https://doi.org/10.32854/agrop.v14i2.1781

Structure and operation of the rabbit meat production chain, Texcoco, México

Galán-Caballero, María Evangelina[1]; Escalona-Maurice, Miguel Jorge[1*]; Jiménez-Moreno, María Josefa[1], Hernández-Romero, Oliverio[1]; Caamal-Cahuich, Ignacio[2]; Velázquez-Marzano, Gustavo[3]

[1]Colegio de Postgraduados, Campus Montecillo, Texcoco, Estado de México, México. [2]Universidad Autónoma Chapingo, Texcoco, Estado de México, México. [3]Delegación La Purificación, Tepatitlán, S/N Texcoco, México.
***Corresponding Author**: mescalona@colpos.mx

ABSTRACT

Objective: The objective was to describe and to analyze the situation and interrelations among the of the rabbit meat production chain, in order to identify the main factors that determine competitiveness.

Design/Methodology/Approach: The methodology used in the research was mixed (qualitative and quantitative). The type of sampling we used was "Snowball". A survey was applied to 33 rabbit producers and a statistical analysis of the data was performed in SPSS (Statistical Package for the Social Sciences). Later, with the use of Geographic Information Systems, the farms were geo-located with Arcview® version 3.2.

Results: The results show the various stakeholders integrating the chain; the lack of communication among them, but highlight commercial relationship among producers, suppliers of equipment, feed and breeding stock; placing the producer as the weakest point in the chain, only as raw material supplier. Producers are heterogeneous and have mainly two types of farms; backyard farming and semi-technical. The spatial distribution map of 33 producers was obtained.

Limitations of the study/Implications: Although rabbit farming is an important complementary activity to food production, the study showed that in the area there are no links among the various agents that integrate the production chain. There is only the mere commercial relationship.

Findings/Conclusions: It is concluded that the null organization of producers keeps them excluded from the productive value chain.

Keywords: globalization, rabbit farming, value chain, product system.

INTRODUCTION

The production chain (Isaza, 2008; Kaplinsky and Morris, 2009) of rabbit meat is part of the chains identified as priority. Rabbit farming presents positive impact in 25 states of the Mexican Republic (the more active are: Puebla, Tlaxcala, Michoacán, Hidalgo, Southern CDMX and the state of Mexico). It is an activity for which there is no national

Agroproductividad: *Vol. 14, Núm. 2, febrero. 2021. pp: 23-28.*
Recibido: *septiembre, 2020.* **Aceptado:** *enero, 2021.*

Imagen de Lily_S en Pixabay

information sufficient to determine its economic and social importance (Delgado, 2010; SAGARPA, 2014). The participation of the Municipality of Texcoco is highlighted with the highest level of regional production and consumption (SAGARPA, 2013; 2014).

The production chain of rabbit meat analyzes the interrelation among the stakeholders that are part of it. This chain is defined as a vertical set of companies that produce raw materials, intermediate products and final products. Each point is in charge of one activity such as marketing, research and development, sales and distribution of the final product to users, who in most cases are consumers (SAGARPA, 2004; Comité Sistema Producto Cunícola del Distrito Federal, 2012). The productive chain refers to production systems, which are a set of elements and concurrent agents of the productive processes of agricultural products, including the supply of technical equipment, productive inputs, financial resources, primary production, storage, transformation, distribution and marketing (FAO, 1996; Olivares, Gómez, Schwentesius and Carrera, 2009).

In this study, the production chain is defined as a tool to analyze relations among those stakeholders involved in the production of a commodity, who share the same market (Isaza, 2008; Kaplinsky and Morris, 2009). Therefore, the objective was to analyze roles and interrelations among the stakeholders in the rabbit meat production chain in order to identify the main factors that would allow it to develop competitiveness for the benefit of the participants and with emphasis on the producers.

