

## Analysis of the mezcal value chain in San Felipe, Guanajuato

Juan Oswaldo Cervantes-Luna<sup>1</sup>

Juan Hernández-Ortiz<sup>1§</sup>

Ramón Valdivia-Alcala<sup>1</sup>

Enrique Melo-Guerrero<sup>2</sup>

Fermín Sandoval-Romero<sup>1</sup>

Araceli González-Juárez<sup>1</sup>

<sup>1</sup>Doctorate in Sciences in Agricultural Economics-Division of Administrative Economic Sciences-Chapingo Autonomous University. Mexico-Texcoco Highway km 38.5, Chapingo, Texcoco, Mexico. CP. 56230. Tel. 595 21500. <sup>2</sup>Institute of Agricultural Sciences-Autonomous University of the State of Hidalgo.

§Corresponding author: jhdzo@yahoo.com.mx.

### Abstract

The concept of value chain has been developed due to the need for rural companies to meet the requirements of the demand for high-quality specialized products. The value chain methodology allows us to make a diagnosis of the current situation. Subsequently, we can make an analysis of the actors involved in it and develop strategies that help improve the activity. This research work analyzes the mezcal value chain of San Felipe, from the point of view of the producers themselves to identify the links in the value chain. Information was collected through surveys and structured interviews. The information indicates that the mezcal value chain in the municipality is at a low level of competitiveness. In addition, it is disjointed in both horizontal and vertical relationships. A greater commitment on the part of the actors is recommended to be able to strengthen the relationships between the links of the chain, as well as to promote training and technical assistance in the different areas of production and to call on research and teaching institutions for the development of competitiveness strategies.

**Keywords:** cooperation, diagnostic, horizontal relationship, mezcal, vertical relationship.

Reception date: December 2021

Acceptance date: February 2022

## Introduction

There is a wide variety of definitions of value chain and its variants, Acosta (2006) uses the term 'agricultural value chain', referring to the set of actors that interact based on a specific product, to add or increase its value along the different links. According to Morillo (2005), value chain analysis is a method used to break down a production process into the activities that make it up, which goes from obtaining sources of raw materials, until the finished product is delivered to the final consumer, including post-sales activities (returns, guarantees, technical service, maintenance, installation, recycling, etc.), in which several companies participate, in order to understand the behavior of costs and the sources of product differentiation, with the aim of creating the greatest added value, this method is a tool for analysis and planning of strategic management or cost accounting that is used to diagnose and improve the competitive advantage of a company and for the coordination of its components and resources (Fennelly and Cormican, 2006; Keshelashvili, 2018).

The main idea of the chain approach is that the value of a product is created in several stages. It refers both to the activities within a company and the relationships between several companies involved in offering a specific product or service and thus be able to start building alliances or strategic networks, but this implies that the actors that are involved are willing to collaborate to identify common objectives, goals and strategies, share risks and benefits, as well as invest time and resources to maintain close business relationships (Dries, 2004; Dahlström and Ekins, 2007), in the same way, to be able to decide in which market segment to emphasize and in which value-generating stage to invest, based on the quantification of the power of suppliers and customers.

By using the chain approach, we can conduct an analysis of production costs and compare them with similar chains, it also provides us with a procedure to define the actions aimed at developing a competitive advantage (Francés, 2001). When studying a production chain, it is a question of understanding the structure of organizations, the functional division of work along a chain, the distribution of added value and the role of regulations in facilitating or hindering participation (Fries and Akin, 2004).

It also allows creating a cooperative intelligence: cost structure, marketing and organizational information that are shared to increase profit and competitiveness (Iglesias, 2002), seeing the chain as an economic unit implies the possibility of thinking about common objectives and the consequent appearance of strategic aspects, in terms of where strategies should be focused, how to better serve the final consumer and improve competitiveness (Mac Clay and Feeney, 2019). Porter (1985) stated that the way of operation of suppliers and distribution channels affect the cost and the way of carrying out the activities of the company, one of the advantages of analyzing the chain is that it allows establishing the strengths and difficulties faced by small producers and take into account that the price of the product is a reflection of the level of costs incurred by each of the links (Morillo, 2005), so the effective management of the value chain directly affects the profitability of the parties involved and customer satisfaction (Keshelashvili, 2018).

