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Towards a strategy for adapting traditional knowledge at ecosystem: A close look at mezcaleros producers in Mexico

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Abstract

Population growth, economic crisis and climate change have altered the ecosystem sustainability forcing us to adopt different pathways of interaction. This has affected not only the relationship between man and environment, but also the interaction between society and economic structure, triggering reduced incomes, migration and the abandonment of traditional knowledge able to transform natural resources into food or beverage. Being in line with the objective to achieve sustainable ecosystem, the goal of this study is constructing strategies that contribute to adapting mezcaleros' traditional knowledge at ecosystem, examining the problems, priorities, strategies and proposals to be undertaken by mezcaleros from Mexico. Using the Hybrid Delphi methodology, in face-to-face and non-face-to-face stage, including six mezcaleros leaders and a research group, the results demonstrated that access to financial institutions and government programs, such as the external activities that must be implemented besides business designing model and plan as priorities in face-to face stage. For the non-face-to-face stage, the priority is to evaluate their organizational capacity, provide detailed organizational tracking, achieving equitable government support and to design a scientific and robust business model. These proposals focus on facilitating adaptation of traditional knowledge at ecosystem without transgressing purity and privacy of the values, customs and local traditions of mezcal communities.

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Introduction

Currently, due to continued growth of human population (United Nations, 2017), economic crisis and climatic change (Banco Mundial, 2018), the world has seen altered its ecosystem sustainability, affecting the social, economic and environmental

balance, forcing the adoption of new ways of relationships. These alterations, not only have made difficult the relationship between man and their natural environment (Berkes, 2012), but also, have distorted the interaction between society and the economic structure affecting the stability of both (Torres & Rojas, 2015). Many researches have shown the difficult interaction between ecosystem interplay, ranging from excessive human influences on nature (Fedorov & Novik, 1973), the vulnerability and the development of resilience of man to climate changes (Audefroy & Sánchez, 2017), to negative influence of globalization on vulnerable people in the world (International Federation of Social Workers [IFSW], 2012).

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As such, ecosystem interaction is very complex. Now, worldwide efforts are focusing on achieving sustainable ecosystems, through a “paradigm shift” (Organización de las Naciones Unidas para la Alimentación y la Agricultura [FAO], 2015), to get a maintainable ecosystem interaction, utilizing traditional knowledge (TK) as a base (Organización de las Naciones Unidas Medio Ambiente, n.d.).

The term ecosystem is considered as the system of the interactive relationship between organisms in a specific physical environment (Government of Canada, 2002) and nowadays, due to its strong interaction with economic systems (Samson & Knopf, 1996), it must involve economic issues. As ecosystem, understanding includes a set of interactions represented in cultural practices, local rituals of everyday life (Berkes, Colding, & Folke, 2000), social attitudes, beliefs and practices acquired from historical experience, which create a bridge between past and present. These activities have generated so-called traditional knowledge (TK) (Berkes, 2012).

Understood as the wisdom developed by people based on the environment and the proper utilization of their lands and natural resources, traditional knowledge (Jain, 2005) has attracted interest of many disciplines due to its potential impact for disaster risk reduction (Shaw, Uy, & Baumwoll, 2008), and also, for promoting the regional development (Olivé, 2011). In Mexico, TK is used to transform various natural resources of cultural and economic importance for many regions (García Mendoza, 2007), one of these natural resources being the *Agave*. Considered a succulent plant with rosettes of narrow spiny leaves and tall flower spikes: *Agave* emerged in Mexican territory 8 million years ago (Comisión Nacional para el Conocimiento y Uso de la Biodiversidad [CONABIO], 2009) and is classified by its uses in food and beverages, principally those fermented ones such as mezcal (Colunga-GarcíaMarín, Larqué Saavedra, Eguiarte, & Zizumbo-Villareal, 2007).