MATERIALS AND METHODS

This research was conducted in the Zone of the Mountain of the Municipality of Texcoco (ZMMT), state of Mexico. ZMMT comprises 16 localities: Xocotlán, Santa Inés, Santa Cruz Mexicapa, San Dieguito Xochimanca, San Juan Tezontla, Villa San Miguel Tlaixpan, San Nicolás Tlaminca, San Joaquín Coapango, La Purificación Tepetitla, Santa María Nativitas, Tequexquinahuac, San Pablo Ixayoc, Santa Catarina del Monte, Santa María Tecuanulco, San Jerónimo Amanalco and Colonia Guadalupe Amanalco (Texcoco Municipality) (INEGI, 2009; 2010).

Methodology. A mixed (qualitative and quantitative) approach was used. Qualitative was based on Ethnographic exploratory observation. Whereas with the Quantitative, measurable data was obtained by applying a questionnaire (Hernandez, Fernandez and Baptista, 2010). The type of sampling we used was chained or in network ("Snowball") in which the key participants are identified. Then, they are asked if they know others who can provide information, once contacted they are included in the sample (Hernández, Fernández and Baptista, 2010). One questionnaire was applied to a producer, finding out about his links with other rabbit producers and this procedure ended when person declared no longer knew other producer. For the study, the sample size was defined as the total number of producers accessed in the mountain area, due to the lack of data on the actual number of producers living in the whole area. The size of the sample (n) was 33 producers and to collect data a 53-marks survey data, divided into eight sections, was applied to the producers. Statistical analysis was performed with SPSS (Statistical Package for Social Sciences). Later, with the use of GIS (Peña, 2006) the farms were geo-located, and a relational database was created in Arcview® v. 3.2. A map was created with the spatial location of producers' farms, by using a digital ortho-image at 1:10 000 scale.

RESULTS AND DISCUSSION

Operation of the production chain is composed of different stakeholders. Commercial relations that keep producers, suppliers of equipment, food and breeding stock in ZMMT are highlighted.

a) Equipment supplier. In the Municipality of Texcoco, two suppliers of rabbit farming equipment were located. The costs of items that they handle varied from $350 to $16,500; COMPROVET occupies 50% of the market. It is a company recognized and authorized by the Rabbit Production System of the state of Mexico. And the other 50% is occupied by INTEPEC, a company that offers imported equipment. These suppliers act in the free market or jointly with an agency that manages production projects, aimed at rabbit producers or people interested in participating in this activity.

b) Food supplier. Various companies were located to breed-balanced feed production. Four of them stand out (Purina, Malta Clayton, Albapesa and La Unión Tepexpan). A gross percentage (81.82%) of the market in the study area is held by Albapesa, followed by Unión Tepexpan and Purina, 9.09% each. Purina is the company that represents the feed link within the chain structure. However, for the producers of the ZMMT, this company handles higher prices, and they prefer to

purchase breed-balanced feed from another supplier at a more accessible price.

c) Provider of breeding stock. The producers acquire breeding stock with Chapingo Autonomous University and Granja la Esperanza (a link in the production chain). However, the practice of buying broods with other farms is present, causing inbreeding and health issues, since they do not know the sanitary measures to follow for the choice of broods.

d) Producer of rabbit meat. Rabbit farmers in the study area are characterized as rural producers; rabbit farming should be regarded as an economically important activity because it generates income, employment, and several activities related to rabbit breeding and the use of equipment from specialized distributors, feed factories and suppliers of breeding stock.

The participants of the production chain lack of communication among them, while maintaining a merest business relationship. This situation places the producer as the weakest point of the chain, solely as a provider of raw material.

Productive structure

Within each farm there are multiple factors that make their characterization difficult. However, the classification made by the FAO (backyard, semi-technical and technical) was used (FAO, 1996; 2011; 2015). Family farms that are sometimes difficult to classify within a system were considered. The producers are more heterogeneous and we worked with the characteristics of each farm visited in the field. In addition, the number of reproductive females in each farm was considered. Farms with 5 to 20 broods were considered as backyard farming; from 21 to 50 they are semi-technical, and with more than 51 they are technical. Of the visited farms, 72.73% were classified as backyard and 27.27%, as semi-technical.