This economic valuation is useful to know and analyze the economic activities of a company and identify its competitive advantages, because, in recent years, consumers in the agri-food industry have been changing around the objective of products with greater added value and more specific characteristics in terms of distinctive quality, traceability and brand. This means that participants in agribusiness must make additional efforts to cooperate in a strategic way of thinking. Consumers increasingly want to know the impact of products not only on their health, but also on the environment, to the point where social and environmental values are being evaluated at the same level of relevance as economic value (Mac Clay and Feeney, 2019).

The Maguey-Mezcal production chain consists of the set of operations and actors involved in the transformation of the raw material from the maguey, to transform it into the alcoholic beverage mezcal, bottle it and market it so that it reaches the consumer. These are consecutive stages throughout a transformation process that involve raw materials, technology, knowledge, human resources, forest and non-forest inputs, infrastructure, transport and sales outlets, all of which interact in links.

The present work arises from the new boom of the agave distillate drink in the market, both national and international, in order to know the problems of the mezcal industry, mainly in the municipality of San Felipe, Guanajuato, Mexico, which is one of the two municipalities of this state that has the denomination of origin for this drink, likewise, the lack of knowledge about basic production practices, product diversification at the time of transformation, as well as a lack of vision at the commercialization stage, have been seen.

According to the Consejo Mexicano Regulador de la Calidad del Mezcal, AC, in its conformity assessment scheme of NOM-070 SCFI 1994 of February 2014, it states that there are 5 links involved in the maguey-mezcal production chain: 1) nurseryman; 2) maguey producer; 3) mezcal producer; 4) bottler; and 5) marketer. This research proposes a value chain model for rural development from the actions of the actors, taking elements of the LEADER (for its acronym in French) model and which means 'links between actions of development of the rural economy and social learning'. The model was implemented in the mezcal sector in the territory of San Felipe, Guanajuato.

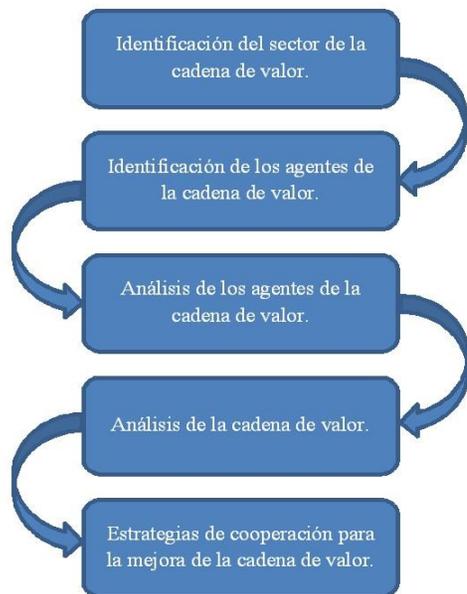
To this end, the creation of links and the acquisition of capacities of the agents that act along the value chain for the development of rural areas were identified and analyzed. Likewise, a value chain model is conceptualized as a social learning, understanding it as a dynamic process, where the knowledge derived from the experience of the different actors in the chain is reflected in practice and is integrated into a collective action within a specific productive sector. This new value chain approach recognizes the ability of actors to create knowledge and generate solutions from their own experience.

The central objective of this research is to propose and validate a model to the mezcal value chain in San Felipe, Guanajuato, through interviews with key actors, in order to promote social learning and favor a better integration of local and expert knowledge for the development of mezcal producers in the area. The hypothesis states that the links between the main actors in

the production and distribution of mezcal are non-existent or are limited to the exchange of goods without developing an information flow that favors the timely planning of production and its market.

## Materials and methods

The research was conducted in the municipality of San Felipe, Guanajuato, which is one of the two municipalities in the state that have the recognition of the denomination of origin mezcal. The methodology proposed by Trejo *et al.* (2011) has been used, they propose the analysis of the value chain with a social integration approach and the establishment of links between actors, which is aimed at triggering processes of social and economic development at the regional level, between the different agents involved in the value chain (producers, processors, marketers and local organizations). In addition, it takes into account and incorporates specificities of the LEADER methodology, such as territorial, bottom-up and multisectoral approaches. This methodology is composed of several steps, which are shown in Figure 1 and described below.