With 100,000 hectares dedicated to sowing of *Agave* in Mexico, almost 20,000 are destined for mezcal production. From this, 51.23 percent of *Agave* mezcalero is produced in the states of Guerrero and Oaxaca (Servicio de Información Agroalimentaria y Pesquera [SIAP], 2018), resulting in the production of 1.7 million liters of mezcal in Guerrero by around 900 mezcateros (Kirchmayr et al., 2014), while 3.9 million liters are produced annually in Oaxaca by 590 production units (Secretaría de Economía, 2010), meaning an opportunity to have economic development (Consejo Regulador del Mezcal [CRM] 2016). However, *Agave* mezcalero production fell 68 percent in the 2008–2017 period (SIAP, 2018) and the majority of mezcateros – *the person who owns the pots and pans has the knowledge to transform the ripe Agave plants into distilled spirit called mezcal* (Illsey Granich, Purata, Edouard, Sanchez Pardo, & Tovar, 2010) – from Oaxaca, Mexico, had reduction of 38 percent loss of agave value, a decreasing performance of tons produced by hectare, (SIAP, 2018), meaning reduced economic incomes and resulting in a decrease in mezcal production, increase migration of people (Bautista, Antonio-Jose, & León-Núñez, 2017), and the abandonment of this artisanal practice (Bautista, Orozco Cirilo, & Terán Melchor, 2015).

This study recognizes the contribution of several technological studies on *Agave*, (e.g. Kirchmayr et al., 2014; Moyano et al., 2016; Thakur et al., 2015); but based on the

difficult situation of this sector, research is required that explicitly examines this sector and builds strategies for adapting at ecosystem. Due to this, the present paper examines the problems, strategies, priorities and proposals to be undertaken in the context of *Agave-mezcal*.

Literature Review

Strategies for Adapting Traditional Knowledge

Defined as the process of changing to suit different conditions, adaptation (Cambridge University Press, 2018), has become a real issue to economies especially in agricultural sector; the major source of food production in both the rich and low-income countries (Phungpracha, Kansuntisukmongkon, & Panya, 2016). So far, many scientific studies can be found showing the importance of adapting and preserving traditional knowledge to the ecosystem changes.

For example, based on traditional ecological knowledge (TEK) as a form of sustainable development for adapting to changes in food acquisition, Phungpracha et al. (2016) highlighted TEK as an important strategy for achieving food security. Under ethnographic methodology, the authors conducted interviews with eight key informants and around forty members of the community who were rice and corn producers from Thailand. The results show that TEK enables the community to be more resilient to changes for the environment but not to socio-economic pressures. In another study, which examined the life of the indigenous Tao community from Taiwan, Enn (2013), explores the loss of the Tao's traditional knowledge after post-colonization. In response, government actions were implemented to recover these lost traditions by learning about their needs and exploiting the traditional knowledge held by the people of the island. In order to preserve the community's language and its fishing and gardening traditions, strategies as the use of technology were implemented in communities with similar problems, sharing experiences and drawing inspiration. In the same way, the island's schools showed the importance of ecology and spirituality in the natural environment to students. In another study, FAO (2011) presented three successful cases based on an exercise in which participants constructed and rethought their traditional knowledge. The study conducted a strategic planning exercise aimed at contributing to the improvement of food security enjoyed by the families of indigenous communities, through the strengthening of its organizations in Ecuador and Peru. The results show a strengthening of the traditional systems, variety in the consumption of traditional products, reduction in the number of families in poverty, and increase in the annual income of the indigenous communities.

The Mezcal Studies in Mexico

Considered as spiritual beverage, mezcal studies make evident the negative impact of ecosystem on this sector. Bautista et al. (2017) research considered 70 mezcal producers from Matatlan and El Camaron, Oaxaca, Mexico and through semi-structured interviews with socioeconomic and environmental questions, examined the socioeconomic and

environmental effects generated by the overproduction of maguey mezcalero in mezcal región of Oaxaca. The results expose a lack of adaptation between market and maguey mezcalero production and the abandonment of traditional agricultural practices. Due to this, the authors recommended an economic and productive planning of the cultivation. In another study, Bautista et al. (2015) studied the relationship of socioeconomically and productive effect with industrialization of maguey by tequila producers. The study considered applying interviews related to production, price and market of mezcal and considering localized agri-food system methodology to 12 mezcal artisanal producers. The results exposed a socioeconomic and productive relationship between artisanal producers, production of maguey, input suppliers, equipment and marketing actors, but also showed the abandonment of artisanal mezcal production due to the industrialization of maguey. Bautista and Smit (2012) explored the concept of sustainable agriculture of 70 units of mezcal production ubicated in Matatlan, Tlacolula and El Camaron, Yuatepec, Oaxaca. Considering the observation and interviews, the results expose a null practice of sustainable agriculture (rest from the ground, rotation, crop association) in El Camaron, Yuatepec, Oaxaca mainly due to ground surface, and traditional modification practices of mezcal production. Here, the authors recommended design strategies for the conservation and preservation of environmental resources.

