

Landscape concept in agave-producing localities: Tlaquilténango, Morelos and Arandas, Jalisco

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Abstract

The understanding of the landscape has become relevant among localities that seek options for improving methods of production, administration and management of heritage. The agave landscape in Mexico gives meaning and identity to several states of Mexico. This research discussed the perception of two localities that produce Agave-distilled beverages about their landscape heritage in 2018. The case study of Tlaquilténango, Morelos and Arandas, Jalisco was selected since both commercially exploit the plant in different proportions, one on a larger scale than the other. Both localities produce alcoholic beverages, which not only implies a material good, but a product of culture, history and identity. To this end, an instrument was applied to evaluate the approach to the perception of the agave landscape as part of heritage in a comprehensive way, defining local workers and decision makers as actors and identifying residuals as the problem. The results showed that most of the participants perceive the agave landscape as part of their heritage and identity, being feasible to work with proposals to reuse the residuals as an alternative for obtaining byproducts of the production process for their revaluation. A comprehensive analysis of the landscape concept envisions a solution to problems associated with the community of producers regarding the management and transformation of the residuals produced. This facilitates the participation of representatives, producers, managers and/or experts, etc., in issues of conservation of the agave landscape heritage.

Keywords:

agave, conservation, heritage, landscape.

Introduction

The European Landscape Convention (CEP, 2000) promotes the planning, protection and sustainable management of landscapes. In its first article, landscape is defined as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and human factors, so it is a fundamental element of the environment, expression of the diversity of their cultural and natural heritage and as the foundation of their identity' (Prieur, 2006). This convention establishes strategies and measures to protect, manage and plan landscapes, with the aim of maintaining and improving their quality, promoting the recognition of their value (Fanfani *et al.*, 2015), the importance of public perception and the integration of this in conservation actions.

The landscape is a complex phenomenon that continuously evolves through time and space (CEP, 2006). Therefore, landscapes have a wide variety of meanings, which agree with the diversity and cultural identity of the localities. The physical landscape affects culture and culture influences the landscape (Álvarez, 2011). The damage to natural landscapes, today, is of important relevance for sustainable development, since there is dependence of men and women on natural resources to ensure their survival. As a natural and cultural heritage, landscapes must be protected and managed in this context (Steer, 2008).

Perception is the process in which information is derived through the senses, organized and interpreted. It is the processing of information (cognitive), the feeling of emotions (affective) and people's preferences (evaluative) (Van der Heijden, 2002). Previous studies (Rogge *et al.*, 2007) have pointed out the differences between perceptions of landscapes, in which it is concluded that this may be related to how different groups of people perceive the administration of land, as well as the qualities of landscapes and possible side effects on them.

The criteria for landscape perception studies are mostly belonging or liking (Palmer, 2003). People judge and interpret their environments and respond to them in terms of affective responses, determined by social codes (Boado and Vázquez, 2000). This means that, to preserve natural and cultural landscapes, similar perspectives must be preserved in future generations, related to resource conservation (Cosgrove, 2002). Therefore, knowing the perception is a tool for determining the quality of the landscape, providing an analysis and a systematic classification for good management.

UNESCO (2006) named the agave landscape of Tequila, Jalisco as cultural heritage of humanity, a unique landscape in the world for its agaves and distilleries. This designation includes the crops of the plant, distilleries, factories and human settlements of that territory, with a cultural and emblematic value of the first level for the country. It is a living landscape, of work, of fields cultivated with agave, of historical territories, of urban settlements, where the beverage was and is produced (Gómez, 2014).

Currently, among the objectives proposed by the promoters of the landscape as heritage, those that mention an interest in conserving and even improving the conditions in which agave cultivation is carried out (Hernández López, 2013) stand out. The agave landscape (AL) has a strong cultural significance at the national level. Nevertheless, the production process of alcoholic beverages generates a large volume of residuals, so envisioning a use or exploitation is of great interest. This study aimed to identify the conception of the AL in two producing localities with different levels of landscape heritage management and different landscape characteristics since the force of human action on agave, as well as the perception of the residuals generated in the production of distilled beverages, is different and directly impacts the understanding of identity, acceptance and appropriation of the AL in both scenarios.

