand and secondly the productive reconversion, which sought to increase productivity through the conversion of crops. Likewise, in an effort to reverse the process of decapitalization of the countryside and seeking to print greater competitiveness for agricultural activities, the federal government agreed with the States, the implementation of the Alliance for the Field program. Therefore, the State Government developed the "Medium Term Development Program 2004-2009", in order to promote this activity so important for the State and to plan the actions to be followed.

As a result of these events and in search of greater economic profitability, the farmers of La Costa de Hermosillo, turned around from the traditional crops of grains and fibers to those of fruits and vegetables, this fact implies for the Border Network of Health and Environment, AC (2002) not only a transformation of productive systems, new arrangements between social agents and the State, but also a notable intensification in the exploitation of existing natural resources.

An additional fact that has affected the intensification of contract farming in La Costa de Hermosillo, was that the irrigation district, which was administered by the federal government for 50 years, was granted in October 1993 to the Users Association of the Irrigation District 051 under the new National Water Law enacted in 1992, an agency that controls the transcendental decisions related to the use and provision of water, which has “turned La Costa into a privileged space for the implementation of the model most advanced border of modern agriculture open to the forces of capital”(Red Fronteriza de Salud y Ambiente, AC, 2002).

This foreign-oriented turnaround in the agricultural production of La Costa de Hermosillo is reflected in the sample published by INEGI (2017), in which it is observed that the production obtained is destined to another country or intermediaries, almost in its totality and leaves nothing for direct distribution to the local consumer (see Table 1).

Table 1. Production of protected agriculture according to production sold and buyer or recipient

	Production obtained	Plantuelas	Production sold	Direct to consumer	Intermediary	Direct to Another country	Other buyers
Pumpkin	1 584.00	0	1 584.00	0.00	0.00	1 584.00	0.00
Chile	2 056.85	20 000	1 896.85	0.00	1 431.85	465.00	0.00
Green bean	40.00	0	40.00	0.00	0.00	40.00	0.00
Tomato	5 438.00	0	5 438.00	0.00	5 438.00	0.00	0.00
Cucumber	31 780.50	0	42 264.00	0.00	12 879.00	25 385.00	4 000.00
Other crops	796.00	180 000	796.00	0.00	0.00	796.00	0.00

Source. Elaboration based on INEGI (2017)

To achieve the objective set out, a qualitative cross-sectional investigation was carried out; the tool used was the semi-structured interview, which was applied to the main agricultural producers of the Costa de Hermosillo, who are under the contract farming modality. The interviewees produce table grapes, kabocha zucchini and watermelon.

5. Methodology

To achieve the objectives, a mixed cross-sectional and analytical type methodology was followed. In order to analyze the characteristics and amounts of production at national level and the state of Sonora, of the crops under study, a desk research was conducted, consulting databases of institutions of specialized governments in the field such as SAGARHPA, national and international reference in the agricultural sector, which served as the basis for establishing the characteristics of the crops and their national position based on their production volume. To obtain information on the effects and characteristics of the crops on the Costa de Hermosillo, as well as the strategies followed by the farmers, a qualitative investigation was carried out, the tool used was the semi-structured interview with producers of the Costa de Hermosillo, which they produce under the fashion of contract farming the most representative crops such as: table grapes, watermelon, walnuts and kabocha zucchini. Each of the interviewees was identified as E1, E2, E3 and E4, in order to preserve anonymity.

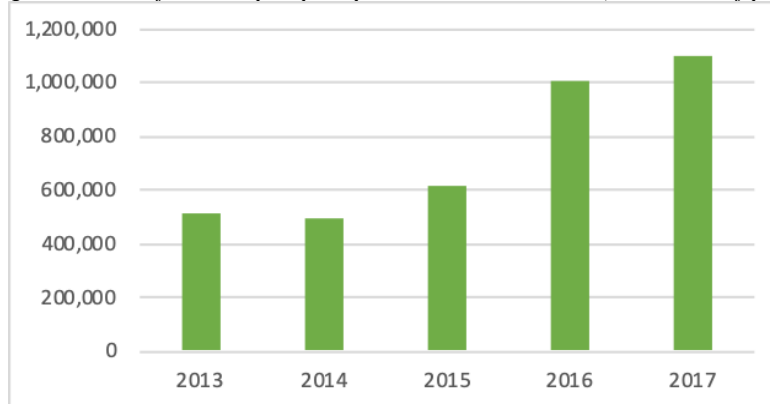
With these two sources of information (of a general and specific nature), the characteristics were elaborated and the effects of the agricultural crops were determined, which under the contract farming modality are produced on the coast of Hermosillo. The analysis was done, specifically for each of them