Even though, the governments encourage the use of TK and scientific knowledge (International Council for Science, 2002), in Mexico, studies about adapting TK at ecosystem, are still scarce.

Methodology

Data Collection and Participants

Interview-based qualitative analysis was undertaken with six mezcalero leaders, who claimed to represent approximately six hundred mezcal micro-producers in the Mexican states of Guerrero and Oaxaca. It should be noted that, due to privacy regulations and socio-political conditions, the names of the producers interviewed are not mentioned; however, the name of the forum in which the leaders were interviewed by the team of researchers can be given: Red Temática Mexicana – Aprovechamiento Integral Sustentable y Biotecnología de los Agaves [AGARED] (2018).

The sample size was based on stratification in accordance with the design used by Marshall (1996) and under the recommendations for the Hybrid Delphi methodology of Landeta, Barrutia, and Lertxundi (2011). This enabled a representative sample of the population to be taken, which could be generalized back to the grassroots that the AGARED forum aims to include – namely a group of around 500 *Agave* cultivators and industrial processors, including around 150 from the mezcal industry. Due to this, qualitative research was planned using Hybrid Delphi methodology in two interview stages – face-to-face and non-face-to-face (during the first stage). The face-to-face information was obtained from semi-structured interviews. The face-to-face stage initially dealt with information related to initial meetings. Once this stage had

been completed, the new researchers and the new social focus of the research were presented. Non-face-to-face data was gathered though the analysis of information by a group of multidisciplinary researchers from social sciences (five researchers from the areas of sociology, anthropology, economics and administration).

Data Analysis

Face-to-face and Non-face-to-face stages.

Under the Hybrid Delphi methodology, the groups were gathered together for the face-to-face stage in order to enhance actor participation, debate, involvement and interaction. Under the guidance of researchers acting as moderators, this stage comprised the discussion of three points: firstly, the general problems faced by the mezcaleros were discussed; secondly, the measures that should be implemented for the growth of the sector were discussed; and, thirdly, the group spoke about their main priorities for the mezcal-producing sector. Each stage was considered a space in which to raise doubts. Data was collected during the face-to-face stage using basic tools such as semi-structured group interviews, thus obtaining various points of view from the interviewees through triangulation validity in order to avoid deviation (Denzin, 1973). Seeking to avoid information insecurity and aiming to make explicit the mezcaleros' needs, this study was divided into two stages, thus enabling the research to be conducted on a profound level and ensuring that the data obtained was reliable (Flick, 2009). For the second stage non-face-to-face, the results were grouped together and presented to a group of researchers with experience in social and economic studies, in order to obtain new proposals and a new research approach.

Results and Discussion

Mezcaleros' Problems

Oaxaca and Guerrero, Mexico have a set of social and economic complexities. Despite having important natural resources and deeply rooted knowledge contained in interesting customs, values and traditions to transform natural resources, 68 percent of total people from Guerrero and 73 percent from Oaxaca live on less than \$1,053.39 pesos in rural communities (US 55.26) and \$1492.32 pesos in urban communities (US 78.29) per month (Consejo Nacional de Evaluación de la Política Social [CONEVAL], 2016). This economic and social situation is similar for the six mezcalero leaders from Oaxaca and Guerrero. This antecedent suggests that this could be one reason of the finding for total rejection to add other states of Mexico as origin of mezcal is due to their economic condition, being hesitant to form part of the formal economy, as they will have to pay taxes on their businesses.