**Figure 1. Model for the analysis of the multisectoral value chain.** Elaborated with data from Trejo *et al.* (2011).

i) identification of the value chain sector. It is carried out through a territorial approach based on five criteria, which includes physical resources, culture and identity, human resources, knowledge of techniques and governance and financial resources (Trejo *et al.*, 2011).

ii) include the agents of the value chain. Where the link of producers is determined (it is usually the easiest and fastest to establish) with secondary information published by official institutions, and in the survey that is carried out to the producers themselves, it includes a section where it is asked with which other agents they intervene in the value chain, and this is how the identification is carried out with the bottom-up approach, from the perspective of the actors (Trejo *et al.*, 2011).

Analysis of agents of the value chain. It uses the bottom-up approach, through the application of surveys and structured interviews, for the identification of the strong points and weak points of the territory (diagnosis), as well as their participation within the value chain, it is closely linked to the territorial approach. In the collection of primary information, questions that result in obtaining information regarding technical aspects (production, transformation and commercialization), as well as economic aspects (costs and profits) and social aspects (organization, agreements and strategic alliances), depending on the identified agent, are included. With this information, a diagnosis of the situation in which the value chain is immersed is obtained, usually, this information is obtained directly with the agents involved, because there is no information published at that level of detail (Trejo *et al.*, 2011).

iii) analysis of the value chain. With the information collected from each of the identified agents, an analysis based on the horizontal integration of the value chain is carried out, where it is sought to detect the degree of integration of the agents, this can be measured through the number of organizations formed, as well as the number of meetings held by these organizations. The analysis is also conducted through vertical integration, where it is intended to detect if there is a dialogue between agents involved in the value chain, which can be measured through the agreements concluded between agents, as well as the existence of strategic alliances (Trejo *et al.*, 2011).

iv) cooperation strategy for the improvement of the value chain. The strategy that is proposed according to the information obtained, the analysis of the value chain through each of the agents involved in it, must be focused on the analysis of the agents and the analysis of the value chain as a whole; that is, the main points to consider in the strategy are the above; first, how to achieve the improvement of the technical aspects, and secondly, achieve an integration both horizontally and vertically; the important point to highlight is that this integration must be voluntary and based on the trust that develops between the actors (Trejo *et al.*, 2011).

### **Information sources and sample size**

The information was collected in the municipality of San Felipe, located in the northern region of the state of Guanajuato, bordering the municipalities of Ocampo, León, Dolores Hidalgo, and the state of San Luis Potosí.

### **Collection of primary information**

The study was conducted through a structured interview aimed at key agents of mezcal production in the municipality, due to the experience acquired over the years they have been integrated into the chain. The information was collected through an interview script that was addressed to mezcal producers.

The questionnaire and interview were conducted with six producers and two mezcal bottlers. The questionnaire consisted of the following sections: characteristics of the informant, production system, training for the job and agents of the value chain with whom they coordinate. The interviews consisted of general data, production characteristics, transformation characteristics, commercialization characteristics, who is the supplier, product they buy, cost and agents of the value chain with which they are related.

## Gathering of secondary information

To identify the sector of the value chain and the agents, support was requested from the Directorate of Economic Development and Tourism of San Felipe, Guanajuato, which provided data on seven producers and four bottlers of mezcal registered in that municipal body, which helped with the first approach to many of them and facilitated the location of the mezcal-producing localities in which interviews were conducted in the communities of Vergel de la Sierra, Cuartos de Bravo, Jaral de Berrio, El Carretón, Emiliano Zapata and in the municipal seat itself.

## Results and discussion

### Identification of the agents of the chain

As a result of the interviews conducted with the Directorate of Economic Development and Tourism, as well as the surveys of mezcal producers in San Felipe, Figure 2 shows a diagram of the agents involved in the value chain. The diagram reflects the links that could be identified, from the perspective of mezcal producers, where one can observe from agave producers to the national and foreign consumer in the main process. In the same way, some actors in accessory or secondary processes such as suppliers of firewood, containers and cork are highlighted.