Materials and methods

Areas of study

In order to frame that each landscape is different and relevant to each locality, the study areas were managed with their own context in mind. For this reason, a comparative approach of two agave-producing regions of Mexico was selected.

Arandas, Jalisco

The municipality of Arandas is located in the center-east of the state of Jalisco, with north latitude: 20° 42' 18" and west longitude: 102° 20' 46", at an altitude of 2 000 masl. The average annual temperature is 19 °C and an average rainfall of 888.1 mm, with rainfall in the months of July, August and September (IIEG, 2016).

The agave landscape of Arandas (Figure 1A) has had a strong cultural tradition that has been transformed for several centuries and from it, one of the main icons of Mexico has been born: tequila. The old industrial facilities next to the AL make up the extension of plantations of the so-called blue agave, from the state of Jalisco. One of the main economic activities and source of income of this state is the tequila industry. Which depends on the supply and demand of the raw material for the production of tequila, the *Agave tequilana* Weber.

Figure 1. A) agave landscape in Arandas, Jalisco; and B) agave landscape in Tlaquiltenango, Morelos.



Since the nineties (during the agave boom), a large number of migrants arrived in the city of Arandas in search of employment opportunities, mainly in the field, either planting, maintaining the agave plantations or in the cut of the plant for its subsequent transfer to the factories (Hernández *et al.*, 2000). In the surroundings of Arandas, between cornfields and infinite agave fields, one can discover some of the haciendas that are an essential historical part of the region. In Arandas there are more than twenty manufacturing companies affiliated with the National Chamber of the Tequila Industry (CNIT, for its acronym in Spanish), which have products related to the agave plant and contribute to the development of the local economy (CNIT, 2019).

Tlaquiltenango, Morelos

The municipality of Tlaquiltenango is located in the southern region of the state of Morelos, with 18° 37' 44" north latitude and 90° 09' 37" west longitude, at an altitude of 911 masl. It is part of the intermunicipal conurbation area of Jojutla. The predominant climate in the municipality is warm subhumid (INAFED, 2007). Historically, the agave landscape of Tlaquiltenango, Morelos

(Figure 1B) in the southwest and southeast regions, has produced mezcal with landrace agave, mainly in Miacatlán, Tlaquiltenango and Puente de Ixtla.

Therefore, there is experience and knowledge in the agave landscape both in production and transformation of this plant, with abundant forest resources of native agave, which is not fully exploited (Granados, 1993). Agave producers in the state of Morelos seek to expand and diversify their market based on the species *Agave angustifolia* Haw., since, due to the lack of the denomination of origin, there is a barrier to the commercialization of their product. Currently, they are promoting the diversification of the market to obtain other products such as fructans and syrup of agave.

Distillate producers are represented by 28 organized groups, of which only nine are formally constituted (direct information from producers, Morelos, 2017). The demand for this production initially meets the local and regional demand of consumers, who prefer the taste of the liquor from agave in an artisanal way (García de Alva, 2020).

Implementation of the instrument

The instrument was applied to one hundred people, divided into two key groups according to the role they play in the production process and that we consider key because of their link with the agave landscape. The first group consisted of local workers (LWs) made up of producers, workers and residents. While the second group by owners and decision makers (DMs) (Table 1).

Table 1. Distribution of the sample.

Key actors	No. of interviewees	(%)	Sex	Age (range average)
Local workers in Jalisco (LWJ)	50	70.5	Female:15 Male:35	18-62 (40)
Local workers in Tlaquiltenango (LWT)	30	14.0	Female:1 Male:9	20-58 (39)
Decision makers in Jalisco (DMJ)	12	11.3	Female:3 Male:5	35-57 (46)
Decision makers in Tlaquiltenango (DMT)	8	4.2	Female:1 Male:2	45-63 (54)

The values are significantly different at $p < .05$ on the test of bilateral equality of column proportions. The tests assume equal variances.