Through the use of the GIS in ArcView 3.2, the spatial distribution of the 33 producers was depicted on a map of the study area (Figure 1). This information allows us to see the distance from one producer to another and the neighborhood of points. The spatial distribution shows that the producers are dispersed. This is one of the possible reasons that has prevented them from organizing.

Figure 2 shows the types of farms found in the study area. Backyard farms are characterized by using less technical equipment and having a minimum of 5 reproductive females; semi-technical farms have a more specialized equipment that allows them to implement the management more efficiently.

In the ZMMT there are 33 producers, with a total of 3,688 rabbits. This amount can vary due to mortality, sales, slaughter of animals or due to the closure of activities of

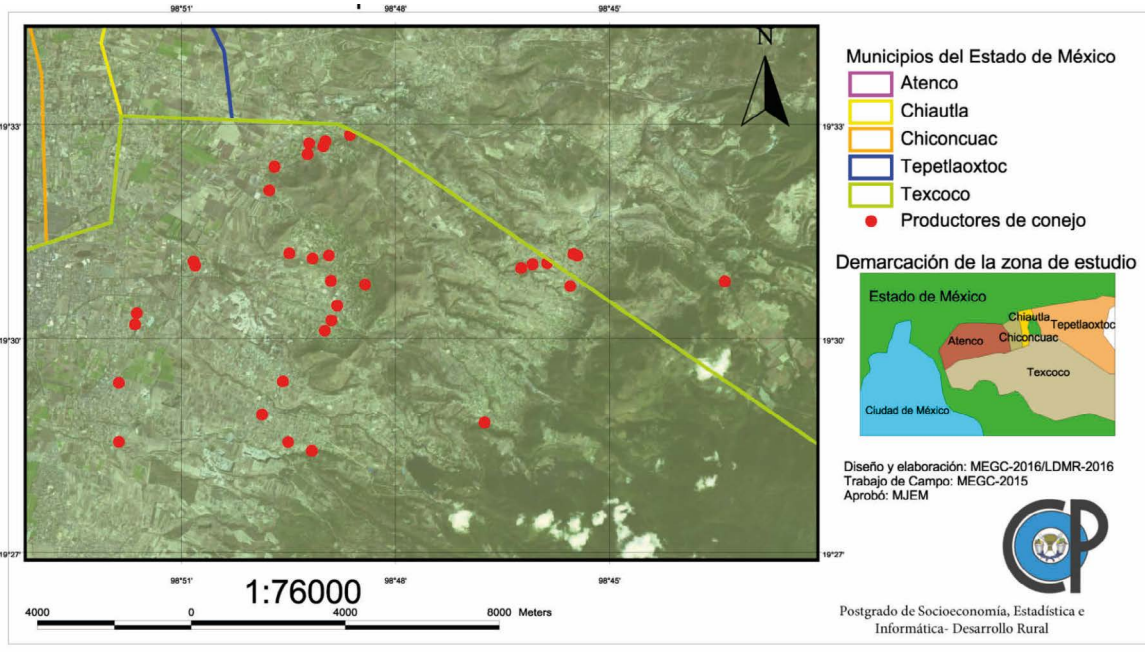

Figura 1. Spatial distribution map of rabbit farmers in the ZMMT, Texcoco, México.

Figure 2. Backyard farm (a) and semi-technical farm (b).

some farms. The towns of San Pablo Ixayoc, Santa María Nativitas and Santa María Tecuanulco did not present any record of producers.

Producers

Of the producers, 81.80% are male, and 18.20% female. The average age is 47 years old (minimum 28, maximum 68); 39.4% of producers finished junior High-school (total education, 9 years). Thus, ranking below the national schooling average of 9.7 years (INEGI. 2010); only 30.3% had a College degree, 18.2% studies in senior High-school and 12.1% finished the Elementary. The level of studies in the ZMMT is an important aspect, since the greater the degree of studies the producers the more open-minded to technological innovation in their rabbit farms, and they also adopt more recent technology in order to optimize their production.