6. Contract Farming in La Costa de Hermosillo. Main Corps.

6.1 Kabocha Squash

Sonora is a leader in Kabocha pumpkin production: of the 160,222 tons produced in 2017, 130,004 representing 81.1% were from Sonora. The production in tons is of five types: Pumpkin kabocha export with 47,148 (36.3%), Pumpkin export Castile 37,387 (28.8%), Pumpkin butter export 26,991 (20.85), Pumpkin export spaghetti 17,733 (13.6%) and Pumpkin squash with 745 (0.65). In Sonora, the municipality of Hermosillo is a leader in the production of kabocha squash (SAGARPHA, 2018). In 2017, pumpkin exports generated approximately 28.5 million dollars, which represents 1.1% of agricultural exports (SAGARPHA, 2018). See Graph 1.

Graph 1. Value of Sonora pumpkin production 2013-2017 (thousands of pesos)



Source: Elaboration based on SAGARPHA (2018)

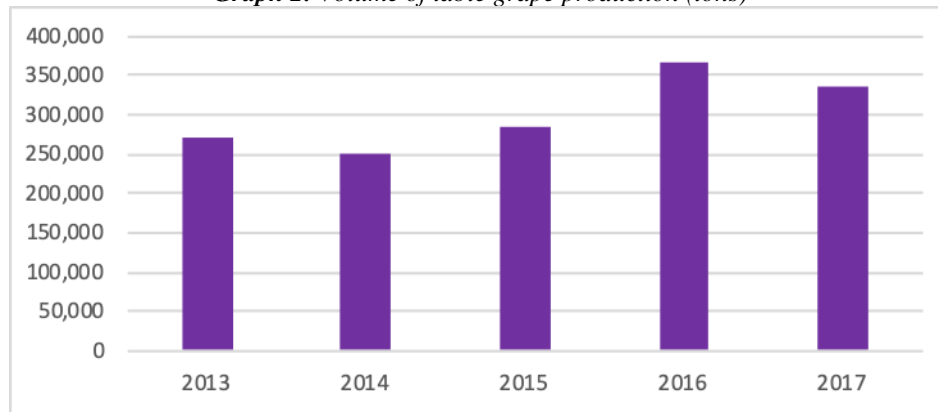
The interviewee (E1) points out that contract farming of kabocha squash started in the Hermosillo Coast in 1990, with approximate contracts of 30,000 tons per year, there are different varieties subject to contract, with production once a year, the crop cycle varies from 90 to 120 days a year, however, the export market is more important in the months of November to December. He points out that the specifications in the contract include variants such as: climate, diseases, exchange rate and product depletion ranges, in case of reaching 5% of the

product. The interviewee points out that, previously, the production contracts were made to the United States, however, better conditions and price have been achieved in the Japanese market and it is with partners of this country with whom there is a cultivation contract.

6.2. Grapes

Sonora is a national leader in the production of table grapes, according to SAGARPHA (2018) of the 235, 831 tons produced as of July 2018, 96.8% corresponded to the state of Sonora, and two are the main regions of this crop, Pesqueira and La Costa de Hermosillo. 4 different modalities are produced, 92.8% is table grapes: 3.7% industrial grapes; 3.3% raisins and 0.2% table grapes in shade mesh. Of the table grape, 90.4% was obtained from the municipality of Hermosillo (SAGARPHA, 2018). For more details, see Graph 2.

Graph 2. Volume of table grape production (tons)



Source. Elaboration based on SAGARPHA (2018)

One of the main actors in the innovation and success of this important crop for Sonora, is the Agricultural Association of Grape Producers of Mesa, which arose in 1977 during the Import Substitution Industrialization model and which has been one of the few organizations that They managed to transcend this economic development model and currently has an important role in integrating 40 producers and linking with research institutions to improve water use, combat pests and obtain greater performance, through constant innovation and Investment in infrastructure, this has allowed maintaining the leadership in the production of grapes in Mexico.

The interviewee (E2) points out that the contracts for production are made every year through the Association of Table Grape Producers, they are made through an estimate of production, with the United States being the main destination with 76%, 8.6% Europe, 12.6% for the national market and the rest to other countries. The grape varieties subject to the production and distribution contract are: from Green seedless the varieties, Perlette and Sweet Globe, from Red Seedless the Flame variety and from Red Seeded the Cotton Candy variety.

6.3 Watermelon

In the first half of 2018, Sonora was ranked as the first producer of Watermelon in Mexico, with a production of 503,839 tons, which represents 37.6% of the total watermelons produced (SAGARPHA, 2017). The advantage of watermelon cultivation is that they are two periods; autumn-winter and spring-summer. The cultivation, production and value of Watermelon in La Costa de Hermosillo in 2018 is shown in Table 2.