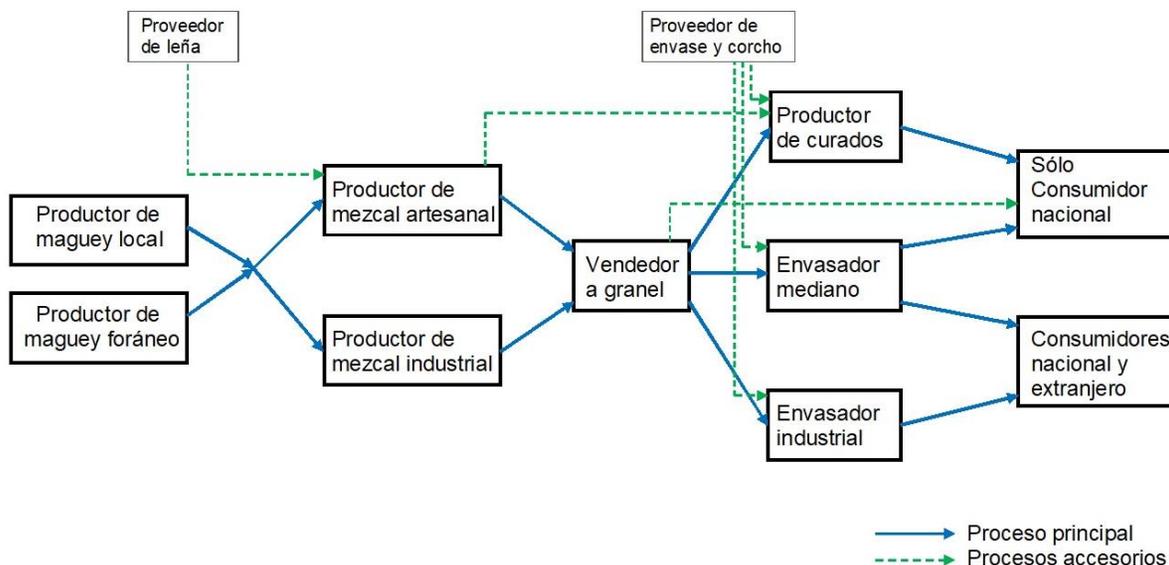


Figure 2. Actors identified in the agave-mezcal value chain in San Felipe, Guanajuato.

### Analysis of the agents of the value chain

In the municipality of San Felipe there are seven mezcal producers and five bottlers (among which are cured mezcal producers). In the following (Table 1), the number of mezcal producers, bottlers and their location in the municipality can be observed.

**Table 1. Number of producers and bottlers in the municipality of San Felipe, Guanajuato.**

Locality	Mezcal producer	Bottler
Municipal seat	1	4
Vergel de la Sierra	1	0
Cuartos de Bravo	1	0
Jaral de Berrio	1	1
Carretón	2	0
Emiliano Zapata	1	0
Total	7	5

Elaborated with data from the Directorate of Economic Development and Tourism of San Felipe, Guanajuato.

### Maguery producers

As for the plantations of agave mezcalero that are in the municipality, most are owned by the current mezcal producers and correspond to the variety *Salmiana crassisipina*, which produces on average 10 L of mezcal for each ton of pineapple (stem) cut, which is a low yield compared to the agave espadín (*Angustifolia* Haw.), which produces on average 30 L of mezcal per ton of pineapple cut. It was found that most of the agave plants are in ejido lands and that it is the ejidatarios (shareholders of common land) who extract and sell the agave pineapple already cut to mezcal producers.

Mezcal producers show interest in joining the activity of producing their own raw material; that is, agave plants, so most of them already have plantations with an average of two to three years, however, producers say that the agave *Salmiana* needs on average 8 to 12 years to reach the maturity needed in mezcal production, for example, in the ejido of Cuartos de Bravo, supports have been obtained from the National Forestry Commission (CONAFOR, for its acronym in Spanish) to establish plantations of five hectares of agave and a total of 42 hectares of agave, between plantation and wild agave, have been counted in the ejido.