Mezcaleros' Strategies of Growing of Agave Mezcal Sector

Based on the idea that traditional knowledge is adapted according to needs (Comisión Nacional para el Desarrollo de los Pueblos Indígenas [CDI], 2004) the adapting strategies first must start from outside to inside. It is possible that due to this,

the six mezcalero leaders, want first to 1) gain access to financial institutions and obtain support and; 2) gain access to federal government support programs. This suggests that it is still necessary to re-formulate access to financial support in private and public institutions in Mexico, considering the people with low economic resources.

Mezcaleros' Priorities

External issues of Mezcaleros' leaders force it to consider the design of a business model and a construction of a concrete business plan to develop their trade into national and international market. This helps them to adapt to their economic ecosystem.

Strategic Proposals from Group of Researches Vision

Taking into account the mezcaleros' TK to address their problems, strategies and priorities and considering their most distinctive features: its artisanal nature, the strategic proposals orientation, from researchers vision in non-face-to-face stage, made the following proposals: 1) Evaluate the mezcaleros' organizational capacity, referring to the resources, knowledge and process employed in *Agave*-mezcal production, to accomplish the goals (Horton, 2003); 2) Provide detailed organizational tracking, understood as the construction of tracking indicators to detect some problem; 3) Focus on achieving equitable government support, referring to search of private and public support; 4) A scientific and robust business model must be designed, based on *Agave* resources and knowledge and process, to add their product to the global market.

These strategies are in line with the activities employed by successful enterprises and institutions to adapt traditional knowledge at ecosystem as Vilniaus Duona from Lithuania that considers its knowledge and process as the main resources to accomplish the goals (Organización Mundial de la Propiedad Intelectual [OMPI], n.d.); Centro Agroecológico San Francisco

de Asis AC (CASFA) that employs organizational tracking through the evolution of its agroecological system indicator (Red Innovagro, n.d.); the government that employs the cooperation between Ecuador and Peru authorities for improving the food security of the indigenous communities (FAO, 2011); or Corporativo Magueyeros San Isidro S.A de C.V. for conserving the properties of pulque as model to enter global market (Red Innovagro, n.d.).

Conclusion and Recommendation

The changing conditions of the ecosystem showed the disposition of mezcaleros to adapt to new conditions. However, this adapting process is derived from external events, which, according to mezcaleros leaders, could be seen as transgression towards local traditional knowledge. Nowadays, the business and plan models could help to facilitate the adaptation of traditional knowledge at ecosystem without transgressing purity and privacy of this knowledge content in values, customs and local traditions, even when the origins of these models were outside of traditional knowledge. Due to this, the proposed strategies try to orient the adaptation to traditional knowledge at ecosystem, under a line of evaluation, tracking, support and construction, taking care not to infringe on this historical and emblematic knowledge. This research is an integral part of a program in development for tracking the activities of the mezcaleros in the states of Guerrero and Oaxaca, Mexico.

Conflict of Interest

No conflict of interest.

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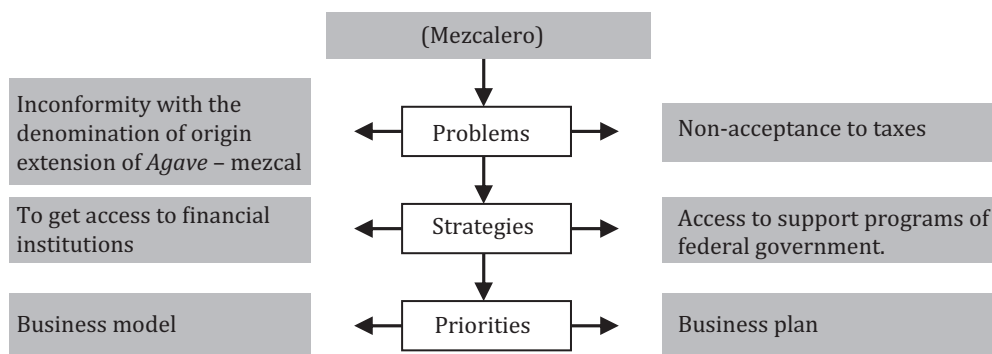


Figure 1 Problems, strategies and priorities of mezcaleros

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