Table 2. Watermelon crop year 2018

Hermosillo	Area in hectares		Production	Value in thousands
	Sown	Harvest		
Autumn- Winter	1,977	1,977	104,740	509,902.51
Spring- Summer	6,488	6,488	328,645	1,758,685.51
	8,465	8,465	433,385	2,268,588.02

Source. Elaboration based on SAGARPHA (2019)

According to the information provided by the interviewees, the age of planting by contracting watermelon crops is 30 years, they indicate that the greatest benefit they obtain in this form of association is to ensure the sale of the product in dollars and It represents for them an area of comfort and tranquility, it also forces them to have a greater organization both in the operation and in the tax system. The amount of the crop in the contract is made by estimating, with distributors from the United States, Canada and Europe and some cases to Japan, the contracts range from 10,000 to 25,000 tons per customer, the most requested varieties in the export market is the seedless watermelon super sweet-5244 and super seedless 7187.

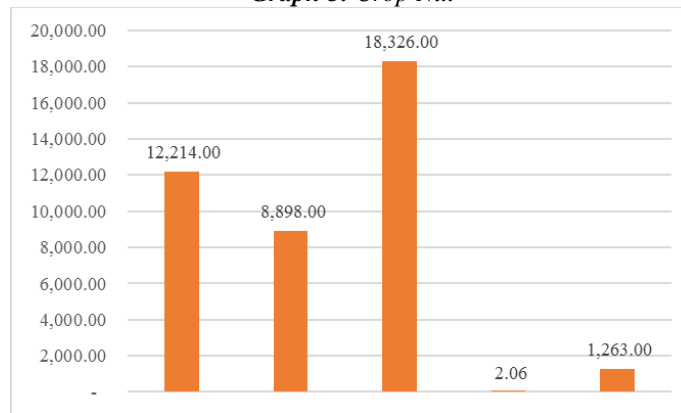
6.4 Nut

According to information from nut producers in the state of Sonora (E4), Mexico had a production of 125,758 tons, wich participates with 3.6% and placing it as the fifth largest producer in the world; On the other hand, according to data by the interviewees in our entity, 18,326 tons were produced in 2016, occupying the second place at the national level and a production value of \$ 1,263.0 million pesos and generating foreign currency of the order of \$ 94.2 million dollars and an important aspect is that due to the size and quality of the Sonoran nut, positioning has been achieved in the most demanding international markets such as the eastern market headed by China.

This crop represents 2% of the total area planted in the state, provides 3.7% of the total value of agricultural production in the state occupying the second place in the country. This crop annually generates around 551 thousand wages, representing 3.1% of the total wages generated by agricultural activity. See Graph 3.

For Hernández (2019), an important part of the success in the production of walnuts and other crops, is related to the productive reconversion since 1980 and the use of technology based on innovations and biotechnology, an important part is investment in irrigation technology, this has allowed a group of farmers to enter the global value chains and new corporate regimes, with three main characteristics: “a) multinational agribusinesses became the key economic actors that drive it; b) the neoliberal State provides the political, legislative and administrative context for the development of this regime and c) biotechnology becomes the main tool to promote said project (McMichael, 2015; Otero, 2014; Rubio, 2014) Hernández (2019, p. 8).

Graph 3. Crop Nut



Source. Elaboration based on SAGARPHA (2018)

7. Conclusions

The Costa de Hermosillo is a leading region in the production of various crops which stand out nationally: the table grape, watermelon and squash kabocha and walnut, all these crops are export oriented and the sale of the production is guaranteed of beforehand by hiring crops. Farmers in this region are satisfied with a modality that gives them certainty in selling all their products, abroad; little is the production that is oriented to the local market. Likewise, local institutions, welcome contract farming for leadership in agricultural exports from the state of Sonora.

Grape producers stand out, who have maintained the organization and integration through the Association of Table Grape Producers of La Costa de Hermosillo since 1977, which has allowed them the leadership in

production nationwide, constant innovation and linking with research centers to obtain greater profitability per hectare harvested and investment in infrastructure.