To approach the perception of AL in Arandas, Jalisco, a survey was applied (García de Alva, 2020) to workers of a medium-sized tequila-producing company, made up of 72 people. Of these, 69% were interviewed in the category of local workers in Jalisco (LWJ), in addition to 12 owners-decision makers of Jalisco (DMJ). The sample size was determined by indicating a confidence level of 95%. For the locality of Tlaquiltenango, Morelos, the survey (Table 1) was applied to 100% of the workers of a small distillate-producing company in this municipality. Made up of 30 workers belonging to the activity of the field, in the category of LWs, in addition to 8 DMs. The sample size was determined by indicating a confidence level of 95%.

For the purposes of this study, it was considered that both landscapes are linked to the agave plant in multiple spatial and temporal stages and that perception depends on the individual and specific interpretation of locality members. In the visit to each of the localities, the actors randomly selected from among the workers (snowball) were gathered. Taking into consideration

varied sociodemographic characteristics to ensure that there is diversity of ages, genders, geographical backgrounds, educational levels and occupations. After making a brief introduction of the objectives of this study, the application of the instrument was carried out.

Initially, respondents were asked to mention with their words what they understood by landscape and heritage (part A), under the hypothesis that different people can assimilate the same term in different ways, therefore, there is no right or wrong answer. Actors were then required to think of landscape as the CEP's definition of landscape, that is, as 'an area, in any form perceived by an observer' and were asked if they could mention whether the agave provided distinctive features to the territory in natural and cultural matter, providing a peculiar condition to their locality (part B). Perceiving with it any existence of link with the AL/individual.

It was found that the actors mentioned a perception of the agave plant as part of their natural and cultural heritage, they were asked to specify if residuals were produced from the production process, if the residual plant is used and if problems are generated from the production process, as well as if there were forms of use, if they perceived changes in soil, air, water or even social changes (part C).

During the discourse analysis of the different surveys, the categories were not predetermined, so the coding of qualitative data was done inductively. They were defined based on the results of the survey. During the fieldwork, a framework was developed to organize and describe what the instruments yielded by classifying and interpreting the qualitative data. Descriptive analysis established the bases for understanding and ordering meanings from qualitative data into quantitative data. At the end, comparisons were made to know the relative importance of the data to obtain conclusions generated.

Results and discussion

Part A: perception of the concept of landscape and heritage

It consisted of the description of how people conceive landscape and heritage. These terms evoke different representations and definitions among the individuals surveyed. With the analysis of the coding of the responses of the instrument, similar concepts among the mentioned answers were typified. It was possible to identify 4 key themes: a) the landscape comprises rural, urban and natural areas; b) landscape related to the visual and aesthetic qualities, with references to views, landscapes, panoramas, with adjectives related to beauty, harmony; c) landscape related to the physical composition of the earth, including geology and geomorphology; and d) people-related landscape, including customs, traditions and ways of life. References were also made to culture in relation to history, functions and characteristics of production, and affective aspects, conceptualizing landscape as a holistic concept.

Some respondents referred to more than one theme within a response, so there were elements of overlap between the concepts mentioned in different categories. Therefore, they are not mutually exclusive. In this part of the instrument, a differentiation is made by localities, trying to point out the differences in the perception of the concept of AL as a whole. Seventy-two point two five percent identified themselves when thinking about AL with the terms of: field, land, flora and fauna (category 1). On the other hand, 67.5% associate AL predominantly with the tangible and observable (category 2).

Repeatedly, the actors described their discourse with adjectives such as beautiful, lovely, harmonious or pretty 'without that landscape, which they call the 'blue gold', we would not have resources, from there we live and eat'. This perception allows us to glimpse their possible level of appropriation, in accordance with the fact that 'the higher the aesthetic visual quality, the better the approval' (Kalivoda *et al.*, 2014). Aesthetic visual quality helps protect a locality's cultural heritage (Jessel, 2006). Finding DMJ as the actors that least reflect a cultural and identity link

with the AL with 58%. Seventy-eight point seven five percent of respondents associated the landscape with the physical composition of the land (category 3), referring mainly to geological and geomorphological features.

Sixty-seven point five percent integrate in their landscape description elements related to the locality, including customs, traditions and ways of life through the years in relation to history; that is, the landscape as a holistic concept (category 4). No significant differences were observed between men and women or between the two localities studied. However, significant differences were found for both category 2 (beauty) and category 4 (affective and cultural aspects) based on the age of the respondent. This allows us to assert that, a greater degree of attachment and affection towards their natural and cultural heritage implies an older age, in addition to the fact that there is a greater interest in its conservation.