In the same way, the producers expressed their interest in introducing some other species of agave mezcalero in order to diversify the production of agave and not depend on a single variety, this in order to be able to offer mezcal of different varieties of agave and be able to access a larger market, and there would also be different yields of mezcal, depending on the variety of the agave.

### Maguery producers from other states

Because most of the agave plants in the municipality of San Felipe are wild and the few plantations are too young to be exploited, there is no established supply of agave pineapples, for this reason producers are forced to acquire agave from other states, particularly from San Luis Potosí and Zacatecas, where the same variety of agave native to the municipality is found.

## **Mezcal producer**

Most of the mezcal producers are artisanal and are in rural communities or ejidos belonging to the municipality, except for one producer who is industrial and is in the municipal seat.

It is worth mentioning that the production of mezcal is a secondary activity, most of the identified producers are engaged in other activities such as agriculture, although there are also merchants, manufacturing factory workers and people who work in the hotel sector.

The producers surveyed are in favor of the integration of groups or associations, in order to access support and training, both for the productive activity of mezcal and for agricultural production. It is important to mention the collective brand Torres Mocha, which was granted since 2015, under which three producer organizations from three different communities work, which obtained support from the municipal and state government for the acquisition of a part of the infrastructure for the mezcal plant and technical advice both for the installation of machinery and theoretical-practical advice in the production of artisanal mezcal.

This type of association can bring with it many benefits as Keshelashvili (2018) indicates, the benefits for the members of an association derived from cooperation include the availability of equipment, plants and machinery, as well as access to better market and information, which improves the availability of specialization and the distribution of work. Producers consider savings as an important part of refinancing, as well as the reinvestment of profits to mezcal production, so bank financing is not considered as an option, mainly due to the high interest rates charged by these institutions.

As mentioned by Keshelashvili (2018), the seasonality of the production of raw materials and their insufficiency is one of the main causes of the instability of the value chain and supply chain in the agricultural sector. In the present research, it was found that the best season to make the distillate corresponds to January to June since, due to the dry season of the area, in this period the distillation time is more efficient and therefore the energy expenditure to be able to eliminate the water and obtain the alcohol content of the mezcal sought decreases. The same mezcal producer covers most of the other links, they themselves are bulk sellers, in addition to bottling mezcal through their own brand; some produce mezcal for other bottlers and cured mezcal producers, and then deliver their mezcal to national and international distribution.

## **Analysis of the mezcal value chain of San Felipe, Guanajuato**

### **Horizontal dimension**

It was found that the interaction between the actors in the chain is not linear and has a complex nature due to its dynamics, especially since the actors are not limited to a single process in the chain, but at the same time are in several links or sometimes covering the entire chain. Within each link, the individual action of the actors and the geographical dispersion predominate, there are no

mechanisms of articulation between the actors, nor of communication, exchange or cooperation. This is mainly because there is no organizational culture, which is because their main activities are different from the production of mezcal (Keshelashvili, 2018).

So, there is no horizontal dynamic of integration, alliances or something similar between actors. In this regard, Keshelashvili (2018) mentions that one of the main challenges for agribusiness management is that the participants of the value chain do not perceive each other as partners and do not adequately care about the stability of quality, which reduces the competitiveness of their businesses. Likewise, Iglesias (2002) mentions that, in a value chain, all members must recognize that all participants must create a win-win situation, so all of them benefit financially and are part of the process of making decisions and sharing information (Peña *et al.*, 2008).

Value chains are built more with cooperation in the business than with rivalries. Where information is widely shared, with the primary objective of adding value and quality to the product and aimed at being recognized as a differentiated product. And as proposed by Howieson *et al.* (2016), the relationship between the actors within the value chain is itself a source of value creation, but if the entire chain is not committed to the process, the value of the results will be compromised, and the obtaining of improvements will not be achievable for the chain.

### **Vertical dimension**

Throughout the mezcal chain, it was found that the relationship between the different participants is limited to the commercial activities of transfer of raw material and product, that is, there is no agreement, negotiation or cooperation aimed at improving the efficiency of the chain. There is no flow of information, which prevents the development of new products. It is well mentioned by Peña *et al.* (2008) and Iglesias (2002), trust is one of the most important aspects to consider in the formation of a value chain. Participants must trust their partners, where there are benefits derived from working together. Continuous communication is key to ensuring that the objectives of the alliance are met and that no member benefits at the expense of others, there is no room for an attitude of rivalry towards producers or buyers. A more advantageous competition for prices and delivery conditions should not be between producers within the alliance, but against other producers, processors or distributors outside the value chain (Barrientos, 2015).