The producers interviewed under the contract farming modality are satisfied with this model that gives them certainty in the placement of their products from the sowing and assures them a price agreed in dollars in advance, also integrates them to the production needs Standardized under international schemes, their only disagreement is that sometimes they can obtain a better price for their harvest in the market, but they have to deliver it at the price agreed in the contract

We can conclude by saying that in La Costa de Hermosillo, local actors, both producers and government institutions, did not put any resistance to this new modality, which guides agriculture abroad, and does not recognize the needs of local markets, making products more expensive in the interior of the country and making use of land and water so scarce in this semi-desert region. Farmers went from an inland-oriented production model, in which the sale of the grain crop was assured by selling it to government institutions with guarantee prices, to another, which will ensure the purchase of the crop at a price agreed in advance in a contract, under an export-oriented production scheme and in which the conditions of quality, type of seed and others, are agreed in advance, are agreed in advance, which for them represents comfort and tranquility in a competitive and unstable market.

References

- CONAGUA, 2015. *Update of the average annual water availability in the Costa de Hermosillo aquifer (2619). Sonora State*. Mexico City: Official Journal of the Federation.
- Echanove, F. and Riedemann, C., 2001. Contractual relations in the production of vegetables and grains in Mexico. *Agrifood*, 6, pp.41-53.
- Echanove, F. and Riedemann, C., 2002. Contract farming: The case of grain and vegetable producers in Guanajuato. In INEGI, Mexico in its unity and territorial diversity. Volume V. Aguascalientes: INEGI.
- Eaton, C. and Shepherd, A., 2002. *Contract farming*. Rome: Food and Agriculture Organization of the United Nations.
- Grijalva, A., 2016. *Banking, credit and business networks in Sonora, 1897-1976*. Hermosillo: The Sonora College.
- Hernández Pérez, J.L., 2019 Desarrollo tecnológico e integración comercial de los productores agrícolas de la Costa de Hermosillo en la globalización. *Region and Society*, 31, p.1-25. doi: 10.22198/rys2019/31/1006
- INEGI. 2017. *INEGI National Agricultural Survey* [online] Available at: <https://www.inegi.org.mx/programas/ena/2017/default.html#Tabulados> [Accessed on 8 August 2019].
- Food and Agriculture Organization of the United Nations, 1993. Water resources policies and agriculture. Rome: Food and Agriculture Organization.
- Proceso, 1981. In Sonora, water is also for the less. One district perished from thirst and they will squeeze another. [online] Available at: <https://www.proceso.com.mx/132251/en-sonora-el-agua-es-tambien-para-los-menos-un-distrito-perecionade-sed -and-squeeze-another> [Accessed on 8 August 2019].
- Puyana, A. and Romero, J., 2008. The Mexican agricultural sector under the North American free trade agreement, poverty and inequality intensify, migration grows. In Barba, C. (ed) *Challenges for the social integration of the poor in Latin America*. Buenos Aires, Argentina: CLACSO.
- Red Fronteriza de Salud y Ambiente, 2002. *Texas Center for Policy Studies*. [online] Available at: <http://www.texascenter.org/publications/sonora.pdf> [Accessed on 8 August 2019].
- Salazar, A., Moreno, J. and Lutz, A., 2012. Agriculture and sustainable management of the aquifer of the Costa de Hermosillo. *Region and Society*, 24 (3), pp.155-179. doi: 10.22198/rys.2012.3.a411
- SAGARPHA, 2017. *Watermelon crop in Sonora, Mexico* [online] Available at: <http://oiapes.sagarhpa.sonora.gob.mx/notas/sandia.pdf> [Accessed on 8 August 2019].
- SAGARPHA, 2018. *Crop information in Sonora Mexico* [online] Available at: <http://oiapes.sagarhpa.sonora.gob.mx/notas/econo/calabaza.pdf> [Accessed on 8 August 2019].
- SAGARPHA, 2018. *Production at State level in Mexico* [online] Available at: <http://oiapes.sagarhpa.sonora.gob.mx/notas/econo/uva.pdf> [Accessed on 8 August 2019].
- SAGARPHA. 2019. *Information by crop at State level in Mexico* [online] Available at: <http://oiapes.sagarhpa.sonora.gob.mx/datosagp/concultivosoi.asp> [Accessed on 8 August 2019].

Vázquez, N., 2011. *Agricultural Association of Table Grape Producers, a model of modern agriculture in the 21st century*. Mexico: Sonora Produce A.C. Foundation.

Annex 1. Information of Interviewees

- E1. 2019. Producer of Pumpkin of the Coast of Hermosillo in agricultural mode by contract. 6 August 2019
- E2. 2019. Grape producer of the Coast of Hermosillo in the form of agriculture by contract. 9 August 2019
- E3. 2019. Watermelon producer of the Coast Hermosillo in the form of agriculture by contract. 15 August 2019
- E4. 2019. Nut producer of the Costa de Hermosillo in the form of agriculture by contract. 31 October 2019