Part B: natural and cultural heritage. Perception as landscape

This section identified the way in which the actors perceive the agave plant as part of their landscape, either as natural or cultural heritage. The most common responses were references to features, such as countryside, natural habitats of flora and fauna (category 1), geomorphological features (mountains, hills, valleys and cliffs) (category 2). Historical and cultural elements that develop within landscape (category 3), especially emblematic, natural and cultural sites, which also tend to be tourist destinations. In addition to answers regarding intangible elements that they link to the AL (category 4).

Ninety-nine percent of respondents agreed that the distinctive character of the landscape in both localities are the agaves. Ninety-one point five percent consider it a positive feature. Using adjectives of beauty judgments and aesthetic qualities related to the landscape images presented, accompanied by personal stories within the landscape. In terms of elements that contribute to shaping the landscape, respondents provided a wide range of responses that, once codified analytically, resulted in six central themes: a) rural characteristics; b) physical/geomorphological characteristics; c) cultural characteristics; d) intangible aspects; and e) visual aesthetic qualities.

Fifty-four percent of respondents link AL only to rural characteristics, especially LWs, who are in contact with that physical landscape (category 1). Forty-six point five percent mentioned geographical aspects of the AL (category 2). Fifty-nine percent, to cultural elements when referring to this landscape (category 3). Fifty-five point two five percent considered that the character of the landscape is related to intangible characteristics (category 4); through the main festivities, identifying sounds and smells, in the case of Arandas, Jalisco. Practically, most of the actors (91.5%) link visual aesthetic qualities to AL (category 5).

An individual's culture is not defined by their ethnic origin but by the behavioral outcomes of shared beliefs and concepts, values, and even rules (Samovar *et al.* , 2010). It was identified how the locality perceives the human force and action in the change of the AL. There were elements of consensus in the results, and they were grouped into five themes: a) urbanization; b) field; c) pollution and residues; d) culture; and e) tourism. Seventy percent of the interviewees considered that the landscape shows a predisposition to long-term changes. However, 18% disagree and mentioned that the changes have been short-term and recent. Twelve percent did not feel confident to give an answer.

The interviewees perceived that there is a constant change (90%), the change is mostly negative, in terms of the quality of the plantations. Urbanization (category 1) was the main identified aspect of landscape change, cited by 54% of respondents, using adjectives of disapproval in aesthetic issues for these modifications. With reference to changes in the countryside (category 2), the majority of respondents, 89%, mentioned developments that they perceived as negative in nature, such as the loss of natural areas, the abandonment of agricultural land and the loss of fauna 'there, they were farmland before'.

In the case of Tlaquiltenango, there is an emphasis on perceived positive changes, such as the adoption of agave farmland in the state and municipality. These phenomena mentioned are perceived in association with an increase of 63% of residuals produced in the transformation processes, having garbage and residuals as the most common reference. 'As there is more production, they generate more garbage' (category 3). Sixty-six point seven five percent mention some changes in the culture of their locality (category 4), highlighting a less local pride, in the case of Arandas, having preference for goods and services that are not national. Other aspects were identified, such as tourism-related landscape changes (81.5%), which include lifestyle modifications between locals and tourists (category 5).

A variety of variables were found. The repetitive topics were very evident. Suggesting that, while perception is related to personal factors, there is also a strong contribution from aspects of place or common cultural backgrounds (Taylor *et al.*, 2014). The actors of Tlaquiltenango, Morelos report that, in Arandas, Jalisco, 'there is not as good a climate as here' and that their municipality 'is less developed and is less visited'. This implies that character is defined not only on the basis of what the landscape is, but also on the basis of comparison with other landscapes (Conrad *et al.*, 2011). The changes in the agricultural landscape of Tlaquiltenango allowed distinguishing the gradual appropriation of the AL.