In the market there are products in which not everything is negotiated with low prices, but there are other attributes that must be considered. However, one always must be alert, hence innovation is important, which is done through research and information collection. One should always keep in mind the question: how can I innovate in the production of my product? The alternative is to look for a new type of buyer and add value to the product, which favors a differentiation strategy, establishing more favorable prices, that the producer considers that at the time of selling their product it already has an added value, which is based on the demands of their buyer. This is how the competitive advantage of the producer is strengthened or created (Barrientos, 2015).

### **Problems identified in the mezcal value chain**

Some of the main problems found in the mezcal value chain in San Felipe, Guanajuato were: tendency to individualism, actors seek individual solutions in the short term, instead of seeking cooperation and integration of actions that boost the competitiveness of the chain in the medium and long term. Weak business organization: training is required to be able to identify critical points throughout the processes and to be able to design key strategies to improve. Disarticulation of the value chain: the disarticulation of the different links in the chain generates an inefficient flow of information.

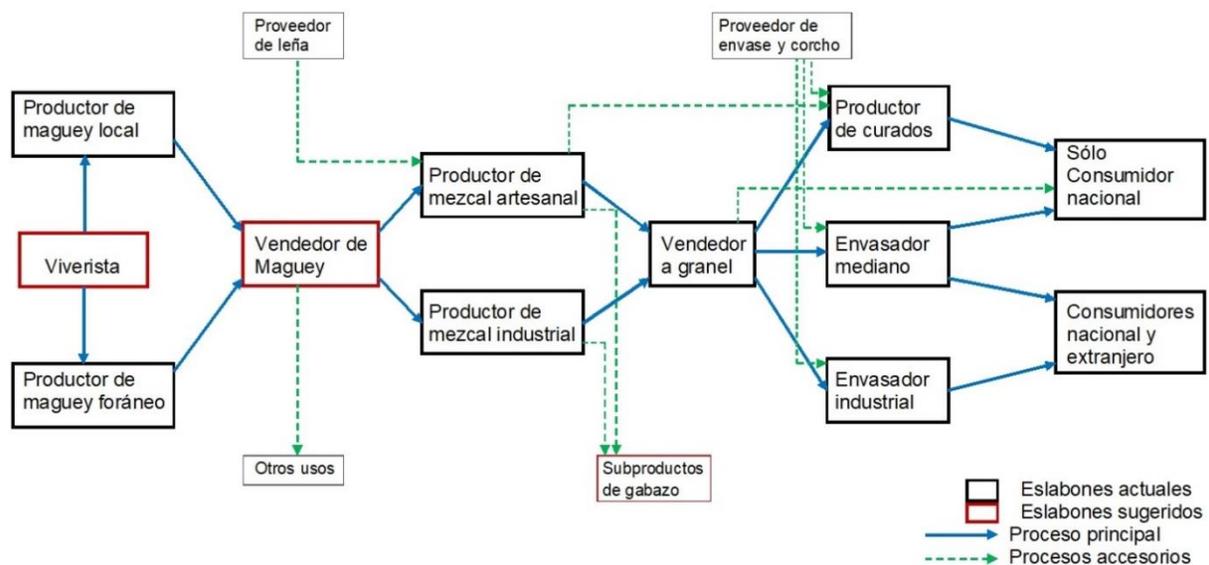
This is consistent with the work of Keshelashvili (2018), where it is demonstrated that the main challenges that hinder the development and efficiency of agribusiness management include land fragmentation, low availability of advanced technologies, lack of awareness and business management skills, poor organization of logistics and supply process, the limited opportunities for negotiation and performing agricultural commercialization.