Rabbit farming is a complementary activity among the producers of the ZMMT, and 33.3% stated that commerce is their main activity; another 30.3% is involved in services and self-employment such as plumbers, electricians, or taxi drivers.

Producers reported an average of 3.73 years performing rabbit farming. The minimum found was 1 year in the activity, while the maximum was 8 years. The latter figure, though, is justified because this person is an intermediary. Likewise, producers face problems that limit performance and yield. It is common to find producers without any training in the management of the species, and with little economic solvency that would allow them to stay actives in the market. These people is forced to participate as emerging producers; that is, depending on their income they enter and leave the market.

Marketing

The 85% of the production is sold at Texcoco; 11% to other municipalities; and the remaining 4% to another of the states as breeding stock. The 49.59% of all the stock is sold as breeding for productive projects, to intermediaries and to a single organization. While 50.41% is provided as raw material (cuts of meat) to restaurants, barbecue places, butchers, or direct consumers (family and friends).

Marketing margin

The main route of commercialization of rabbit meat is through the intermediary. Around 35.73% of the production is commercialized; 27.87% is sold to restaurants, in these places a diversity of dishes is prepared and their prices are higher. Restaurants obtain a much greater profit in relation to the producer.

Despite the producer holds 80% of the price of sells and the remaining 20% goes to the intermediary, this is only the raw production price. It seems that the producer keeps a higher profit; however, the production costs per rabbit have yet to be considered. Total production cost is calculated from the birth of the rabbit to the sacrifice (2 months), the calculated cost was $47.25 (2.40 USD). If the producer keeps $37.80 (1.90 USD) per sold rabbit, this is without considering the investment in equipment. This market exercise is segmented as follows, and it was calculated with prices and costs in December 2014. The estimation was that one rabbit eats an average of 5 kg of feed from birth to 2 months of age; the cost per kg of feed in 2013 was $6.25 (0.32 USD), then, total feed costs per rabbit (5 Kg) accounts for $31.25 (1.60 USD) plus $8 (0.41 USD) of labor, $2 water and $5 of averaged transportation caveat (0.36 USD, for both), the total production cost per rabbit is $47.25 (2.40 USD); the value said above which is higher than the profit per rabbit

(1.90 USD) held by the producer. Also, it is important to mention that in this calculation the investment in equipment was not considered, nor the transportation cost as a function of the distance to the selling location. The marketing margin was calculated with the minimum price paid by the consumer and it is a function of the product (Table 1).

Table 1. Marketing margin of rabbit meat.

Letter	Marketing	Price/Pieza ($ Pesos)	Percentage %
a	Producer Price	60	80
b	Channel Price (as raw meat)	65	87
c	Consumer price	75	100
d	Trade margin (b-a)	5	7
e	Marketing margin (c-b)	10	13
f	Total margin (c-a)	15	20

CONCLUSIONS

The production chain of rabbit meat is disjointed; the participants in it maintain solely a trading relationship. This situation forces each producer to develop their own market, by offering a product with little or no added value. This basic product usually does not comply with the required health standards, causing losses in their market position. Producers trade based on their own decisions, without knowledge of the general market information in relation to prices.

In such a way that, difficulties in trading, access to financing and markets, cause the farming activity to be emerging. It becomes difficult for the producers to maintain their farms while waiting for better conditions which may lead to increase their production. Thus, the greatest profit from the commercialization of rabbit meat goes to the hands of intermediaries, restaurants, and bulk sellers or transformers. These participants can provide added value to the product and raise the sale prices; which is why the producer is considered solely as an input (raw material) supplier.

ACKNOWLEDGMENTS

The first author acknowledges the Mexican Consejo Nacional de Ciencia y Tecnología (CONACyT) for the scholarship granted to his postgraduate studies. To the Posgrado en Socioeconomía, Estadística e Informática, Desarrollo Rural del Colegio de Postgraduados, Campus Montecillo, for the support provided to implement the research.