All the producers and key actors of Tlaquiltenango consider the introduction of agave plantations to their locality an important change for them and their environment, they mention that their 'lands were wasted, we did not get anything from them'. 'I was about to migrate in search of some opportunity', 'the plants have adapted to the climate here perfectly, they even grow in half the time than in Jalisco'. By better understanding how farmers see themselves and how they carry out agriculture, it is possible that empowerment projects, the creation of new tools, markets and incentives allow the maximization of the production of the locality, minimizing erosion, water pollution and biodiversity loss (McGuire, 2015).

It was also mentioned that 'it was an opportunity to transform income for the family', 'I do not know what I would be doing now, if it were not for this plant', statements in which principles of a progressive appropriation of the agave plant can be seen. This frames the importance of farmers having a position of interest and responsibility to use their heritage in such a way that they maximize crop production and minimize the negative impact on it (FAO, 2010). Nevertheless, intangible aspects are important to safeguard its essence and it would have to be more than simply protecting physical sites, addressing more than just the visual (Conrad *et al.*, 2011). That is why it is of the utmost importance that the locality members link intangible elements to their perception of AL. With the participation of the locality in the analysis, in the force and pressure that transforms the landscapes being necessary (Eiter, 2015).

Part C: Perception of Agavaceae plants as residuals

The perception of how they visualize the residuals generated in the productive processes of obtaining alcoholic beverages was questioned, broken down into different items: a) in favor of change, to exploit the residuals; b) increase awareness and education on the generation and use of residuals; c) improve the management of land use and exploitation; d) reversion of perceived negative changes through land-use change, rehabilitation, restoration and exploitation; e) innovation to conserve/improve, from the perspective of landscape of the locality of both regions, residual management and improvement of tourism in the area and finally; and f) how is the exploitation of agave and how they would like their landscape to be in a few years.

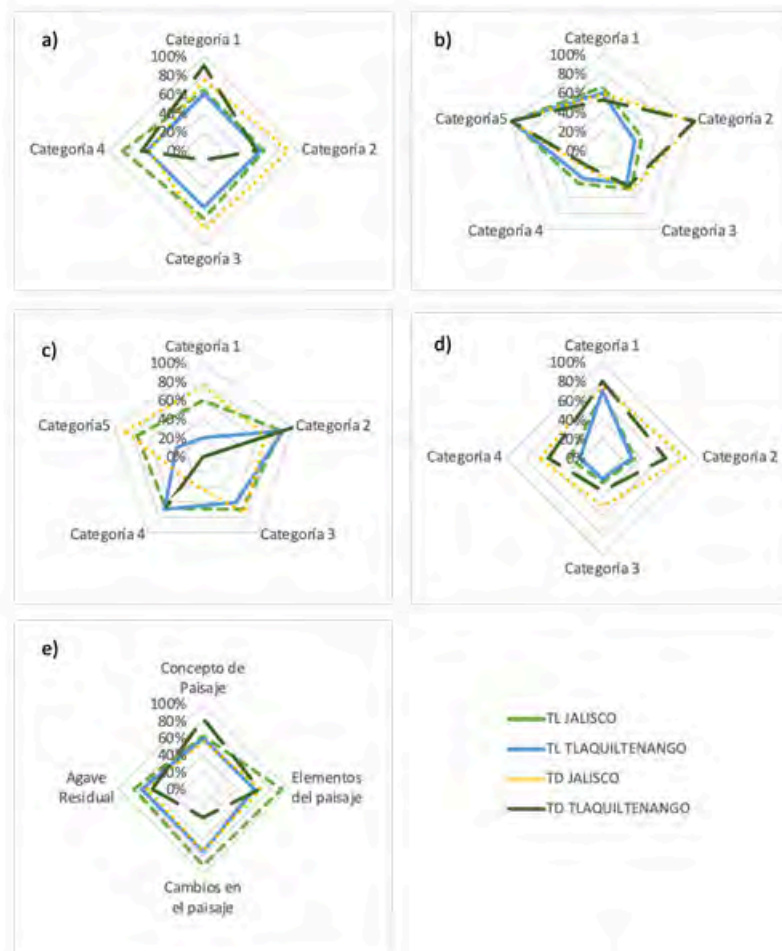
According to these aspects evaluated, about 54% expressed their position in favor of any significant change that has a positive impact on the AL. This is explained by a positive perception of the current situation, and by a negative perception that their territory as a landscape could experience possible changes (Taylor *et al.*, 2014). In addition, several respondents, in Tlaquiltenango, Morelos, mentioned ideas of positive changes of the AL in the future. Some

included proposals to mitigate soil degradation, such as: elimination of agrochemicals, soil rehabilitation and restoration. These recommendations focus on improving errors of crops close to and prior to those of agave.