As expressed by Morillo (2005); Barrientos (2015), for any strategy to be effective, they must be based on objective goals, their implementation needs resources and the company-environment relationship is fundamental to achieve the expected results, as well as constant training and establishing the corresponding communication mechanisms between the different links and having a cordial attitude and being sufficiently integrated to have the capacity for cooperation to overcome the cyclical problems of production.

To develop an integral management of value chains, it is necessary to include demand information such as market size, quality standards, competition, business practices, among other variables, on the supply side, information is needed on the scale of production, the availability of inputs, access to information and entrepreneurial capacity, likewise, quality and technological knowledge are key factors for value chains to achieve sustainable development (Peña *et al.*, 2008).

### **Value chain suggested for the agave-mezcal system for San Felipe, Guanajuato**

Figure 3 suggests some actors that are not currently within the industry in the municipality, but that should be considered for better development and decision-making for the growth of the value chain, such as nurserymen, local maguey producers and bagasse by-products, this in order that they are considered and begin to develop. In some production networks, the length of the chain can be very short and consist only of a small number of layers, in others, the chain can be very long, depending on the number of actors involved. In reality, each stage of a production chain is composed of a much broader set of nonlinear/horizontal relationships, which may not be visible to the naked eye, but which must be incorporated into any analysis of production networks (Coe *et al.*, 2008), for this reason some actors that are not currently developed in the municipality are being suggested.



**Figure 3. Suggested agave-mezcal value chain in San Felipe, Guanajuato.**

As mentioned above, most agave plants are wild, for which the incorporation of the nurseryman link (producer of seedlings until they reach the appropriate state of distribution and sale) is considered, this in order to have a sustainable exploitation, and to be able to ensure the supply of agave pineapple. Related to the exploitation of natural resources, it is proposed to consider the link of maguay seller, given that several mezcal producers are ejidatarios, according to the agreements of the ejido assembly, they are allowed to extract a certain number of kilos or agave plants (quantity that varies from ejido to ejido), there is no control of how much wild maguay is being extracted, so it is proposed to incorporate this agent in order to have a regulation and control of the exploitation and do it in an environmentally friendly way considering constant training to the ejidatarios in terms of sustainable management of resources.

Attention should be paid to the fact that, once the most important strategies have been identified, it will be necessary to verify their compatibility with each other and towards the prioritized objectives, this implies that it may be difficult to follow strategies that do not converge, and it is possible that a suboptimal performance is achieved with respect to the determined objective (De Figueiredo *et al.*, 2017). On the other hand, it was found that some producers make handicrafts from the fiber of the bagasse that is discarded in the process and others simply give it away for livestock feed; however, a greater analysis is required on the alternatives of handling this waste and determine if it can have a greater use and that it becomes raw material for other processes and products. As mentioned by Ariyawardana *et al.* (2015), it is important to observe the most valued attributes of the products by the consumer and see how their preferences vary and thus have market opportunities for all the actors in the chain and consider what interventions are required to comply with them.

## Conclusions

The analysis of the mezcal value chain of San Felipe, Guanajuato, allowed identifying the characteristics of the agents that participate in this activity, which has a simple composition that goes from producers, processors, intermediaries and consumers. It is poorly articulated horizontally

due to the lack of cooperation, negotiation and partnership that allow a more dynamic relationship for the flow of information between the actors. A greater commitment from the actors is required to be able to have a better relationship both vertically and horizontally, it will be necessary to implement an agave nursery in order to establish plantations and thus have the security of supply of the raw material for mezcal producers in the coming years.

It should be understood that the establishment of the plantation or production of the seedling is the first of the links that add value within the mezcal production chain and at the same time helps to focus the activity on sustainable schemes. Competitive advantages that distinguish local production from that of other places should be identified; for example, the environmentally friendly product badge, organic production, socially responsible company, among others. The organization of producers will also be important to access government support and request the participation of research and teaching institutions, as has been the case with the mezcal value chain in the state of Oaxaca.

Participants in the value chain must try to improve and maintain competitiveness based on innovations. Coordinate actions between various value chains (diagonal coordination) combining products and services (rural tourism). It is recommended to continue working on the monitoring of the development of the value chain in order to conduct an accurate evaluation of each of the links in the chain and to be able to propose and implement improvements to it in order to generate greater development and better conditions in each of the links.

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