REFERENCES

Comité Sistema Producto Cunícola del Distrito Federal. (2012). Plan Rector del Sistema Producto Cunícola del Distrito Federal. Recuperado de: http://dev.pue.itesm.mx/sagarpa/estatales/EPT%20COMITE%20SISTEMA%20PRODUCTO%20CUNICOLA%20DF/PLAN%20RECTOR%20QUE%20CONTIENE%20PROGRAMA%20DE%20TRABAJO%202012/PR_CUNICOLA_DF_2012.pdf

Delgado, C. M. (2010). El sistema agroalimentario globalizado: imperios alimentarios y degradación social y ecológica. Revista de Economía Crítica, 10: 32-61.

Hernández S. R., Fernández C. C., Baptista L. M.P. (2010). Metodología de la investigación. Ed. McGraw-Hill. 613 p.

Instituto Nacional de Estadística y Geografía (INEGI). 2009. Prontuario de información geográfica municipal de los Estados Unidos Mexicanos. Texcoco, México. Recuperado de: http://www3.inegi.org.mx/contenidos/app/mexicocifras/datos_geograficos/15/15099.pdf

Instituto Nacional de Estadística y Geografía (INEGI). 2010. Censo de Población y Vivienda 2010. Recuperado de: http://www.inegi.org.mx/lib/olap/consulta/general

Isaza, J. G. (2008). Cadenas productivas. Enfoques y precisiones conceptuales. Sotavento MBA. 11:8-25.

Kaplinsky, R. y Morris, M. (2009). Un Manual de Investigación de Cadenas de Valor. Ed. Gabinete Productivo. México. Recuperado de: https://proyectaryproducir.com.ar/wp-content/uploads/2010/04/Kaplinsky-Manual-completo-Rev-4-2010doc.pdf

Olivares P. R, Gómez C. M. A., Schwentesius R. R., y Carrera C. 2009. Alternativas a la producción y mercadeo para la carne de conejo en Tlaxcala, México. Región y sociedad, 21(46):191-207.

Organización de las Naciones Unidas para la Alimentación y la Agricultura (FAO). 1996. El conejo cría y patología. ISSN 1014-6423. Recuperado de: http://www.fao.org/3/t1690s/t1690s.pdf

Organización Interprofesional para impulsar el sector cunícola (INTERCUN). 2011. Guía científica y gastronómica de la carne de conejo. SPIM, España. ISBN: 978-84-92928-12-5. Recuperado de: https://euskaluntxia.com/wp-content/uploads/2018/01/guia-cientifica-de-la-carne-de-conejo.pdf

Organización de las Naciones Unidas para la alimentación y la Agricultura. (FAO). 2015. El Estado Mundial de la Agricultura y la alimentación. La Protección social y la agricultura: romper el ciclo de la pobreza rural. ISBN 978-92-5-308886-4. Roma. Recuperado de: http://www.fao.org/3/a-i4910s.pdf

Peña, L. J. (2006) Sistemas de Información Geográfica aplicados a la gestión del territorio. 2da. Editorial Club Universitario. Alicante, España.

Secretaria de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA). 2004. Análisis de políticas agroalimentarias rurales: integración de cadenas agroalimentarias. Proyecto Evaluación Alianza Contigo. Recuperado de: https://www.agricultura.gob.mx/sites/default/files/sagarpa/document/2019/01/28/1608/01022019-enfoque-internacional-sobre-el-desarrollo-de-cadenas-agroalimentarias.pdf

Secretaria de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA). (2013). Informe de Labores de

SAGARPA 2012-2013. Recuperado de: https://www.gob.mx/cms/uploads/attachment/file/102889/1er_Informe_de_Labores_SAGARPA_2012_-_13.pdf

Secretaria de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA). 2014. El Estado de México primer lugar en producción y consumo de conejo. Boletín de prensa B025/2014. Recuperado de: https://www.gob.mx/agricultura%7Cedomex/es/articulos/el-estado-de-mexico-primer-lugar-en-produccion-y-consumo-de-conejo#