The activity carried out with respect to agave conditions the perception. In both localities, LWs have a perception of the concept of landscape more integral (CIL) in relation to decision makers.

The results indicate (Figure 2) that the locality cannot perceive the landscape in the same way as specified in the CEP definition, since, in both localities, the landscape is considered as one thing (with no apparent links), concentrating only on the physical landscape. The perception of the physical landscape influences the perception of the landscape (Zubelzu *et al.*, 2014). Recognizing the need to understand the landscape as ‘an essential component of the environment of people, in which there is culture, a natural heritage and identity’ (article 5, Council of Europe, 2006).

Figure 2. Graphs of perception by categories. a) landscape concept; b) landscape elements and features; c) identified changes in the landscape; d) Agavaceae plants as residuals; and e) CPI= integral landscape concept, ECP= landscape elements, CAMB= landscape changes, AR= residual agave.



The sensitization of a locality as conscience becomes a matter of concentrating expert points of view to convey the relevance of the landscape (Olwig, 2007). Therefore, having a better communication between decision makers and locality members, since involving the locality will

not only depend on providing solutions that research such as this can contribute, but on the motivation, will and effective participation of the locality. Knowledge of the perception and interest of the locality indicates a degree of consensus of the majority of its members for decision-making (economic, social and cultural actors).

Knowing that, in the appreciation of value and relevance of the AL, there is a potential to research and produce goods and services with a locality with a common social interest. In addition, locality perceptions must be balanced with other parties (Prieur, 2006), for example, with decision makers.

Making local knowledge and strategies for heritage conservation available to authorities and key actors at the locality level. The participation of local actors, decision makers, representatives, economic actors, specialists, etc. will be encouraged, potential innovations would be recognized and adopted, offering ideas. With this, it must be guaranteed that all actors are informed, motivated and part of what leads to the conservation of their AL heritage. There is evidence that the perception of an AL can be used to react to an empowerment strategy at the landscape level (McGuire, 2015). And with this, generate agreements on techniques and processes suitable for the use of the residuals generated in these two localities.

Conclusions

Both Arandas, Jalisco and Tlaquiltenango, Morelos, have, as a common denominator, the production of distillates, either tequila or mezcal, from the agave plant, being one of the main sources of income for both localities. The actors, in both localities, have similar characteristics such as: ages, schooling and ways of life. However, they have differences in terms of climate, orography, modes of production and location, with respect to the other locality. An older age conditions a higher degree of attachment to the natural and cultural heritage of the AL. The perception of the different actors depends on the activity carried out in relation to agave.

The actors who are in direct contact and handle the agave plant had a greater identity with the natural heritage. Contrary to the actors who only handle it as a finished product (distilled or tequila), since they mention a greater perception as cultural heritage.

In both localities, the concept of more integral landscape was that of local workers, even versus the concept of decision-makers. The answers that mention positive adjectives (both beauty and attachment) indicate a better level of appropriation of the AL, which entails an interest in protecting their cultural and natural heritage in both localities. Therefore, it is feasible to work with proposals for the reconfigurations of residuals as alternatives for obtaining a new product, from the production process of alcoholic beverages, in these two localities.

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Journal Information
Journal ID (publisher-id): remexca
Title: Revista mexicana de ciencias agrícolas
Abbreviated Title: Rev. Mex. Cienc. Agríc
ISSN (print): 2007-0934
Publisher: Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias

Article/Issue Information
Date received: 01 April 2023
Date accepted: 01 July 2023
Publication date: 19 July 2023
Publication date: July 2023
Volume: 14
Issue: 5
Pages: 001-013
DOI: 10.29312/remexca.v14i5.2928

Categories

Subject: Articles

Keywords:

Keywords:

agave
conservation
heritage
landscape

Counts

Figures: 2
Tables: 1
Equations: 0
References: 29
Pages: 13